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FIRST LESSONS

IN

BEE CULTURE,

OR

BEE-KEEPER'S GUIDE,

BEING A COMPLETE INDEX AND REFERENCE BOOK ON ALL
PRACTICAL SUBJECTS CONNECTED WITH BEE
CULTURE. IN BOTH COMMON AND
MOVABLE-COMB HIVES;

ALSO

A SUMMARY FOR THE YEAR,

BEING A COMPLETE

ANALYSIS OF THE WHOLE SUBJECT.

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By N. C. MITCHELL.

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PREFACE.

This volume is designed as a directory to aid and explain the improvements that are going on in bee culture. "It is time," says Mr. Quinby, "that the work *luck*, applied to bee keeping, was discarded." The prevailing opinion that bees will prosper for one person more than another, under the same circumstances, is fallacious—as well might it be applied to the farmer or mechanic. But be it remembered that the successful cultivation of the honey bee depends upon a correct knowledge of the laws of insect nature, for in proceeding with the bee culture we have to deal with two insect tribes, *namely*: the *honey bee* and the *moth miller*. These two insects, though alike in nature and tastes, yet in procuring their food are dissimilar. The industrious bee goes forth, at the rising sun, to gather its food from each opening flower, but the slothful miller waits until the shades of evening approach, then seeks to obtain his supplies by stealth. Then, I say, in order to be successful in this enterprise, we must become acquainted with their wants and habits. Now, in order to convey the most valuable knowledge as to their instinct natures, I have drawn from every available source at command. I am not ambitious to claim this work as *purely original*, yet I have endeavored to discard worthless theories and accept such facts as have been demonstrated by practical and experienced bee keepers, and in drawing from other authors I have endeavored to skim and only take the cream.

I remain, yours, etc.,

INDIANAPOLIS, IND.

N. C. MITCHELL.

ACKNOWLEDGMENTS.

In preparing this work I have not confined it altogether to my own views, but have drawn from the following works and authors: "*Langstroth on the Honey Bee*;" "*Mysteries of Bee Keeping*, by M. Quinby; "*Bee Keepers' Text Book*," by N. H. & H. A. King; "*Nature's Bee Book*," by M. A. Flanders; "*Kidder's Guide to Apiarian Science*," by K. P. Kidder; "*The American Bee Journal*," by Samuel Wagner.

LESSON A.

Well, my children, you have accompanied me to the apiary this bright and beautiful morning, to learn something of the honey bee. Willie, my boy, have you ever thought of the untiring industry of the honey bee, constantly gathering the choicest sweets of nature? Look at that colony, my boy. See them hastening out. Not a single moment is lost. Every effort is put forth to gather all the honey secreted in the flowers before it is evaporated by the noonday sun.

Here, my children, you may learn a lesson from the little busy bee. See, my boy, they stop for nothing, even during the after part of the day, when there is no honey in the flowers, they are still to be seen gathering pollen and water, which are just as essential to the welfare of the bees as the honey. In another lesson we will give you the reason, and tell you what the bees do with both. Willie, you remember, the other day you asked me if there were bees in America when Columbus discovered it? There were none, my son, although the valleys, the mountains, and the beautiful prairies were covered with nature's choicest flowers; and yet, not a single bee was there, in those primitive days, to sip the sweet nectar from a single flower.

It seems, my children, that God in his great goodness created the bee for a wise and good purpose—to accompany man through life; for, wherever civilized man has gone, the little bees have ever been his companion. You

ask, my children, if bees were not originally in America, and would really like to know where they did originate. I would say to you, that bees have lived since the earliest dawn of creation; and, whilst the innumerable creatures and insects created by God have passed away, bees have lived through all the many changes and in almost every clime, and will doubtless continue to live to the end of time.

It is thought they were transported to Pennsylvania from Germany about the year 1627. We also have accounts of bees being brought from England about the year 1685, and from that time, they have been following man up, wherever his destiny may have carried him. And, as fast as the line of civilization has advanced westward, the little bee is found following in its wake, taking possession of every available tree and flower, at the same time allowing man to take possession of them, by putting them in log hives, which they accepted without a single murmur. And, from that day to the present, they have not deviated in the least from their one grand principle, *industry*—their habits ever the same—working from early dawn till dewy eve, always laboring—laying up stores for their own and man's good.

We might go on and say there were no bees in California until after gold was discovered there in 1849. Soon after, they were taken there from Pennsylvania by the Harbisons, and now all that vast country is inhabited by the little bee. From California they were carried to Utah by wagons. And the day is not far distant when they will have been introduced into every territory in the United States.

Having told you, my children, from whence came the honey bee, we will now tell you something of the bees. Come near the hive, my boy. Now, do you see those little fellows? they are the ones who gather all the honey, all of the polen, all of the water; they, too, take care of the young bees, feed and nurse the young from the time they are first hatched out from the egg.

Come nearer the comb, my children,—look down in the bottom of the cells. Do you see those wormlike looking little objects—so very small they are scarcely perceptible to the naked eye? Well, they, my children, have just hatched out. Do you see how careful the bees are of them? Minnie, do you see the bees crawling into the cells headforemost? Well, the bees are feeding them, and will continue to do so until they have sealed them over, after which they will need no more attention. All they now require is heat enough to keep them from chilling, and in twenty or twenty-one days from the time the eggs were laid, the young bees will crawl from the cell a fully developed bee.

Bees seem to have their distinct duties to perform. After leaving the cell, for the first eighteen or twenty days they spend their time generally in the hive nursing brood, helping to build and repair comb, and, occasionally, on beautiful afternoons, they may be seen to leave the hive for a few minutes, to play. Minnie, my dear, do you remember a few days ago, of your running to me with the startling information “the bees were swarming!” I told you, no, I thought not, and said “they were only playing, like my little children do occasionally.”

I will now tell you how you may always know whether the bees are swarming or playing. When they leave the hive to swarm, they rush out pell-mell, like children engaged in certain games—first one out, the best fellow! When they leave to play, they fly out, turn their heads toward the hive, and play about until they get tired, then return to the hive, and go to work again in real earnest. The balance of their life is spent in out-door labor, gathering honey and polen, and everything that is necessary to keep the colony in a good condition. Their, out-door labor lasts only forty or fifty days, when it may be said of them that they have gone the way of all earth.

“Oh, Pa! do you mean to say that they all die so soon?”

Yes, my children. The average life of the honey bee is but seventy days, during the summer or working season. In winter they may live until spring, but as soon as the old bees leave the hive, but few of them ever return, and in a very few days the old bees are all dead, and their place is taken by bees that were hatched out in February and March.

But, my children, there is another bee which inhabits the hive, which I have not yet told you about, and that is called the queen bee. She rarely ever leaves the hive. She is by some styled the mother bee. It is she who lays all the eggs from which the young bees are hatched. She appears to have no other duties to perform than that of laying eggs; and that keeps her very busy, for during the season when the bees are gathering honey rapidly, the queen lays from two to three thousand eggs every twenty-four hours. But as I expect to speak to you again about the queen bee, we will pass her by for the present, and notice for a moment the big, lazy and noisy bee called the drone.

Willie, do you remember, when you and Minnie were somewhat younger, how you *would* run away from the hive? and one day, when the drones were out flying, you said that you were afraid the big bees would sting you. They, my boy, are like many men and women in the world, who make a big noise, but never sting.

I will tell you a little incident which took place in our apiary. There came a man one day to visit us, and as we were taking him around among the bees, from hive to hive, and while we were sitting in front looking at the bees, there came along a drone. Pretty soon he commenced buzzing around my friend, when he looked up and asked, "What is that?" We soon informed him that it was merely a drone. He sprang to his feet, and you should have seen him run! It reminded us of the good Book, where it says, "The wicked flee when no man pursueth." We called to our friend to know what was the matter. Nothing, he replied, only he did not want to

be stung by that big bee! He said the little fellows hurt bad enough, and he was sure that if stung by one of the big bees, it would kill him!

We endeavored to assure him of there being no cause whatever to fear the noisy bee, as that noisy fellow had *no stinger*. We introduce this to show how little is known of the bee by the masses.

Now, my children, if you will be attentive, and treasure up what I have to say, by the time you get through with your lessons on bee culture, you can handle bees as well as I can. As we pass through each lesson, it will be necessary for you to pay particular attention, and get the true meaning of every word. New beginners are apt to read a work very rapidly, and at the same time think, "Oh, well, I understand enough of that?" and they will say, "I can do it just as well as the writer can." There, my boy, is the sticking point with many bee keepers. They know too much, or think they do—which is much worse than if they thought they did not understand it.

LESSON B.

EXPERIENCE IN BEE KEEPING.

Good morning, my children! According to promise, we will add another lesson in bee culture this morning; hence we will adjourn to the school-room for these lessons, which is styled the apiary, and look in upon the bees to see how they are progressing. Finely, we see, and busy as usual.

But before going any farther with our lesson, I want to tell you something of how bees were kept when I was a boy. My earliest recollections are associated with the keeping of bees, and when a very small child, I might

have been seen toddling around after my father, watching every motion and attention when among the bees, and well do I remember the first bee that ever sought me for his victim. Well, it struck me just above the eye! I let all hold go, and flat I went to the ground. Your grandfather picked me up and carried me to the house. After great suffering and various prescriptions, my eye closed—but not forever, as you see.

That, my children, was forty years ago. In those days all bees were kept in hives made from hollow trees. Such hives as we have in this age, were not thought of in America at that time. Since then there have been many, many changes. Many have thrown away their old hives, and are now using movable-comb hives of some kind. At the same time, there are many old fogies who use the old round gum hive and common box hive.

Do you remember, when we were visiting at Mr. Brooks', of seeing hives scattered all over his farm, and wherever the bees clustered, there they were hived and left to stand among the weeds, under the trees, and where the chickens roosted. They were, in fact, in every nook and corner, except where they should have been.

You also doubtless remember his reply, when we asked him how his bees were doing, "Kind o' so, so!" Yes, that was it—exactly what we want is the definition of the words, "Kind o' so, so!" We said, "Mr. Brooks, we are now looking for items for our paper; tell us how many swarms you get annually from your forty colonies of bees."

"Well, sir, as near as we can calculate, about twenty, and one-half of them flew away, leaving me ten swarms; but, then, let me get ever so many swarms, enough die off every winter to leave me about the same number I had in the spring. So I hold about my own in number of colonies."

"Well, Mr. Brooks, will you be good enough to tell me how much surplus honey you take from them annually?"

"Well, let me see—well, about—well, I don't really

know. There is one thing, they used to do better than they are now—much better. John took out of three hives which the bees had all died in—at any rate, there were no bees in either hive—about sixty pounds of pure honey from each hive. I never could tell what went with the bees.”

“Well, did you get any honey from the other hives?”

“None at all; I did not have time, really, to look after them. I would like to know what became of those bees.”

“Mr. Brooks, do you take a bee journal?”

“No, sir; I have not the time to read one if I did; and still I do believe that I know more about bees than any man in the country. I have kept bees for forty-five years. I want none of your bee journals, or bee books, or those confounded patent hives that Adams has over the river. No sir—none for me! Not one of those fellows can catch me trying their hives. The old way is the best. Adams, over the river, says they get about one hundred pounds of good box-honey from each hive. They have what is called a movable-comb hive. I saw Mr. Adams in town the other day, and he had six hundred pounds of nice box honey, which he sold at forty cents a pound.”

“But,” said we, “Mr. Adams has taken two thousand pounds of box-honey from twenty colonies of bees, and sold it all at forty cents per pound—in all, bringing him eight hundred dollars in clear cash. He used a movable-comb hive, and takes all the bee journals, and reads all the books written upon bee culture that he can get his hands upon. What do you think of that, Mr. Brooks?”

“I will tell you what it is—I don’t believe one word of it. Let me see—why, that is more money than I ever made on bees in all my life. It’s more than I have made from my farm of two hundred acres in the last ten years. No, sir, you will have to go somewhere else to tell your big yarns.”

My children, my reason for introducing Messrs. Brooks and Adams to you, is that you will find a great many Brookes in the country—yes, one thousand to where there

is one Adams. And now let me impress one great, important fact upon your minds, and that is this: The care of the bees is that which makes the money for the bee keeper, and if you will do as I tell you, you can do even better than Mr. Adams did.

We say there are a great many men who keep bees as Mr. Brooks did. Yes, they live in every village, in every hamlet, in every neighborhood, in every township, in every county—indeed, everywhere. Their name is legion. They see honey in the markets selling at a good price, but it is not their own. They see the honey on the Adams table, but not a bit on their own. Adams sells honey and bees both enough to buy a good farm every year, while the Brookses live from hand to mouth.

Now, my children, perhaps you think Adams' bees were better workers than Brooks'. No, indeed; the bees are alike—but the difference is in the hives. The Brookses keep their bees in nail kegs, tobacco boxes, in barrels, round gum hives, old boxes of all kinds, shapes and sizes, and take no care of them from one year's end to another. They do nothing for the bees, and the bees do nothing for them; so the account is always square.

But not so with the Adamses. They look after their bees, keep them in nice movable-comb hives, where they can get at their bees, and where they can get the surplus honey out as fast as capped over.

My children, let me impress it upon your minds—so that you will never forget it—to insure success in bee keeping, you must *take care of your bees*. You must have them in a hive where you can see every comb at any time, and all times. Bees require the same attention that your cows do. How much butter would the farmer's wife get if she did not milk her cows regularly? Little or none at all. Just so with the bees. They soon fill their hives, and if they have a hive that the bee keeper can not get into, then, indeed, he may justly claim that he gets but little return from his bees. I am rejoiced to see prejudice and stubbornness giving way to light and rea-

son. To-day many are throwing away their old hives and getting their bees in movable-comb hives.

That, my children, is the first step in bee-culture in the right direction. The next step is to get all the information you can; take all the bee journals and papers published in the United States; get the practice of our best bee keepers; *follow them to the letter*; never try experiments; if you do feel so inclined at any time, experiment upon but one hive at a time—by so doing, your bees will last longer than if you tried the same upon all at once. Always bear in mind that some other person has tried the same thing and failed, long before you thought of it.

Then let me entreat all new beginners to follow only the road marked out by our ablest apiarians. After you have learned to handle bees, and understand their habits, etc., then it is time enough to try experiments. Then you will have learned enough not to kill your bees.

LESSON C.

HOW TO TRANSFER BEES FROM THE COMMON HIVE.

Come, Willie and Minnie, let's away to the apiary this bright, beautiful morning, so charming for the transferring of bees from the old hives. See what Mr. Jones has purchased and brought home yesterday. Just look at them! Did you ever see such looking hives? And yet, when we come to lift them, they are in good condition, providing the comb is not too old and heavy. No matter, they have plenty of bees, and we will soon have them in our nice, clean, new hives.

Now, Willie, you get the table out under the shade of the trees. Minnie, bring out the woollen cloths to spread upon the table, to lay the comb upon, to keep from kill-

ing the young brood in the comb. Willie, get the knife ready; lay it upon the table. Now, my children, we are ready to go to the hive.

Light that roll of cotton rags which you prepared yesterday—that will do. Blow in a little smoke. Hear them sing. Minnie, you ask why we blow the smoke. It is for this reason, my little girl: As soon as the first breeze of smoke reaches the bees, they think they are to lose their honey; they at once run up to their stores and fill their sacks full, after which they are as harmless as *butterflies*, and will not sting unless you squeeze them.

My children, there are other ways to make the bees fill themselves. Stop up the hive, so the bees can not get out, and then drum on the hive for a few minutes, until the bees fill themselves. Then you can do anything with them, without the least danger of getting stung. But we prefer the rags, or dry, rotten wood smoke, to anything that we ever tried.

Now, all is ready; turn the hive upside down; set that box upon the bottom of the hive, to let the bees run up into; that will do. Never mind the holes; the bees will run in the box if the hole was big enough for you to get your hand into the hive. Now, my boy, rap the hive with the hammer about five or ten minutes, until all the bees have passed up into the box. Come, Minnie, see how fast they run up! That will do; bring the hive to this box near the table. Willie, you will now set the box containing the bees, where the old hive stood; that will allow the bees returning from the fields to enter it, where they will remain until the comb is transferred to the new hive.

Now, Willie, take the chisel, and pry off one side of the hive, so as to get out the comb without breaking. Willie, do you observe that the hive is not in a proper position to preserve the comb from breaking; had I not noticed in time, most of the comb would have been broken. Always lay the hive down so that the edge of the comb stands upright; then there is no danger. That is the way,

my son, and remember well what I have told you about it, then you will have no trouble. That is right; you have succeeded in getting the side off all right—just as good as I could have done it. Now what is next to be done?

There are three sides and one end that the comb is fastened to. Take that long, thin-bladed knife, and cut the comb off the top side of the hive, close up to the board. Now pry it off; that is right. Now cut the first comb loose from the bottom and the end of the hive, and lay it on the woollen rags that Minnie spread upon the table; that is well done. Now be careful, or you will kill the young brood.

Now, my boy, lay the frame upon the comb, and cut it so that it will stand right side up, as it did in the hive. Cut close up to the frame, so the comb will fill up the frame, and lay on little slats across each end, and tack both ends with the smallest size tacks you can get. Now turn it over and tack the other side. Now set it in the new hive. Cut out another comb; be careful to save all the small comb, you will often find a place to put it; that is right, you have done well, but there are a few pieces which might be placed in the frames and fastened, and given the bees; they would be glad of it, and would soon fix it up all right. Now let me see if you can do it; that is right so far.

What is that you are doing? This comb will fit in sideways so nicely! No matter, my son, the comb must be set in as it stood in the hive, and were you to set it in that way, the bees would cut it all out, so you would have the trouble for nothing, and at the same time give the bees a great deal of trouble to remove it.

My children, let me ask you to remember that there is only one successful way of doing anything, and that is doing it right, and if not done right, it had better not have been done at all. The old adage is a good one, and one always worth remembering, "That which is worth doing at all, is worth doing well."

You have the combs, I see, in the new hive; so far, so

good. Now carry it to where the old hive stood, set it upon the same spot; now lay a board or sheet down in front, shake the bees down in front of the hive; that will do. See how they run into their new home! In two or three days open the hive and cut out the slats that were nailed across the frames to keep the combs to their place. The bees have now fastened the comb; there is no danger of it falling out.

Willie, I see you have transferred that colony just as good as I could have done it, and in all you made but one mistake, and that was in fitting in the comb so that it would stand sideways. That you will never do again. But there is one thing I particularly wish you to understand. It is this: Should you open an old hive, and find some of the comb old and thick, filled up with old bee-bread, or cut up with the moths, better discard all such comb. They are worthless, unless it is for rendering into wax. You can not be too careful when transferring old comb, as very much of it will be found worthless, and if put into the frames, would be only that much dead weight. Better reject it at once, and let the bees build new comb.



LESSON D.

INCREASE OF STOCK.

Come, my children, let us now adjourn to the apiary for a few hours, to continue our lessons in bee keeping. I want now, to tell you how to increase or multiply your colonies so as to make from one, as many as you may want; but before we take up that part of the subject, let me say to you that this part of the subject is fraught with great danger to the new beginner, and here is the very rock upon which their brightest anticipations may ground or run ashore—for a single false step may be the

ruin of a colony of bees, and, if followed up, ruin to the apiary.

The new beginner should consider well this part of apiculture before attempting the increase of stocks artificially—better allow the bees to swarm naturally, until you thoroughly understand how and when to divide your bees. You ask, “can you tell us how to increase or divide a colony so that there is no danger of loss?” Certainly, my son. If the new beginner would follow my advice, he could divide as well as I could, and keep his bees always strong. But, Willie, my boy, man is a curious piece of mechanism—he is fond of trying experiments, like Adam and Eve in the Garden of Eden. They were happy, or they should have been, as they were monarchs of all they surveyed. They could eat of the fruit of every tree in the garden save *one*,—and the Lord commanded the man, saying, of every tree of the garden thou mayest freely eat, but of the Tree of Knowledge of Good and Evil, thou shalt not eat; for in the day that thou eatest thereof, thou shalt surely die. Genesis, 2nd Chapter and 16th and 17th verses.

That, my children, should have been a sufficient command to have kept Adam and Eve away from the fruit of the tree; but, on the contrary, it increased the curiosity and wish for that fruit, so when the tempter came in the guise of a serpent, they were ready for him. They did eat, and they likewise fell. And in their fall came misery and darkness into the world. Through their disobedience to the Great and Grand Giver of all good, have we, to-day, the roaring of the thunder and the flashing of the lightning, and the many ills that flesh is heir to. Had it not been for that fall in the Garden of Eden, all would be sunshine, brightness, and life. No death would come to chill our hearts and desolate our homes.

You will pardon our digression, my children, I merely allude to this, to prove to you that man has ever been an experimenting genius, and probably will so continue till the end of time. It has been said that the man who first

invented powder, lost his life by trying to ascertain the strength of it. It seems that he filled a keg with powder, then sat down on it with a leg on either side of the keg, then held a fire brand to it, and off it went, hurling him into Eternity.

This case, my children, is one that the inventor should not be blamed for, for this reason, they have no means of knowing the power of their invention until tried; but, with the bee keeper it is a different thing. They have had line upon line, upon the subject of bee culture. Then why, let me ask, shall you be caught trying everything that you can think of? Better follow the directions of those who have made bee keeping a grand success; and, when you thoroughly understand bee keeping as taught by them, it will be time enough to try experiments. Let me entreat of you, my children, to never try any other plan than the one laid down here, until you can do it just as successful as I do. Then, my children, if you see where you can make some improvement, do so.

You will now have learned enough to at least not kill your bees with experiments. And, as we have digressed so far from our subject, before we take it up again, I will call your attention to another rock that has wrecked many fond hopes. Many bright dreams of future success have faded out in darkness, leaving the experimenter a wiser, if not a better man. We allude to the many new beginners in bee culture, who attempt to get up a hive and present it to the public long before they learn the first principles of bee keeping. Many of them think all they have to do, is to get up a hive, and their fortune is made. It is an easy matter to get up a hive, but quite another to introduce it to the public. The inventor starts out in the fresh flush of hope. He calls to see Mr. Reed, a good and reliable bee keeper, that he has often heard of. He is perfectly sanguine, his hive will certainly fill the bill. He calls the attention of Mr. Reed to his great and wonderful improvement; indulges in an elaborate and glowing description of his hive, and

closes, by telling him that his hive will soon take the place of all others.

Mr. Reed asks our sanguine inventor, "How long have you kept bees?" "About one or two years," is the reply. "Well, Mr. Inventor, to be plain with you, I thought as much, when I first saw your hive; for no man who understands bee keeping, would be caught carrying such a thing around to sell to bee keepers. The ignorant may buy it, but assuredly, no man who knew the habits of bees would touch such a hive." And this is the reception he gets from bee men.

Let me ask of you one favor, my young friend in bee culture, and that is, never attempt to get up a new hive until you thoroughly understand bee culture, then it will be time enough to think of it. Then you will be better able to construct a hive that Mr. Reed will not object to. Remember that there is not one hive in fifty that the inventor ever makes one cent out of; and, were it not for this, we to-day, would have twenty bee keepers to where we now have but one. For this reason, whenever any one starts an apiary in a neighborhood, let him be an inventor or not, all eyes are upon him—everybody is watching him. Many are predicting that he will fail. He makes a grand display for a short time, but for want of experience, he fails, and all of his acquaintances say, they knew all the time he could not succeed.

Now, had the bee keeper understood the very first principles of bee culture, he would have succeeded, and all of his friends would keep bees to-day. This has been the history of thousands, all over the United States, and it will be so as long as men attempt to do what they know nothing about.

Now, Willie, having cautioned you against a few of the dangers which new beginners have to contend with, we will take up the subject, "The making of artificial swarms." Some writers will tell you to take a large colony of bees that are about ready to swarm, and divide them equal, leaving the queen in the hive that you are to

remove to another location; and they will tell you that the bees in the queenless colony will soon build a queen cell and rear a young queen. That they will do, my children, but any man who follows dividing in that way, can not increase his colonies to any great extent, and of those made up in that way, one-half or more fail.

We once made up colonies in that way, but gave it up for a plan that will never fail. And now, Willie, I will tell you how to make up a colony—one that will be as strong as the old ones; and, that you may understand how to do it, go to the shed and get a hive and bring it here, and we will make up a colony, then you will understand it. That will do—set the hive in the shade. Now, Willie, light the rotten wood and blow in a little smoke. Minnie, you open the new hive, take out all the frames, then the hive is ready to put the frames of honey and bees in. Willie, open your hive. Select that comb in the center of the hive; it has plenty of young brood, be careful. See that the queen is not on the comb, as you want always to leave the queen in the old hive. That will do, now set the comb in the new hive that Minnie has prepared for you. That is right; now put an empty frame in the hive where you got the bees from. That is good so far—close up the hive. Open the next hive and take out another frame, and continue to take one frame from hives enough to fill the new hive. Leave room for one empty frame, and set that in the middle of the hive. Now give them a queen bee, and your work is done.

In another lesson I will tell you how to raise queens and keep them constantly on hand. Let us now review, and see what we have done. Well, we have made one new colony by taking one full frame of bees from a number of hives, and have made the new hive as strong as any of the old ones. The hives all have but one empty frame, which they will soon fill with comb and young bees.

Now, if the weather is fair, and stocks are wanted, instead of surplus honey, you may continue dividing in the

same way every few days. In that way your stocks, both old and new, are always strong.

Pa, it seems to me that when the bees were taken from so many hives they would fight and kill each other! Almost any one would think as you do, my son, until they try it for themselves, and find to their utmost surprise that the bees will not fight, and very few bees will leave the new hive to return to the old hive. The reason for this, my children, is that they realize they have been transferred to new quarters, that all their surroundings are new, and when they leave their new home for the first time they mark their location, just as they do after natural swarming.

Here is another advantage in making colonies in this way. We find no trouble, or but little, in introducing a young, unfertile queen, if done at the time, or within one hour after making up the colony. Still, at the same time, perhaps it would be better for the new beginner to put the queen in a wire cage, and slip it in between the combs in the hive for a few hours, at least, as they will sometimes hug the young unfertile queen before they are aware of the loss of the old queen. The introduction of an unfertile queen bee among a colony of bees at certain times raises an excitement that is not easily quelled. At other times they may be introduced with impunity, the bees receiving her with marks of sincere courtesy and respect, and no questions asked.

We have never had any trouble introducing fertile queens to new colonies; neither have we, to our knowledge, lost a single queen; and it has always been our practice, when we had fertile queens on hand, as soon as we made up the colony and closed up the hive, we carried the queen to the entrance and let her go. And we have no hesitation in recommending the same practice to all new beginners; but the new beginner would do well to cage unfertile queens, for fear of danger when introducing them.

When we come to take up the subject of queen breed-

ing, in another chapter, we shall try to show bee keepers that it is to their advantage to always keep on hand enough fertile queens to supply all newly made colonies at the time of making them up; and, now, as to how many colonies can be made from one, we will say, if the novices in bee culture will follow our practice, they may increase their colonies in one season to almost any number.

LESSON E.

NATURAL SWARMING CONSIDERED, AND OBJECTIONS POINTED OUT.

You will remember, my children, that I promised to tell you something about natural swarming, or, in other words, allowing the bees to swarm whenever they were ready. This, by some, is considered to be the most satisfactory way. They claim that nature has endowed them with instincts, and that we should let nature's teaching alone. The advocates of natural swarming claim that artificial swarming being unnatural, is consequently injurious to the bees. Let us for a few minutes examine their claims, and if they can make a good case, then we will give it up.

Mr. Jones has a fine apiary to commence with. The middle of May we have frost, and the sunny days of June are nearly upon us. The bees are making every preparation to cast off swarms. There are thousands of bees lying idly around the entrance of the hive. The apiarian looks forward to the time when he will have a fine increase of stocks. He tells his wife to carefully watch the bees, for fear they will run away; but towards noon the bright and beautiful day is changed, the heavens are covered with clouds, a cold breeze springs up from the north. Soon the rain is seen to fall, and finally it comes

in torrents. All right—the next day is cold and cloudy, and the day following likewise.

The first day of June, beautiful, leafy June. The sun rises in all its glory; the bees are out again gathering honey from all the beautiful flowers. The farmer says to his wife, watch the bees, they certainly will swarm. The days come and go, clear and beautiful. The 10th of June passes. The bees are still lying idle at the entrance. The 12th has come—the good wife still watching. Farmer says “Confound the bees, why don’t they swarm?” Again there comes a change in the weather, cool winds and rain; four or five cloudy days. Again it is clear, the bees are still busy, but they don’t swarm. The 1st of July is near at hand with its rains, clouds and sunshine, perhaps constant rain for a few days; and then, perhaps, beautiful weather till near the 15th of July.

The bees are still lying idly at the entrance of the hive. It rains again for a few days. “Bees can’t swarm when it rains,” says farmer Jones. Why don’t they swarm when its clear weather? That is the question, Mr. Jones, that’s the point that has puzzled many bee keepers long before your advent upon the stage of life. You say “Confound the bees, you don’t believe they mean to swarm. Why, the season is passed and not one swarm yet.” This, my friend, is a true picture, and one which many bee keepers have looked at year after year, without knowing the real cause.

Now, Willie, let me tell you why the bees did not swarm. It was this: just as the bees had capped over their queen cells, they were nearly ready to swarm. The rain came on; the bees saw that the weather was unfavorable for swarming. They left the queen cells, when the old queen at once destroyed the young queen while in the cell. That would delay swarming for at least two weeks longer. The young queen comes from the cell—her doom is sealed. Either one of the above causes will seal the doom of the young queen. Then how exceedingly small is the chance of colonies by natural swarm-

ing. There is no dependence to be placed in them. But bees do swarm naturally, and I will now call your attention to a season when natural swarming actually does take place.

Mr. Jones is now all excitement; he leaves the field at the sound of the horn, to attend to his bees. About the time he gets back to his work, toot goes the horn again. Mr. Jones is again heard to indulge in confounding his bees. In the first place he confounded them because they did not swarm; and now, confounds them because they do swarm.

We will not follow Mr. Jones any further in his field labors, and before we part with the good wife, we will bestow upon her our blessings, and long life to the horn. We will now confine our observations to the seasons, both old and new, and see how they get along; and to give Mr. Jones every advantage of a favorable season, we will suppose the season is good; that the bees have more honey than they can possibly gather. Now Mr. Jones has all that heart can wish. First, natural swarms, secondly, the flowers are laden with honey, these being two grand requisites in successful bee culture.

We will now watch Mr. Jones's bees every day. We take a look at them and see how they do. Let us now go to the hive that cast the first swarm, and see if the young queen has made her appearance. The hive is open—there she is, my son, just crawling out of the cell. Oh! how lovely. She, my son, is to be the future mother of this colony. Now let us look at this young queen and follow her for a few days. She leaves the hive on the day she is five days old, on what is termed her nuptial excursion. It may be from seven to ten days, but we will suppose that she leaves at the shortest period, five days. Three days after that she commences to lay eggs. Now get your pencils and let us figure a little. A fertile queen during the brooding season, will lay from *two to three thousand eggs every twenty-four hours*. Now let us see, the young queen is eight days old before she lays a

single egg. If she lays but *two thousand* eggs daily, there is a loss of *sixteen thousand* bees right in the middle of the honey harvest. We will suppose that she lays *three thousand* eggs daily, then there is a loss of twenty-four thousand bees, enough to make a good swarm. But that is not the worst view of it. During the time the queen was laying no eggs, the bees were constantly filling up the hives with honey, so as to leave the young queen but little spare comb to deposit her eggs in. We have a hive now, well filled with honey. In about sixteen days after the first swarm, we may look for a second swarm, and again there is a loss of another eight days before the young queen commences to lay.

Now what is the result? The bees have filled the hive from top to bottom with honey, and little or no place left for the queen to deposit eggs, and soon the bees commence to dwindle away, and the first thing Mr. Jones knows, he has not a single bee in the hive. He opens up the hive, and finds it full of honey, but no bees. Mr. Jones is surprised that his bees should have left him so unceremoniously. Mr. Jones is not the first man who has lost bees in that way. This is a common occurrence, and happens very frequently when the honey harvest is abundant. The reason for the disappearance of the bees, my children, is, that the queen did not have enough room to deposit her eggs, and the old bees so soon dying off, left the queen with but few bees, when they all took their leave, leaving the hive full of honey.

Now let us go back and look after the first swarm. They had the advantage from the fact of having the old queen with them, but as fast as the bees built comb, the bees filled it with honey. True, the queen was on the alert, but still the bees are filling the hive with honey, and do as the queen could, she is hampered, and the hive is full of comb and honey. Winter approaches; the bees have but little empty comb to cluster in, and the result is death to the colony the first cold weather. Bees can not live between combs filled with honey in the winter. I

have opened hundreds of hives in the condition before mentioned. But the bees don't always die? True, my son, but it is only a question of time, when bees are left to swarm naturally, as to when they will die. If they are in movable-comb hives, they may be equalized and kept in good condition, or the surplus honey may be thrown out by a honey extractor, and the bees in that way furnished with empty comb to winter in.

Here let me impress it upon your mind, that whether you let your bees swarm naturally, or swarm them artificially, you must have a movable-comb hive, so that you can determine the exact condition of your bees at any time. Had Mr. Jones, instead, resorted to making new colonies by artificial means, as laid down in this work, he could have kept his bees all at work, in the place of having them lying around the entrance of the hive all summer, living upon the honey gathered by a few industrious bees. The true doctrine is to keep all at work, and it can not be done by any other means than by artificial swarming.

There is another objection to natural swarming, and that is that many swarms are lost by going away to the forest. And I would say here in all candor—take away from me that movable-comb principle, and deprive me of the advantages of artificial swarming, and force me to fall back upon the old plan of keeping bees, and I would not keep a bee another day. I do not wonder at it, when I hear some farmer say, "Well sir, I have kept bees for twenty, thirty or forty years, and somehow they do but little good. I scarcely ever get any honey or bees either." Ask him about the care of his bees, and he will frankly tell you that his bees take care of themselves. Such a practice would result in no gain whatever, and would eventually result in the loss of his bees.

LESSON F.

ITALIAN BEES AND THEIR HISTORY.

Well, my children, we must now be off to the apiary for another lesson in bee culture. And my subject this morning will be upon the beautiful Italian or Ligurian Bee. And you, Ellen, may come too. This variety of the honey bee was found in small districts amid the Alps in Switzerland and Northern Italy. They are of a striped golden color, and were described by very ancient writers as being of a very valuable kind. But for centuries they remained in that location not known outside, until they were accidentally discovered by Capt. Baldestein in the wars of Napoleon, who carried them across the Alps, in 1843, and in 1853 they were introduced into Germany. In 1859 the first stocks came across the waters to our own shores, for one Mr. Colvin; but, unfortunately, he was not successful. They all died the following winter. But in the following season Mr. Mahan was successful, he superintending their voyage in person.

Shortly after Mr. Mahan's importation, S. B. Parsons, of Flushing, Long Island, succeeded in getting a few swarms over alive from Italy. From these, by the help of many other apiarians, he has succeeded in raising a large number of queens, which have been sent to nearly every State in the Union. Since then there have been numerous importations by others, and the Italian bee is now getting very common.

Is the Italian bee an improvement? Yes, my son, they are far superior to our common black or German bees. In the first place they are a little larger and very beautiful. They have three distinct golden or leather colored bands running around the body. The first one is small and scarcely perceptible, commencing at the thorax. The

next two are much broader, and I have seen some bees that had four beautiful bands. The number of bands, undoubtedly, is a test of their purity; and, I am of the opinion that a pure colony of Italian bees will always show three distinct leather colored bands, and the colony be of uniform color. I am aware that I am taking a position that is controverted by many. Be that as it may, I am compelled to take that stand, for many reasons. I will give you one, and pass on for the present. I have often tried to raise Italian queens from the eggs of the queens that breed two and three banded bees, and I never found one that would breed pure queens. You ask me how I know? I will tell you: The bees invariably show unmistakable signs of impurity, having but one or two bands, and some of them even *none*; and, occasionally, one of the queens would be black. I admit that there are some Italian queens that are very dark, and yet breed the most beautiful bees. Let me see the young queen, and I will tell you whether the mother is pure; and I will here say, that a queen that will duplicate herself every time, is very valuable.

Pardon me, my children, for departing from our lesson. We will now notice other advantages which the Italian bee possesses over the common bees.

THEIR STRENGTH.

Their individual strength being greater, they fly with less fatigue, and are more active and successful in defending themselves against their enemies, or their stores against the moth-miller.

THEY HAVE MORE HONEY SOURCES.

It is said by those who keep them, that they gather honey from sources in which other bees fail—such as the iron-weed, thistle, and the seed-crop of red clover, and many other flowers which are seldom visited by the black bee. It seems that their proboscis is longer, that they

can reach the honey-cups of flowers which the other bees can not.

THEY ARE MORE INDUSTRIOUS.

They work more steadily during the season, and they continue their season longer, working even when there is little honey to be gathered from any source.

THEY BREED FASTER.

It is a well known fact that breeding keeps pace with honey gathering. The result is strong stocks, which secure a large product of honey, and consequently are proof against the moth and poor seasons. Hence the large profits arising from them. Their stocks always being strong, they breed earlier in the season, and continue later, casting larger swarms. They will actually swarm about two weeks earlier than the black bee, thereby gaining that much time in the best part of the honey-gathering season.

EASIER HANDLED.

In opening a hive, the queen of the Italians is more readily found, from the fact that the workers are generally all busy, and her majesty remains undisturbed on the combs. They being more constant workers are less inclined to rob, are more peaceable, and less inclined to use their sting than the native bee. Being hardier, they are longer lived, and winter more safely; and, when a queen is past her prime, they are more apt to supersede her, while the common bees will remain queenless, and thus dwindle down and fall an easy prey to the moth.

HOW TO ITALIANIZE.

I have now briefly shown you their importance. I will now give you a few hints how to change your common stocks to Italians. The first step is to remove the native queen. She is most easily found by opening the hive,

near the middle of a clear day, when many of the bees are absent in the field; handle the combs carefully, looking over one at a time; if she can not be found in this manner, it will be necessary to shake or brush the bees off on a sheet, and as they crawl for the hive she may be seen; then capture and destroy her. Use the smoke sparingly. If they fly, or show too much sign of it, you might sprinkle them slightly with water.

After you have destroyed the common queen, you may place the Italian queen in a wire cage, having both ends stopped up to keep the queen secure. Slip the cage between two combs containing honey, where she can reach the honey in case the bees refuse to feed her. Let her remain in that position twenty-four or thirty-six hours, then open the hive quietly; pull out one stopper; close the hive and let her crawl out at her own pleasure. Since following this plan, we have never lost one queen in introducing.

I will now tell you how to Italianize your colony when you have only one queen to do it with. If you get the queen in the fall of the year, prepare a strong hive for early breeding the coming season. See that you have, at least, one frame of drone comb in the center of the hive, then stimulate your bees by feeding as directed in another chapter, commencing about the 1st of February. The queen will then commence to lay eggs; and the colony being a strong one, the queen will fill the drone comb full of eggs. By following this plan, you can have drones out in March or the 1st of April. We will now suppose that you are using a movable-comb hive. The first step for you to take, is to open one hive—a very strong one is best—hunt out the queen and destroy her. Now, exchange the frames with the Italian colony (as described in another chapter) leaving all bees in their own colony. The queenless colony will at once build queen cells, and it may be, that they will build them in four or five different frames. If so, you can Italianize as many colonies as you have frames with queen cells on.

Frames having queen cells on, will be ready to remove to another colony about the ninth day after removing the common queen. On the day before you remove the queen cells, open as many hives as you have frames containing queen cells, and destroy the common queens. On the next day, take one frame from each colony; shake off the bees and exchange the frame for one that has a queen cell on, and your work is done. You should leave one queen cell in the hive where they were reared. You will remember that I have already told you that it was not necessary to leave any frames containing comb with an Italian queen longer than six days. Any six days the frames may be taken out, when you are Italianizing or raising queens.

My children, this is a subject which will require thought and study. We have tried to make this lesson as plain and comprehensible as possible, so that any one having even one Italian queen, can Italianize his entire apiary before the common drones make their appearance in the Spring.

LESSON G.

WINTERING BEES.

As I enter on this subject I am aware there is a diversity of opinion existing among practical apiarians as regards the protection of bees from the inclemency of the weather. Some will tell you to keep them warm; others will say, keep them cold. Some prefer to bury them in the ground, or put them in the cellar; another will advise carrying them to the chamber, wood-house, and about forty other places; enough to puzzle the inexperienced bee-keeper. Yet, no doubt but what bees have been sometimes successfully wintered in all of these contradictory methods. Yet it is also true that

some of these methods are much superior to others. But what the common bee keeper wants is the most practical method. Warmth is the first and main requisite. By this, we do not mean that they should be kept uncomfortably warm, nor below the freezing point. An even temperature is most desirable, at about the right degree of heat; and whatever method produces that, that is the one to accept. Dryness is another essential to the successful wintering of bees. These are the two great essentials in wintering bees—dryness, and even temperature, something a little above the freezing point. And, if we were asked to-day, by the novice in bee culture, where he should winter his bees, we would tell him: Let them stand on their summer stands, and keep them there until you thoroughly understand bee culture.

We have noticed that new beginners invariably follow after some of the plans laid down by the different writers upon apiculture, and generally result in the loss of many valuable colonies. Now who is to blame? Not the writers, certainly; for they all carry their bees through the winter in good condition. But here is where the trouble is—there are many points which the novice never gets, or, if they do, they do not comprehend the meaning until they have lost many valuable colonies. I have a case at hand: A friend of mine had bought a fine colony of Italian bees; they had plenty of honey to carry them through the winter. He told me at the close of the honey season, that he was determined that they should not freeze the coming winter; he intended to keep them in a good and safe place, so they would come out strong in the spring. Well, time went on—some time during the winter, I called at his shop, and the first thing I heard on entering, was a colony of bees humming away furiously. Said I, "Mr. Gooding, what have you there?" "That," said he, "is my fine colony of Italian bees, that I was telling you of." "Well, how long have you kept them in here?" "Ever since they were taken from their summer stands." "And you have had fire in this room every day,

and worked in it too?" "Yes sir!" "Well now, Mr. Gooding, we have only to say to you: take your pencil and write upon that hive *dead!*" Said he, "you don't mean to say that they will die?" "Yes, sir, nothing will save them." He at once carried them to the cellar, but long before the weather changed so that they could be set out, they had died; and that was the only colony that Gooding lost that winter. You ask me what caused their death. That is easily answered: the room was kept too warm, and the pounding kept the bees excited all the time. Bees must be kept where there is no artificial heat, and all must be quiet. The least jar will cause the bees to fill themselves, and if they can't get out to discharge their fæces it is injurious to them. And now let me say that I have found Goodings living all over the country, and in every school district, with their bees stored away in a very bad condition, worse than if left out on the summer stands. Again we say, better leave your bees out, than to lose them while in winter quarters. We would, however, advise you to remove the top of your hive, honey boxes and honey board, if you have one, and draw over the hive two or three thicknesses of old wollen cloth, or carpet, or any thing which absorbs all of the moisture and gases which arise from the bees. Having done this, you may set on your top, to keep out the rain and snow. Remember, the cover should be well ventilated.

If the novice will follow the directions laid down in this chapter, they will have but few bees to die in winter, unless it is for the want of honey; and this would never occur, if the bee keeper would look after his bees as soon as the honey season closed. The weak colonies should be made strong by exchanging frames with strong colonies, giving the weak ones combs containing brood, bees and honey enough to make the weak strong. The apiarian can, if careful, equalize his colonies and have all strong and ready for winter.

For more particulars, see chapter on Artificial Swarming.

LESSON H.

ROBBING.

In robbing bees partake somewhat of man's nature, that is, slightly inclined to self. It is not the weak and most needy that partake of this spirit, but the contrary, generally. The healthiest and strongest swarms do so. Robbing, with bees, is generally performed in spring when flowers are scarce, or in the fall after they fail.

IT IS DIFFICULT TO KNOW.

I suppose there is nothing about handling bees as difficult to understand, or to be certain of, as robbing. You are liable to be deceived.

WHAT SWARMS OR STOCKS ARE LIABLE.

Late swarms are liable, from the fact that they are weak, and unable to defend their stores; also any weak stock, no matter whether old or young. Queenless stocks are apt to become weak and depopulated, and consequently become victims.

INDICATIONS OF ROBBERS.

Robbers may be known by their buzzing around the hive in a suspicious manner. Should one alight, he is in danger of being hurled from the entrance, and sometimes receives a fatal sting. We may often see them in combat; and if the colony is weak there is danger of overcoming them, but if the colony is strong, there is not much danger. In fact, a strong colony is hardly ever overcome by robbers.

THE BEE-KEEPER'S DUTY.

Although I have said that it was most difficult to decide when robbers commence their depredations, yet the pru-

dent and careful bee-keeper will know the condition of all his stocks. He will know which are his weak stocks. Such ones should have the entrance closed, allowing only one bee to pass at a time.

Gum camphor placed in the entrance will drive the robbers away.

PREPARING BEES FOR WINTER.

Every hive should be thoroughly overhauled before cold weather sets in, so as to ascertain their exact condition. If you are using movable-comb hives it is an easy matter to attend to it. Every hive should be opened up, every comb examined carefully. Look for moths, or the work of them. If any are found, cut them all out. See that they have honey enough to last them during the winter. Twenty-five pounds is enough in our latitude. If they have not, change a frame or two with a colony that have honey to spare. See that your hives are not full of honey. If they are your bees could not live in such a hive, with a cold wall of honey on each side. You must give your bees empty comb to winter in, or else they will certainly freeze. Where you have a number of movable-comb hives, equalize your colonies by exchanging frames, and by that means you benefit all.

LESSON I.

HIVES.

I have not left this subject off until the present because I thought it not of much importance. It is probably of the most benefit to the bee-keeper, and I trust that I shall so show it to your mind.

As regards bee-hives at this enlightened day, none except movable-comb frames of some kind are considered advisable, with enterprising bee-keepers.

VALUE.

The value of a hive depends upon its size, shape, and the advantages secured in its construction.

SIZE.

Experience has demonstrated that it should be a proportionate and suitable size. We want a hive to contain fully two thousand cubic inches in the clear, which would be twelve inches square, and about fourteen inches high, in the clear. This does not include the honey-boxes or the surplus honey room, but it is what is required for a common colony for brood and supplies. It is essential, if you use movable combs, that they should all be of a size, so that one set of frames will fit in any hive in which you should accidentally need them. The above dimensions do not include the room that is occupied by frames for movable combs: If they are used it should be an inch or two larger each way.

SHAPE.

I am aware that I again approach a critical point, where there is a wide difference of opinion, ranging from the old gum-hive up to the modern bee-palace. While I would warn you of either extreme, I would say, be prepared to judge and choose for yourself. Inasmuch as the country is flooded with things called bee-hives, and each in its turn claiming to be the best, therefore I would say that common prudence would dictate much care in selecting a hive for use. As regards the mere wants of the honey-bee, shape is not so essential. They may as readily accept an old gum or box-hive; but we have other difficulties to contend with, which are not so readily overcome, and which can not be met with in either class of such hives.

WHAT A HIVE SHOULD BE.

Although bees may be kept in a gum, box, or nail keg, yet this does not prove their adaptation to the wants of the insect, or to the practical handling of them by the bee-keeper.

The public is fully acquainted with the success attending bee-keeping in the above-named hives, therefore I shall not say much in that direction, because I trust that the old bee-gum and brimstone age has passed away, and that we are entering on an enlightened age, where science unfolds her glorious banner. I have already advised you as to size, yet I wish to say something about the movable combs.

THE ADVANTAGES OF MOVABLE COMBS.

First. The bees are allowed to work in their natural order, making each comb in a separate frame capable of being swung open or lifted out at pleasure, making it truly a movable comb.

Second. It gives full control of all the combs, that all the necessary operations may be performed without injury to a single bee. This is of much advantage and importance to the bee-keeper.

Third. It gives you at a glance a correct knowledge of the condition of your stock, having the whole interior, and every inch of surface of comb, in view; that in dividing up in the swarming season, or in doubling together in the fall, you may know what combs to use or reject.

Fourth. Another great advantage is, that we can watch the progress of queen cells, thus knowing when to make artificial, or when to look for natural swarms. And here is a fact worthy of notice: Every time that a stock change their queen (and that is every time they swarm) there is a loss in breeding of from fifteen to twenty-five thousand bees; the old queen always leaving with the first swarm, and there are no more eggs laid, until the young queen is ready to begin her labors, which is generally from fourteen to twenty days.

Now, as I have shown you, in the chapter on breeding, that the queen is capable of laying about two or three thousand eggs per day, thus you can reckon what a loss you sustain, which can be obviated with the movable combs. As soon as there have one or two swarms issued,

you can have enough queen cells for several artificial swarms. By watching your stocks, you may divide them up, giving each a queen cell nearly matured.

I have thus briefly given you some, but not all, the advantages of movable-frames. In considering this subject, I am led to believe, without the least doubt, that whoever realizes the greatest possible benefits from his bees, must use movable combs in some form. The principles involved in them can hardly be dispensed with. This subject is of so much importance that I hardly know when to leave it. I think the practical bee-keeper is aware that unless he can have easy access to the interior of his hives, and can have control of each and every comb, he can not manage his bees successfully any length of time.

Bees many times do well, especially young swarms, for the first year, in a common board hive; but after they have filled it, the story is told. Then the next thing should be to remove a portion of it, and give them a chance to refill it. But such an operation as this can not be easily effected in a common hive. It has been ascertained by experience that bees will make honey nearly four times as fast when they can have the central portion of the hive to work in, as they would if they are compelled to carry it all to the upper part of the hive, or in the surplus boxes on the top of the hive.

REASON WHY BEES WILL MAKE MORE HONEY IN THE CENTER OF THE HIVE.

The reason why they can make honey so much faster in the body part of the hive is simply this: As the great mass of the bees are constantly there, they keep up that amount of animal heat that is necessary to build comb, and this without any extra exertion or loss of time on their part; whereas, when they build in boxes it takes a large number of bees to cluster there in order to generate the amount of heat that is required to construct comb, which is very great—nearly one hundred degrees.

Thus, by having to cluster there for the only purpose of generating this required heat, there is a great loss of time. Not only this, but the distance a bee has to travel after entering the hive is another consideration. It will take a bee as long to travel up through the combs to the store boxes and back as it will to procure the load of honey.

Now I trust that the reader will readily see the importance, and carefully consider the propriety of having suitable hives, so that he may reap the utmost benefit.

MOTH-MILLER.

The moth is so well known that it is hardly necessary to undertake its description. The female miller is much larger than the male; and it is also well known that in its larvæ or worm state it feeds upon the wax composing the cells, and in weak swarms soon envelops whole combs in a common ruin, making them utterly unfit for the purposes of the bee, and in a short time increasing to such an extent as to cause the bees to dwindle away and finally to leave the hive in despair. I believe if we would combine all the other depredators and consider their ability for mischief, and compare them with the miller, we should find its power for the destruction of the bee equal to them all.

The moth, or miller, in its adult state is not so greatly to be feared as its numerous progeny. As the green fly is led by its instinct to deposit its eggs on the carcass where its offspring may have its proper food, so with the moth. It seeks the hive containing combs, where its natural food is at hand for its young. One writer and vender of hives says that he regards the fear entertained of the moth as misdirected, more imaginary than real. To this I can not agree, and can not see what induced him to make such an assertion, unless the insect was beyond his control. You may see him at daytime very piously inclined around some corner of the hive, closely resembling a weather-beaten sliver. He is undoubtedly unnoticed

by the bees. But as soon as evening draws her mantle around, then the miller throws off its inactivity and commences to look for a place to deposit its eggs.

SMALL STOCKS MOST LIABLE.

It does not need much argument to prove that a heavy and strong swarm will protect the combs to a greater degree, and that with such the moth has a poor chance to deposit its eggs on the comb, where its instinct has taught it to place them. But if the combs are well protected they must leave their eggs somewhere, and the nearer to the combs the better. So, if driven from the combs, the next best place is in the crack or corner of the hive, under the edges of the hive, or among the dust and dirt on the bottom board of the hive. The eggs will here hatch, and the worms will live upon the offal until full-grown, and then will leave the hive to assume the form of the miller, while those that are deposited in the comb eat their way through it, if there is no honey in it; but if there is, he scales the outside, eating the scalings, being careful as he proceeds to keep his passage-way well lined with a silken shroud, gradually enlarging it as he increases in size.

SOME OF THE SYMPTONS.

You must not expect me to point out every small symptom, but I will try and give you some of the main ones; and then if you are a close observer you will soon know and learn for yourself. You may, or will often see a few small bees, all webbed together, on the bottom board; or you may see small pieces of comb that have been broken off by the bees, in order to rid themselves of the ravages of the worms; or, later, you will probably discover fewer bees in and around your hive; they are dwindling away. This you will readily learn, if you see your bees often as you should. It is an important item that we should at all times know the actual condition of our bees; and this I claim can only be accomplished by the use of movable

combs. The above symptoms are principally designed for those who use the box hive, and then sometimes we are liable to be deceived about the condition of our bees; but with the movable-comb frames it is impossible—we may know to a certainty.

REMEDIES.

If you are using a common hive, and it gets much infested by worms, my remedy would be to drive them to a new or clean hive. With these kind of hives prevention is better than the cure. We can only prevent it by having strong stocks. As soon as a stock becomes weakened by any cause, then the moth takes advantage of it, and with the box hives we have no way of preventing them.

DANGER OF DRIVING.

Some may say, If I drive my bees, is there not danger of losing them? They may not make enough honey in their new home to do them. This may be so. But the truth is this, you are likely to lose them finally. If you drive them you secure what little honey there may be in the hive, and then you have a chance to destroy all the worms and eggs, which otherwise would have matured and have become a multiplied plague to other colonies. When a stock of bees is once much affected with worms, it is a very difficult thing to rid them, and, I may say, it is next to an impossibility. But with the use of the movable comb it is different. We can open them out, and at once see which comb or which part of a comb they are lodged in, and either extricate them, or, if the comb is much infested, cut it out.

TIME OF THEIR GROWTH.

When they are first hatched it requires very close inspection to see them with the naked eye. The rapidity of their growth depends much upon the temperature of their surroundings. Their good living has not so much to do with it. If the weather is hot it will only take a few

days to develop them to the full grown worm, while with a low temperature it would require weeks, or even months, for the eggs to hatch and to develop into the worm state. Then they undergo a transformation and become millers.

THEY DO NOT LIVE THROUGH WINTER.

A perfect moth never survives the frozen winter. Their species is only saved and propagated by the egg which is laid the season before. It is a rare thing to find a miller before the latter part of May or the middle of June. After this time they are very numerous until cold weather appears. Then if there are any weak stocks of bees—stocks that are not able to protect all their combs—the moth takes advantage of the occasion and deposits its eggs, and there they remain for the next season. Then I would earnestly recommend you to keep all your stocks strong. Light swarms must be doubled up, or loss is certain.

And in concluding this subject let me add, that all profit is seldom obtained in any pursuit without some care and pain. If you plant a field of corn you do not expect that the whole work for the crop is done. Neither should you expect when you set up a stock of bees that a full yield will be realized without something more. Although they do not require that unceasing care as the growing of a crop or the rearing of some animals, yet, if you expect to be remunerated to the greatest extent, you must bestow that necessary protection and care that their noble nature demands.

LESSON J.

THE APIARY—ITS LOCATION.

In locating an apiary one essential consideration is necessary, and that is, to have it in a suitable locality where it will be convenient to watch the hives during the swarming season, that you may at any time, from a door or window, see when a swarm issues. Otherwise its location is not so essential, for each one will, in choosing a site, be governed by the circumstances.

PROTECTION.

If possible, the hives should stand where they will be protected from the northern and western winds. This may be accomplished by building a high and light board fence on the west and north sides of your grounds where you expect to set your hives. By doing this, you will save more than bees enough to pay for the trouble; for during the spring and fall we have much high wind, and bees returning home heavy laden are not able to reach the hive, and are blown away and lost, for at such times we generally have cold nights. It is good economy to have the necessary protection, for enough bees will be saved to pay the expenses; for, be it remembered that one bee saved in early spring is worth more to the stock and to the bee-keeper than one dozen in middle summer.

CHEAP CONSTRUCTION OF STANDS.

We recommend that the hives should be set on low stands near the ground. Whatever is the mode of construction of stands, I would recommend to you to place them close to the ground. The benefit to be derived from this plan is that weak or fatigued bees, if it should happen to be windy, are likely to miss the stand and fall on the ground, and, as they can crawl when they are un-

able to fly, they make their way to the stand and enter the hive and are saved; while, if the hive had been some one or two feet from the ground, they would undoubtedly perish.

SOME OF THE ADVANTAGES.

Suppose, for instance, we place our stands some two or three feet from the earth. When approached by the bees on a chilly afternoon (and we have plenty of such in early spring), or toward evening, even if there is not much wind, they are very apt to be heavily loaded, and are likely to miss the hive and bottom board and fall on the ground. If unable to rise, they perish. Otherwise, if the hive had been low, they would have made their homes secure. In this way we may save thousands of bees annually. Enough may be saved in one spring from a few hives to make a large swarm. A little forethought is all that is necessary.

AN OBJECTION OFFERED.

But, says one, if you place your bees so near the earth they will draw dampness, and the combs mold. I think this all imaginary. A circulation of air between the bottom board and the ground is all that is necessary.

BEE-HOUSES.

Now, kind reader, I have carefully gone over the ground of the apiary. I have, in a former chapter, told you about hives. I there strongly recommended you to use movable combs. I would still urge their utility; and in leaving this part of the subject I would say, be cautious, and consider well your undertakings. If you do so, you will be bountifully rewarded. I would say there is no more necessity of having your bees run out or dwindle down than there is for your cattle, or sheep, or anything else that is kept on a farm. Give them a proper hive, and if suitably situated and protected with the proper care and attention, at the time when they need it, they will repay you better than anything else kept on a farm.

LESSON K.

BEE PASTURAGE—WHAT IS HONEY?

Most common observers think that the little honey-bee actually makes honey by transforming the sweets in some shape or other. But this is not the case. There has never been one pound of honey made by bees. Honey is a liquid sweet secreted more or less by all flowers, and is merely gathered and stored in the combs by the bees. Honey and pollen are not only secreted by all flowers, but nearly all the flowering trees and plants of the vegetable kingdom yield a supply for the honey-workers.

I will now name a few of the leading sorts that yield a continuous supply throughout the season. The first that seem to offer their products are the alder, soft maple, and the willows. Of the latter there are several varieties, which put forth their blossoms very irregularly, some a full month earlier than others. These all afford much pollen. So much, then, for the production of the swamp. Then closely follows the hard maple or sugar-tree. This suits the bees much better. Then soon after we have the gooseberry, currant, peach, pear, and cherry, all of which are richly stored with honey, which is about the first obtained. Next in succession are the apple blossoms, which afford a real harvest. Raspberries also yield an excessive flow of excellent honey. Then comes, with the month of June, white clover, which is usually the chief source of surplus honey. The honey from this plant is of a superior quality, of great value everywhere. The plant continues in bloom about two months, yielding large supplies of honey, making it a valuable pasturage for the bee-keeper. After this we have white-wood or poplar. This secretes much saccharine matter, which is

sought after by the bees. Catnip, strawberries, honey-suckle, hoarhound, and various other garden flowers, are rich in honey, and valuable when in sufficient quantities. The locust-tree is a great producer of honey, and generally attracts multitudes of bees while other flowers are neglected. Basswood, or the linden tree, opens its ten thousand petals about the first of July, and yields much honey, which is clear and transparent as water, looking superior to the clear white honey, but in flavor is inferior. But during the blooming of this tree, where it is plentiful, bees will accumulate in astonishing quantities.

As I pass along I would not forget to mention the value of white clover, which, owing to the length of its season, makes an important item to the honey-bee. Also, mustard, pumpkins, melons, and many other flowers, all produce honey.

And lastly, but not least, is buckwheat. It is an important honey source. It is a great harvest, and in some seasons is their main and only dependence for surplus honey.

DO BEES INJURE THE CROPS?

This question, I am sorry to say, of bees injuring the crops, has had many advocates. It is nothing but a silly prejudice against bees, entertained by some covetous fruit-grower, based on the notion that the crops are injuriously affected both in quantity and quality. It is an unfounded notion, and it derives no support from close observation and science. Yet it occasionally looms up and creates much alarm, as the appearance of a comet did in the by-gone days.

I claim that this nectar passes off, and is lost, if not collected by the bees. It is the sweet secreted by the flower which produces this nectar.

I will now give you an instance of a lady in Germany, which happened a few years ago. She established, at considerable expense, a green-house, and stocked it with a great variety of choice native and exotic fruit trees, expecting, in due time, to have remunerative crops. Time

passed, and annually there was a superabundance of blossoms, with only very little fruit. Various plans were devised and adopted to bring the trees into bearing, but without any success, till it was suggested that the blossoms needed fertilization, and that by means of bees the needed work could be done. And a hive of busy workers was introduced the next season; the remedy was effectual; there was no longer any difficulty in producing crops there, the bees distributed the pollen, and the setting of fruit followed naturally.

But some will contend that bees do injury to the crop by extracting the honey from the flowers, and they will say: "Is it not reasonable, that if a portion of the plant is taken away by the bees, there must be a less quantity of material left for the formation of seed," etc. It is a fact, that if a person has an opinion formed, he will build up strong proofs in his favor, which he thinks he can substantiate by satisfactory reasons.

BUT WHAT ARE THE FACTS?

The flowers expand, and a set of vessels pour into the cup, or nectary, a minute portion of honey. And strong testimony proves very plainly that it never again enters the stock or flower, but there it evaporates like water. For instance, in passing a field of buckwheat in full bloom, we are assured of the presence of honey in the air. Now, what is the difference whether this honey passes off in the air, or whether it is collected by the bees? If any difference, it appears in favor of the bees getting it, for it thus answers an important end in the economy of nature.

Now, instead of the bees being an injury to the crop, I shall prove to you that they are an advantage. The stamens and pistils of flowers answer the different organs and sexes, that is, male and female. The stamen is the male, which furnishes the pollen; the pistil is the female, which must be impregnated by this dust or pollen from the stamen, or no fruit will be produced. Now, as we all

know that the breeding in and in of animals is detrimental, so it is in the vegetable kingdom. The pollen from one flower always falling on the pistils of its own flowers, would deteriorate. Thus it becomes necessary that the pollen produced by the stamen of one flower shall fertilize the pistil of another, to prevent barrenness. This is fully accomplished by the bees traversing from flower to flower, and carrying the pollen sticking to their legs and wings to the next flower, and impregnating the pistils of it. This was the case with the above lady's green-house.

The necessity was seen and planned by the All-wise Governor. He has created the bee for the flower and the flower for the bee; endowed the plant with the power of secreting the liquid sweet, and given the honey-bee the instinct to search after it and treasure it up for its own as well as for man's wants.

Says Mr. Packard: "If all the bees were to be destroyed, I for one, if a farmer, would prefer to go into some other business." This prejudice against bees seems to me would have no foundation; and I hope that the day is dawning when it will be done away with.

A DRY OR A WET SEASON FOR BEES.

The inquiry is often made, "What kind of a season is best for bees?" I would say that this point has been watched very closely, and, like many other occupations, an extreme either way is not the most beneficial, but a medium between the two extremes produces the most honey. But if I had to choose one or the other, I would gladly accept the dry season. A wet season washes much honey out of the flowers, and it is also unfavorable for the bees to work.

Says Butler: "The hotter and the dryer the season is the greater and more fragrant are the honey-dews." Cold and wet weather is unkind for them. Much rain at any time, as coming from a higher region, wasteth away that which is, so there can be no more until another fit of hot and dry weather. Dry weather makes plenty of

honey, and warm, moist weather plenty of swarms. A warm, calm, and moist spring causeth many and early swarms, but sudden storms do hinder them.”

The above extracts are from the *American Bee Journal*.

CONCLUSION.

After considering this subject of bee pasturage or honey sources in some detail, I will only add that there might have been much more said; and still I think there has been sufficient. That part that relates to the injury of crops by bees I hope that the reader will carefully consider. It may be of practical benefit to him some day. I abbreviated it as much as possible, and hope that I will be understood.

Although honey is gathered from nearly all plants, shrubs, and trees, yet there are only a few predominant sources namely, apple, bass-wood, clover, buckwheat, and, in a few localities, honey-dew. But clover is the only universal dependence, as that flourishes almost everywhere, to some extent. Buckwheat, in some places, is the main source for later supplies, while bass-wood is confined to certain localities, and is of short duration; but the time, limited as it is, nevertheless affords a most bountiful and acceptable supply. And we have apple blossoms for the rearing of broods in early spring. Thus we have a regular chain of supplies all nicely arranged by the Creator.

Where all of the above supplies are found, and are abundant, there is the true Eldorado of the apiarian. But give a favorable season for clover and buckwheat, and I will insure the bee-keeper plenty of honey. And now, lest I forget it, I would recommend the sowing of a small piece of buckwheat some two or three weeks earlier than the usual crop is sown, which will pay in honey, if the grain, perchance, is not so good. If we want to keep many bees, it is well to make some little arrangements with our crops. But I may say more on this before I leave the subject.

OVERSTOCKING.

To a person acquainted with the immense honey resources of our country, a question might naturally arise, Will not this branch of enterprise be overdone? or, Will there not be more bees kept than there will be profitable pasturage for? To this, and all such questions, I would say, that it might be possible to confine an over-amount of bees in a certain locality, where they would not make it profitable, yet it is a question that needs much argument and proof, whether it could be done or not—the bees making such range, traveling miles in case of necessity. But it is not probable that it will be done. We have no history of any country or age where it has ever been overstocked,

A modern writer says that in northern Arabia the hills are stocked with bees—that no sooner are hives placed down than they are occupied by bees.

Mr. Gifford, in the *Prairie Farmer*, says: "I know of one neighborhood East, a thickly-settled place, where nearly every farmer keeps from one to fifty swarms of bees. It is said that they get as much honey per swarm as they used to when there were but few bees kept, and a double price for their honey."

We all know it to be a fact that at times the supply of honey seems to be inexhaustible. It is also a conceded fact that during the night flowers secrete honey; and if it is not gathered in the fore part of the next day it is all lost by evaporation with the noonday sun. Thus it appears that this precious sweet is involuntarily given out by the flowers.

Again, upon this subject, is Mr. Sturtevant, of our State, who is an extensive bee-keeper, having over two hundred swarms. He says: "A kind of Providence has furnished this beautiful supply each day, and if workers are not on hand to gather it that day, it is gone. I have never known a season where the honey harvest did not enable every strong colony in a few days to lay up an

abundant supply for its own consumption and a generous surplus for its owner.

“To secure these results, however, the hive must be supplied with an abundance of workers. The whole secret lies in strong swarms. The rapidity in which swarms increase in weight at certain periods of the season is surprising, ranging from three to five or ten, and even eighteen pounds per day.” He further says that “my own bees the last season, 1866, built combs and stored honey in their surplus boxes only from twelve to fifteen days, the shortest harvest I have ever known. But in this short time many of my swarms collected, in addition to an ample supply for their own consumption, from thirty to thirty-five pounds of surplus honey.” And he says that the same would have been true if the number of stocks were ten times as great.

Now, I say to you, dear reader, as I have not asked you to take my views wholly, but have given you extracts of the experience and testimony of others, to stimulate you against the false reasonings of others, that there is danger of overstocking the country. You nor I, nor our children’s children will ever see that day. Then be encouraged, and embark in this pleasing and profitable enterprise. And I would say to all, let us persevere in our efforts for the improvement and extension of bee-culture, by interesting and instructing the rising generation therein, for there is yet a vast field of observation and experiment to engage their attention.

CULTIVATION OF HONEY CROPS.

As I partly promised, I would say a few words on the cultivation of honey crops. Some, and many writers, recommend the cultivation of honey crops, or such crops as will furnish feed or pasturage for bees. But I think that this is not wholly necessary, beyond a regular line of crops for grain and seed. White clover stands first as the best general crop for the bee. It also makes an excellent pasture for stock of all kinds; but where it is

eaten off close by sheep it is not so good, they not letting it have a chance to head and blossom. Cattle pick or choose around in spots, and do not eat as close. Thus a dairy region is much better for bees. Where white clover is abundant there are never bees enough to collect one-fourth of the honey which it affords.

Again: we all know the value of buckwheat as a field crop. We know the worth of an acre or two for bread; and yet this is one of the best honey crops. We might lengthen the season of it longer than it is at present, although it is in bloom fully as long, if not longer, than any other plant or flower, except it might be white clover. By putting a field of buckwheat in a week or two sooner, and one a week later than the common time of sowing, it would more than pay in honey, and the chance of a fair crop in either case might be good.

Speaking of it as a honey crop, Mr. Harbinson says: "When the weather is favorable, the bees store honey from it very rapidly, faster sometimes than they can build combs to receive." He has seen them fill pieces of old comb, laid close to the entrance of the hive, with honey, and has known stocks to store about fifty pounds of honey during the continuance of buckwheat. Then, I say, remember your bees at the time of buckwheat sowing.

Again: fruit trees are excellent pasturage for bees, they coming in early for the rearing of brood; and let us not argue that it will not pay to raise them for the fruit alone, especially apples. Yet we might have our lawns and roadsides all lined with cherries, which are also excellent for bees as well as man.

In conclusion, let me add, is it not easier to cultivate and produce enough bee pasturage, in addition to that from natural sources, to supply one hundred hives of bees, than it is to provide keeping for one hundred head of sheep? And the profit of the bees will be more than double that of the sheep.

LESSON L.

IS BEE KEEPING PROFITABLE?

I shall, in this chapter, try to give the reader some facts and figures, and probably will give him some history of the bee; also, some quotations from Holy Writ. The object of my holding these facts and figures from the reader at other places in my work is, I did not wish to encumber his mind, or to overload it with words; for I am aware that a great burden of words is not as easy to load up or to treasure up in the mind, and to carry, that is, to retain them, as if they were more condensed. Even if it requires some thought to unravel them, we will do it with more ease, and be benefited thereby.

HISTORY.

The honey-bee has existed since the dawn of creation, and, under the protection of an unerring instinct, has outlived those changes and convulsions which have destroyed other races, and has extended its range from the equator to the frozen regions. Here is an exception to the general law of the animal kingdom. As a general thing, each region has its animals. For instance, the seal and the otter, if transferred to the equator, would perish. The same with the crocodile, if among the icebergs.

But bees approach nearer to the human. They flourish in all localities, and in all climates. Wherever human foot is able to tread, bees are his companions. By this does it not argue that they are in some way, more than is generally attributed to them, essential to man, or to the existence of vegetation?

They are wholly vegetarians, always seeking their food from the flowers. Their diet is unchanged. Climate does not have any effect on it. But take the man from the

tropics, eating his oranges, transplant him to Lapland, and he will relish a quart of seal oil. Then is man not more unstable than they? We say, then, man, comparatively a creature of yesterday, should be guided by reason and sound judgment. He is put here as lord over all, and reason and revelation teach us that all were created for some wise purpose. The sweets of nature were undoubtedly created or produced for man; and the honey-bee was given to man for his service to collect those sweets. For, in the earliest history of our race, the promise was that man should inhabit a land "flowing with milk and honey." This promise was made in Exodus iii: 8. They did actually enjoy such a land "flowing with milk and honey." See Deut. xxvi: 9.

The Prophet Jeremiah says: "For he hath sworn to give them a land flowing with milk and honey as it is this day." Then, if the old prophet's testimony is good, they were at that day enjoying, to the fullest extent, the promise. The land of Palestine is undoubtedly a land of bees. All modern travelers agree to that fact, and say that bees are abundant, even in the remotest parts of the wilderness, where they deposit their honey in clefts of rocks and hollow trees.

But to return to my subject. I ask pardon for wandering, but, as I am not a bee, you must not expect me to take a bee-line in my remarks.

Now, is bee keeping profitable? The more I look at this question the more simple it appears. But, nevertheless, some will not believe a simple or a plain truth. I say that, with proper attention, bee keeping is very profitable; and if there is an occupation under the shining sun worthy man's attention, it is this. Do you believe it? But I shall not ask you to build up your imagination for a fortune in a few years, if you but recklessly engage in this enterprise. No, sir, this all would be folly. I shall give you a few thoughts, facts, and figures, what others have done, and then let you draw your own conclusions.

Bees are unlike any other live stock. They are self-

supporting and self-sustaining, and with little extra care will store a large surplus for the wants of man. How much easier it is to give bees the requisite care and attention than it is to attend to the expensive rearing of animals, which need almost constant care during certain seasons of the year; barns, sheds, pens, etc., to be constructed; food to be supplied; yet no good farmer thinks of complaining of all this.

Contrast the keeping of animals with that of bees, and it is easy to draw the conclusion where the profit lies. We will now suppose the first cost of a swarm of bees to be equal to that of a good sheep, which is not far out of the way. The hive may opposite the shed or stable for the sheep. The sheep, we will say, shears five pounds of wool; at fifty cents a pound, makes \$2.50; one lamb, at one year old, worth \$5.00; total \$7.50. Deduct keeping, washing, and shearing, about as follows: 12 months' keeping, at 25 cents per month—let the other go—makes \$3.00; leaving only \$4.50 for the risk, interest, and all the care and trouble for one year.

Now, the bees will, if the season is favorable—and this you must allow me, for I have allowed it with the sheep—will store at least fifty pounds of honey; at 25 cents per pound, makes \$12.50. Allow them to cast one swarm (very often two or three), worth at least \$5.00—which is only about one-half of their actual worth—total, \$17.00, net profit. Deducting the sheep's profit, leaves the nice, clear gain over that of the sheep of \$13.00. But be it remembered, that I have figured below what actual experience will prove for the bees

Mr. E. Townly, of Cincinnati, Ohio, says that "on the 25th day of April, 1858, I purchased ten hives of bees in the old-fashioned hives, for \$50. They were so full that I had to divide them before I moved them. I divided them and made twenty hives, and in thirteen days afterward I divided ten of them again, making me thirty hives; and I sold from them \$547 worth of honey. The increase of

my bees is worth \$500 more, making me \$1.047, in one year, for an outlay of fifty dollars."

I will now give you another, from the Bidwell brothers, of Minnesota. They had, in 1864, fifty-nine stocks of bees, and in two seasons increased them to one hundred and ninety-six stocks; and he says that each stock averaged forty-two and one-fourth pounds of honey to the stock. He does not say whether for one year or for the two, but we will call it for the two years. Now let us figure on it and find the profit. Fifty-nine stocks, at \$5 each, make \$295, as capital. Now 196 stocks are worth \$980; then 50 old stocks, making 42 $\frac{1}{4}$ pounds apiece of surplus honey, is 2,507 pounds, at 20 cents, making \$701.40; total for bees and honey, \$1,681.40. Deducting \$295, first cost, leaves him the nice sum of \$1,386.40, for his net profits.

He further says that the past season, of two hundred and four old stocks, he received on an average a little over seventy pounds of surplus honey per stock, making about fifteen dollars' worth of honey per stock.

Mr. W. P. Thew, of Caledonia, Ohio, said that his bees, one swarm, stored in a movable-comb bee hive, in one season, ninety-six pounds of surplus honey, which is worth twenty-four dollars. Is not that good profit, to say nothing of the swarm, which would be about ten dollars more, making over three hundred per cent. per annum?

I find in the *Ohio Cultivator* an account from Mr. D. D. Kinney, which is about thus:

Five old stocks, worth eight dollars each	\$40 00
Eleven hives for swarms, sixteen dollars, time and labor six dollars	22 00
Total	\$62 00
Eleven swarms, and five old stocks, making sixteen stocks . .	\$128 00
Amount of honey sold and consumed	37 00
Total	\$165 00
Deduct first cost	62 00
Profit	\$103 00

I have now given you a few of the many statements and accounts. I will now briefly give you a few figures in such a shape as I trust will be satisfactory to each and all. I will make my calculations low. I have given you statements above where profits were over three hundred per cent., but with this calculation will only put at thirty-three per cent. of increase, and thirty pounds of honey to each stock.

We will suppose that we have ten stocks of bees to commence with, worth \$100—

	SWARMS.	making	TOTAL.	and	HONEY.
First year we get	3		13		300 lbs.
Second " "	4	"	17	"	390 "
Third " "	6	"	23	"	510 "
Fourth " "	7	"	30	"	690 "
Fifth " "	10	"	40	"	900 "
Sixth " "	13	"	53	"	1200 "
Seventh " "	18	"	71	"	1590 "
Eighth " "	23	"	94	"	2130 "
Ninth " "	34	"	125	"	2820 "
Tenth " "	41	"	166	"	4358 "
<hr/>					
Total					14,880 lbs.
Thus we have 166 stocks, at \$10 each					\$1,660 00
Fourteen thousand eight hundred and eighty pounds of honey, 20 cents per pound.....					2,976 00
<hr/>					
Total proceeds..					\$4,636 00
Deduct first cost.....					100 00
One hundred and fifty-six new hives, \$4 each					624 00
<hr/>					
Total expenses.....					\$724 00

This leaves as a net profit the snug sum of three thousand nine hundred and twelve dollars, enough to buy a nice farm. Now, the saying is that figures will not lie. Here we have them. Is not the calculation low enough? Some writers count on doubling every year.

I now have a request to make of the reader; that is for him to make the calculation of ten swarms of bees for ten years, doubling each year, or to allow each old stock

to cast one swarm, and thirty pounds of honey to each old stock for each year, and see where it runs to. Truly, among all the creatures which our bountiful God hath made for the use and service of man, in respect of great profit with small cost, it is the honey bee. Why will not men learn that it is just about as easy and cheap to raise honey as not to raise it, and far cheaper than to buy it?

Says Dr. Eddy: "The profits resulting from a judicious and proper system of bee culture may be safely estimated at from one hundred to five hundred per cent. per annum. I have," says he, "three swarms, which have paid me in honey and increase of stock, upwards of one hundred dollars in two years. The average of my entire stock for three years has been three hundred and twenty-seven per cent. per annum."

Now, in conclusion on this point, although I could lengthen these facts, figures, and testimony much longer—yet I think enough has been said, that the reader may, with practical care and consideration, contemplate bee keeping with success.

A little practical knowlede with regard to the nature of bees will enable one to obtain perfect control over them; and will also open his eyes to the fact that, with properly constructed, movable-comb hives, success in bee keeping is not left to the luck of chance, but is dependent upon the observance of simple rules and regulations. If these are all observed, the bee keeper need not be afraid but what he will have remunerative success. I do not wish to hold out inducements for any one to be disappointed, but I would encourage all suitable persous to try their skill at bee management.

LESSON M.

A SUMMARY FOR THE YEAR.

I shall, instead of giving you a separate management for each month in the year, divide the year into four seasons, allowing three months for each season, March, April, and May comprising the spring, or preparatory season.

SPRING.

As this season approaches, it seems to endow all nature with new life or zeal; hence it is called spring. Bees are not slow to discover this, and now will have an earnest desire to come out on fine days. The hives should now be brought from their winter quarters and set on the stands on which you intend them to remain during the season. Now know how their supplies are, and only feed in case of necessity. If they have honey, which you should know, they do not need feed. You need to use much care in feeding; it is liable to induce robbing. It sometimes may be necessary to feed, but it is not always the surest road to success. If you find it necessary to feed, I would take the stock or hive to a closed room, and there feed it enough to last several days, which they will store in the combs, and then return them to the stand, keeping a good lookout. In all bee management, it is necessary to see your bees often.

Now, as the season advances, the colonies will steadily be growing stronger. Remember that the swarming season is advancing; have your hives made for the season, all in readiness, not having to wait after a swarm comes out to make one. Study well the chapters on natural and artificial swarming. Be prepared to know what to do. As some seasons are in advance of others, it is well to take this into consideration.

SUMMER MANAGEMENT.

June, July, and August is the fruitful or harvest season for the bee keeper. Now he is to reap his harvest; with June, if not before, the swarming season comes. If you swarm artificially, now is the time to do it. Look at lesson on "Artificial Swarming," and understand the subject. As your surplus boxes are filled, remove them immediately, and put empty boxes in their place. Keep your hives shaded from the hot sun; make them as comfortable as possible. Look out for after-swarms. In August, if favorable, you may look for buckwheat swarms. Try and prevent over-swarming.

FALL MANAGEMENT.

September, October, and November. Bee pasturage will now begin to fail. Look out for robbing. Now know the condition of each hive. Weak ones should be united. This is best done with movable combs. It should be done in the latter part of the season. Stocks that you think will not have honey sufficient to last them through, take out frames from strong colonies and give it to weak ones. When the apiary has received reasonable attention, little more remains to be done than to prepare the stocks for winter. Study well the lesson on wintering of bees. Decide how and where you are going to winter them. If a house to winter in is to be built, prepare to erect it.

WINTERING OF BEES.

As I have devoted one chapter to this important question, I hope that you have considered the subject well, and are now prepared to act. If your bees are in good condition, they are as good as already wintered. The whole secret in wintering, or even in keeping bees successfully, is in keeping strong stocks. If your bees are put away in good condition, and properly arranged, it is about all that they require during the winter.

And now, as the evenings will admit of it, study well this work.

LESSON N.

ON CHOOSING A PURSUIT.

I shall, in this chapter, try more fully, if possible, to illustrate the principles of bee keeping—not expecting to go over all the ground that I have been on, but to give you a few thoughts in a condensed connection.

As there are a great many crippled and deformed people, also, many aged men and widows, and many others that are in dependent circumstances, who are depending on their own exertions for a living, and who can not earn a needful support in any other channel of trade or industry, to such I would say, turn your attention in this direction.

Also, to all others in choosing a pursuit: Is it not well to make choice of a pursuit which is pleasant and profitable? In such a one there is double inducement to engage. Such a pursuit we eminently find in bee culture. In what other pursuit can the farmer find more pleasure than in the care of bees? He is admirably situated to combine interest and profit together. So with the fruit-grower. He is also benefited in a twofold sense, the bees finding a rich harvest on his trees; it also being essential to the propagation of fruit that the trees be visited by the bees.

The crippled and deformed also, should keep bees. If bees are not adapted to his circumstances, he should adapt himself to their conveniences, because they need not that manual care as other stock. Yet they need a watchful eye, which can not always be given by a man of much business; but with the former, he could give them full care. One of our great naturalists, whose re-

searches have aided much in this science, was a blind man. I give this for your encouragement, to show or prove, to you that impossibilities are diminished where there is a will. The man of science in bee culture, finds ample time and use for his talents in the study of their habits, and to observe the precision with which all their work is done. It is exceedingly interesting. But this is not all. While there is much pleasure furnished by bees, yet there is another side furnished by the picture—which is profit.

To this question, "Will it pay?" most people look at in these days. To such I say, and I think that I shall prove, that it is a safe, sure, and good funded institution; pays better dividends than government bonds. I am aware that there are a few persons who will not agree with my last statement. They have the old stereotyped idea, *luck*, applied to the management of bees; but at the same time are willing to confess that they would like to engage in the business, but say, "I don't believe I should ever have any luck with bees."

Nothing, certainly, can be more erroneous than such a notion. As I have said elsewhere, we can not expect complete success in this occupation, until we become somewhat familiar with the laws by which these insects are governed. But somehow or other this all-controlling word, profit, does entwine itself around; and, unless it can be interwoven into the considerate pursuit, it soon ceases to have a charm. It seems to be money which makes any branch of business have the proper jingle, and unless we can have our dollars and cents counted out for us at night, we are apt to abandon the pursuit. How often has this been the case with those who have engaged in the culture of bees without suitable information on the subject. Many will purchase a swarm of bees, and set them on a bench in one corner of the garden, and then turn them over to that mysterious power called luck, and expect him to take full charge and control over them. In nine out of ten of such cases, in a

year or two they will abandon bee culture, saying that they "have no luck with bees."

In the first place, we must have suitable hives. They must be proportionate in size; not too large or too small; properly constructed, of good material, in a proper shape. This undoubtedly embodies a movable-comb frame; for there is not the least possible doubt in my mind, that whoever realizes the greatest possible benefit must use or adopt them in some form. The principle involved in them can hardly be dispensed with.

What success or luck would a farmer have, if he fed hay or grain only when he had leisure? Yet it is precisely the course pursued by many who attempt to keep bees. Here is where all the fault is. Some will say that three out of five who undertake to keep bees fail. This is the point; and where they get shipwrecked is neglect. I might add and enlarge on this point, but it seems useless.

I have shown you elsewhere, the profit of bee keeping (read Lesson L); and in conclusion, I will say, that all of my experience, as well as that of many other men who have had much experience and observation, is, that with proper care and attention, every farmer and bee keeper may not only keep his table supplied with one of the greatest delicacies, but also realize handsome returns of a production of ready sale everywhere, and always commanding a good price, with less expense and labor than an equal amount can be realized from any other farm pursuit.

Now, reader, I ask you to calmly consider over this subject in your own mind. Is the doctrine sound? If so, then take hold of it. May not you be one of the fortunate ones? If there should be some other individual already engaged in the business, do not be afraid; there is room enough for you. Your bees will have as good chance as his. You know bees are privileged characters, roam where they please. There is enough for all. I have

to confess that this subject seems of so much importance that I hardly know how to close. I wish you eminent success.

LESSON O.

USEFUL HINTS.

It shall be my object in this lesson to use short extracts, or brief subjects, such as shall contain useful knowledge, facts that every bee keeper ought to know; and, if I chance to say something that has been gone over on other points, bear in mind that I wish to fix the facts in your minds. A good story or a fixed fact will bear telling twice.

HOW TO PREVENT OVER-SWARMING IN A MOVABLE-COMB HIVE.

Open your hives once every two weeks, and cut out all the queen cells. By following this, you will never have a swarm unless you want it. Should you be using the common box-hive, there is no way to prevent them from swarming, and they may continue swarming until they exhaust the old colony, and all perish in the end. Now for the remedy.

As soon as they have commenced to over-swarm, and have clustered, hunt out the queen and destroy her, and return the bees to the hive they came from, and follow up as long as they swarm. Or, perhaps a better plan would be, when the bees have clustered, invert or turn the bottom side of the hive up, blow in a little smoke; that will drive the bees up into the combs; now hunt out the royal cells, destroy them, and return the queen and bees to the hive.

The more prolific the queen the more young bees you have, and the more surplus honey will be stored. A

drone-laying queen should be taken away, and one producing workers put in her stead.

All stocks should be kept strong in order to be successful.

Beginners should be very cautious about increasing their stock rapidly, until they thoroughly understand the business.

It is recommended to give bees wheat or rye flour in early spring, before they can gather pollen. This promotes early breeding. Set it in the sun near your bees, out of the wind if possible. It can be put in old pans or boxes. If you make a few days' difference in swarms coming out, it will be of great importance.

It is not necessary, that because you are fond of whisky, to sprinkle the inside of the hive with it, or use any other patent charm or drops; but all you want is a good clean hive. It is well enough to wash it out with salt and water to make it cool.

LESSON P.

THE EGYPTIAN BEE.

This species of the honey bee is not sufficiently enough known to warrant a recommendation.

The *American Bee Journal* says: Through the agency of the Society of Acclimatization, at Berlin, Prussia, the variety of the honey bee prevalent in Egypt has been imported and introduced into Germany. M. Vogel, of Custrin, in whose charge the imported colony was placed by the society, has been successful in multiplying stock and preserving its purity, and several young queens have already been sent to England. And it is stated that arrangements have been made to bring this variety to this country.

From another source I learned that importations had been made last year, but they have not been sufficiently tried and tested to admit of any testimony for or against them. I know not what their relative value is.

They are said to be a very beautiful bee, differing in size from both the common and Italian bee. In color, also, it differs; and it is said to be quite as gentle in temperament as the Italian, while the breed is more easily kept pure. This is about all the information that I have been enabled to gather. It may be that this bee will be an improvement. Egypt, along the Nile, is a bee country.

The above is an extract from *Mitchell's Guide to Bee Keeping*, published in 1868, since which time there have been numerous importations, and we have had the pleasure of trying the little creatures. The queens have many claims to beauty, and are not so large as the Italian, but more active in their movements, it being almost impossible to capture them, but when captured are easily held. The bee keeper may have the queen upon a bit of comb; the comb being in one hand, with the other he attempts to catch the queen. The first attempt will be futile enough, resembling somewhat the Irishman's flea, viz: "When you get your hands on her she ain't there," and comes the nearest to being in two places at the same moment, of anything I have ever met with. You think you have her on the top side of the comb, but a second look shows she is on the under side. You make a second effort to catch her, and she leaves you and is away to the hive before you can corner her. The bees inheriting their queen's traits, are much more active than others I have seen; but when they have little stores of honey, they are very quiet and suffer the bee keeper to handle them with impunity. But wait till they commence gathering their stores of sweets, and the Egyptians will get their share; and if there is honey to gather from any source, they will secure it and keep it when got, fighting bravely even unto death before they will suffer themselves to be robbed.

It is a well established fact, that the Black and Italian bees will fill themselves when disturbed. Not so with the Egyptian; the bee keeper can smoke or put them in a wagon and haul them all day over rough roads, then give them egress, and the entire swarm rushes out as in ordinary swarming, with this difference, that such treatment makes them savage. And I here make the assertion that no man could live two minutes in their presence unless covered with armor. And we caution the novice in bee culture, unless he has his life insured and wishes his family to receive the benefit therefrom, to let, at such times, the little dears alone. We do not wish to do the little fellows any injustice, and will say, we believe the Egyptians are more industrious and gather more honey than any other bee that we have any knowledge of. And could we discover any plan by which we could handle them as we can the Italian bees, the Egyptian bee would be far more preferable. It is just possible there may have been an Egyptian queen imported into the United States—nothing being certain. We now leave the little rascals to take care of themselves, which they seem fully capable of doing; and should we have occasion to refer to them again, we hope to have formed a better opinion of them, is our last word in their favor.

LESSON Q.

HOW TO CHARM OR TAME BEES.

In this lesson I shall say some and many things which will interest the reader, and some which may not be quite so interesting, yet I hope that it will all be beneficial. Keeping bees good natured, I know, affords a

pretty fair chance of ridicule. It may seem rather absurd to teach a bee anything, yet it will not hurt to think about it a little.

Is it unreasonable that a bee can not be educated? Can not it be acted on in some manner? Can not they be subjected to the control and will of the bee master? Is there no analogy between them and other animals? The horse and the ox have been educated to the place that they now occupy. A bird can be brought from the wild forest and tamed. Most all animals can be petted. The same creatures may be made vicious or tame. Are bees entirely different? Are they endowed with a distinct instinct? We will have to admit, for experience proves that they may be made ten times more irritable than they naturally are. Nature has armed them with means to defend their stores, and instinct has taught them to combat, when sufficient cause. This is right. It could not be better. If they had no means to repel their enemies, they would be overrun with lazy depredators. Yes, and I would not except man, who would prey upon the fruits of their industry, leaving them to freeze and starve. Had it not been arranged by an All-wise Creator, this industrious insect would probably have long been extinct. Reason should teach us that they should be carefully handled, avoiding all jostling or pressure. All quick motions, such as running, striking, attempting to disperse those surrounding your person, should carefully be avoided. In our movements among them we should be slow, cautious, humble and respectful, and manifest a becoming deportment. Never manifest fear while operating with them. This should be observed in all cases. This should be remembered: Whatever is attempted, let no cowardice be witnessed by the bees. They hate a coward. You may imagine that their intention is to sting you when they approach in a threatening attitude, buzzing very provokingly for several minutes in close proximity to your ears and face, apparently to ascertain your intentions—then if you are afraid, and

begin to strike, you are sure to be attacked, and will likely get the worst of the bargain; but if you remain still, with your head down, a few moments, they will leave.

In all of your proceedings with bees, be not panic-stricken, and take to your heels and run. If you once do so you will have occasion to repent of it. If you expect to make a business of handling bees, I say, always stand your ground. If you haven't the nerve, then, as an alternative, use the protector.

THE GREAT SECRET.

Before a swarm leaves the hive, the bees fill their sacks with honey for the journey, and to aid them in starting in their new homes. The secret is, when you wish to handle them, get them to fill themselves in the same manner. We know how harmless a fresh swarm of bees are. While they are thus filled they are like a man soon after dinner, uncommonly good-natured; he feels like being quiet; he does not show any rough points of his character. Now, all that is to be done is to get your bees to fill themselves.

HOW TO DO IT.

When we wish to handle or change our bees, rap gently on the side of the hives; this will charm them; then give them time to fill themselves. If there should be some on the outside of the hive give them a gentle sprinkling with sweetened water, or diluted honey. If they were docile and tractable before, they are doubly so now. You may shake them down, hunt out their queen, or perform any operation with them you wish, and they will not sting. A honey bee filled with liquid sweets will not sting unless pressed.

DRY ROTTEN WOOD SMOKE IS A GOOD AGENT.

The effect of smoke on bees is wonderful. With it we can subdue their combative propensities, and render

them harmless. We can turn their anger to submission. And when once thus overpowered they seem to lose all knowledge of their strength, and become as harmless as flies. By rapping on the hive, and allowing them to fill themselves, and sprinkling them with honey-sweetened water, and in case it is necessary, use smoke, any bees can be handled without fear. This is the sum and substance of the art of taming bees. This is the explanation of all the charms, secrets, and receipts for taming bees, and is as good to you, reader, as if some unprincipled vender had humbugged you out of a five dollar bill.

A SMOKER DESCRIBED.

Take a clean cotton rag and roll it up. The roll should be one inch or more thick. When you wish to use it, light one end of the roll, and you can blow the smoke into the hive.

LESSON R.

TRANSFORMATION—CONVERSION OF A WORKER LARVA INTO A QUEEN.

This important discovery, of changing the larva of a worker into a royal one, is generally attributed to Sci-rach. He accidentally discovered the fact in the following manner: Having used smoke very freely in some of his operations with his bees, they were much annoyed at it, and considerable numbers of them left the hive, among them the queen. He searched for her diligently, but in vain. Next morning he discovered a small cluster of bees on the prop of the hive, whose queen had fled. Examining them, he found the queen. Placing her at the entrance of the hive, she was at once recognized and treated as a queen. "But," says he, "on examining the

combs, I found that the bees remaining had already planned, and almost completed, three royal cells."

He then carried away two of the cells, to ascertain whether the bees would continue their operations. He beheld, the next morning, with the utmost surprise, that they had removed all the food around the third worm left behind, on purpose to prevent its conversion to a queen.

Huber also gives us a detail of some of his interesting experiments, the substance of which only I can have space to present to my readers.

He deprived a hive of its queen, and put into it some pieces of brood comb containing worker eggs. The same day several cells were enlarged by the bees, and converted into royal cells, and the larva supplied with a profusion of jelly. He then carefully removed these worms from the royal cells and substituted for them as many common worms from worker cells. The bees did not seem aware of the change. They watched over them, and continued enlarging the cells, and, at the usual time, sealed them over. At the proper time the queens were hatched. He says they were of the usual size, and well formed in every particular.

THEIR MODE OF PROCEDURE.

When they are accidentally deprived of a queen, they fix upon a worm not more than three days old; then cut away and demolish the three adjoining cells, and raise around it a regular cylindrical enclosure, and at the end of three days they so cut away as to change the direction of the cell from a horizontal to a perpendicular position, working downward until it assumes something the appearance of an inverted cone, or acorn, about an inch long. In due time it is sealed over, and the larva undergoes a transformation into a royal nymph.

But in regard to drones the case is altogether different, as there is not that similarity existing between them and the worker as there is between the worker and the queen.

The primary object of the drone is to pair with the queen. He is the gentleman bee; his whole form, size, and organs are different from the worker bee, and it has been ascertained by dissection that the workers are imperfect females. This was proven by M. Jurine, a Frenchman.

And now, in conclusion on this subject, I kindly ask you to pursue this path of science, which is still capable of inviting you onward. I have only been picking up a few pebbles along the shore, while the whole ocean of knowledge lies unexplored. I ask you, is there in the catalogue of Nature's sciences one more worthy of our attention, or more inviting than this? Observe this insect race—ordained to keep their instinct pure and their storehouse sweet.

CLOSING REMARKS.

Now, kind reader, I must bid you good-bye, and close this part of my work. But I will say to you, go on, read on, read all you can, and where you can. Think of what you read; *adopt* nothing without first meditating on it. This is the only way to keep clear of all humbugs. Remember that the wants of the bee are simple. Attend to those wants at the proper time, and in proper manner, and you will reap your share of success.

WHO SHOULD KEEP BEES ?

I say all. All that possess a rod square of land should keep bees; yes, and if you lack that rod you should or can keep them. I know of some who own no land and still they keep bees. If you reside in the city full or country sparse; if you are on the mountain top or in the vale; if you are a mechanic or a farmer; if you are a lawyer or a preacher; if you are rich or walk in poverty's vale, you can afford to keep bees. The farmer is very suitably located to keep bees, having a sufficient range in his pastures, orchards and all other flowering plants and trees. He will find more profit with the least labor bestowed than in any other branch or department of his farm. The mechanic can, also, with a little time and labor, supply his table from his own storehouse. If he works in wood so much the better, he can make his own hives and also he may, perchance, get a job to make his neighbor's. The merchant or professional man, for they too, will find bee-keeping a healthy and pleasant outdoor pastime. There is this one great advantage about bee-keeping—it is no difference whether you own a foot of land or not—you have a free pasturage for your bees.

Mr. Kilpatrick, in the *Ohio Agricultural Report*, says many persons who are unfit for any hard labor will make good bee keepers, such as the aged, lame or deformed of both sexes, who can also obtain from this pursuit a good, independent living and to all such we say keep bees with care, they need no feed, they increase rapidly, and their produce brings a good price.

BREEDING.

Breeding depends upon the yield of honey, strength of colony and the season of the year. There may be other circumstances that have an influence, but these are the main ones. Reason teaches that a half-starved swarm, without sufficient strength, will not breed as fast, or send off as many and healthy swarms, as a hive that has a good winter's supply.

TIME OF BREEDING.

A strong swarm will breed the year round, but the warm season is the most prosperous, while a very weak stock does not commence to breed until warm weather. It is necessary that the temperature of the hive should arrive at a certain degree of heat before breeding or hatching will commence, and, of course, this is arrived at sooner with a large swarm than a small one, the animal heat being so much the greater in a crowded hive than in one that is nearly empty or desolate.

HOW WEAK STOCKS COMMENCE.

The queen first deposits a few eggs in the center of a cluster of bees of a small family in the warmest place in the hive wherever it may be. She will occupy a few cells on each side of the comb and as these eggs hatch out she will gradually enlarge as the stock increases and warm weather advances.

THE CELLS.

The cells in which the workers are reared are much the smallest in size. A drone cell is nearly one-third larger, and a queen cell still larger, and requires much material for its construction, and is always built vertical, or perpendicular, generally on the edge of the comb, somewhat

resembling a pea-nut. It will be understood that the cells are all made by the workers; all that the queen has to do is to deposit her eggs therein.

TIME FROM THE EGG TO THE PERFECT BEE.

After the egg has been laid in the cell, in about three days you can see a small white worm coiled in the bottom of the cell inclosed in a milky substance, which, no doubt, is its food. In about six more days it is sealed over. In this condition it remains about twelve days, when it bites off the cover and comes out a perfect bee. The period, owing to the occasion, varies somewhat, ranging from twenty to twenty-five days. The temperature of the hive has much to do with the time. A high temperature facilitates it while a low one retards it.

SEASON OF BREEDING.

I have said that strong swarms breed nearly the year round, but there are seasons of the year when it seems most genial. In spring and first of summer, nearly all of the combs that are convenient for breeding that are empty, and food abundant, they rear brood more extensively than at any other period. Towards fall they fill or store the cells full of honey. Then there is less room for brood. Generally about the first of May the hive becomes crowded with bees, and as the resources for gathering honey increase, the workers will at once construct one or more queen cells, and take an egg out of a worker cell and deposit it in the queen cell, feeding it with a peculiar kind of food, said to be royal jelly, at the same time guarding and building the queen cell. In a few days it will be capped over, and still their work is not done, for in every hive there is an old queen who will not tolerate a rival queen for a single moment, and were it not that the workers stood guard over the queen cells, both night and day, the old queen would at once rush upon them, tear a hole in each cell and at once dispatch them with her sting. I have opened a hive and in turning

the frame I discovered a queen cell nearly capped over. Upon the same comb I noticed the old queen. After watching her for some time, she approached very cautiously the queen cell, and when within about two inches of it one single worker ran at her as if she was large enough to destroy her at once. The queen turned short around and ran the other way, keeping out of the way of the worker, and, for more than one hour I watched their maneuvering, and at no time could the queen get nearer than two inches of the queen cell.

QUEEN BREEDING.

The Italian bees having acquired a great reputation for their many good qualities, all are asking how we shall proceed to raise the queens, and how keep them pure. There are many ways of doing one and the same thing, and queen breeding comes under that head. We have tried several different ways. By following the plans we have laid down in this work, you can not go astray, as we have aired the subject in every way conceivable to us at present.

The first requisite in queen breeding is the preparing of each colony containing a pure Italian queen that you wish to breed from. The hive must contain a large colony of bees. The comb must be examined carefully, to be sure there is drone comb in the center of the hive. That being done, it will be quite easy enough to get out Italian drones one or two months before the black drones make their appearance.

To insure this, it would be advisable to stimulate the colony early in the season, by giving them water with just enough sugar in it to entice the bees to partake of it. Feed them a little every day, and by so doing you will have early drones.

Having placed you in the situation for raising pure Italian queens, we will now proceed, first, by saying queens raised as above directed are just as pure as those raised in sunny Italy. Suppose you want to raise just enough to Italianize your own colonies. In such a case, as early in the season as you find drones capped over in the Italian colonies, then is the time for action. Lose not one moment. If you have one colony, or more, follow the same plan.

Your next move is to take every comb containing eggs and larvæ out of the center of the hive in which the Italian queen is located. Shake or brush off the bees, being very careful you do not hurt the queen. Then take the frames to a hive containing a black queen. Open the hive and destroy the black queen. Having done so, take out all the comb containing eggs or larvæ; then set in the combs from the Italian colony.

Take the comb from the black colony, containing the black brood, and put it in the Italian colony. You see, when done, that you have only exchanged the combs.

Perhaps you will say, dear reader, Why all this trouble? Why not take out the Italian queen and introduce her to another colony? That would be the speedy way, but would it answer the same purpose? I think not. You ask, Why. I have known many queen breeders that have made the change in that way. I have one in my mind's eye at this moment. He owned an Italian queen that money could not buy, which once belonged to me; but unfortunately I sold her before I knew her actual worth. Being a choice queen, I offered fifty dollars to get her back, and would have given one hundred; but money could not tempt the party to sell her—the owner wanting her to breed from.

As soon as the queen-breeding season came, he took her from her hive, and introduced her, in the usual way, to another colony. The consequence was, the bees not liking the change, dispatched their beautiful Italian

queen. I have heard and known of hundreds of fine queens being lost in the same way.

While upon this point, I must say, that if persons will persist in following their own methods, and lose fine queens thereby, they have none but themselves to thank. I can only tell you how to accomplish the change without any danger of losing your queens. By following the plan laid down, the Italian queen is always in the same hive, and you will always know where to find her.

I would like you to bear in mind that every sixth day you may remove the brood comb from the Italian queen, and exchange it for the black bee's comb, as first described in this chapter.

Possibly I may repeat some things treated of in a former chapter; but considering the subject of much importance, I hope it may not try your patience were I to repeat on every other page some of our advice to bee keepers. I wish this work to be a help to bee keepers that are yet unlearned in the art, as, also, the novice in bee culture, who is so fond of trying experiments to discover something new. There are many who will try everything and anything to accomplish in a new way what is better done in the old way.

But to the subject. The frames have been exchanged, and the bees in the queenless colony are busy building queen cells. On the eighth day after destroying the black queen, open the hive, and see how many queen cells the bees have built, and count all that you can cut out without injury, remembering that often there are two or more cells built so close together that they can not be separated without injury. Count the cells and close the hives. Open as many colonies containing black queens as you have queen cells, at the same time destroying the black queens. Then leave them until the following day, when they will have discovered the loss of their queen, and will accept the queen cells readily.

Again I would caution you, having no doubt you will want to be expeditious with the matter and destroy

the queens at once and introduce the queen cells immediately—if you do so, it is possible that the bees will destroy the queen cells before they are aware of the loss of their queen. At all events, you will be the more certain to succeed by following the plans laid down.

On the following day after destroying the black queens, open the Italian colonies, and with a thin-bladed sharp knife cut out each queen cell. Commence cutting at least one-half inch from the base of the cell, running the knife clear through the comb; then cut clear around, coming at no time nearer to the queen cell than half an inch. Care must be taken not to shake or jar the cell; in truth, the cell should remain untouched. Handle with the utmost care; cut them all out but one, leaving that in the hive to Italianize the colony. Care should be taken that the young queen does not become chilled in the cell before she is put in her new quarters.

Having cut all the queen cells from one hive, now open one queenless colony after another, until you have introduced into each a queen cell. To do this with safety, take out from the center of the hive a comb containing brood; cut a hole in the comb at the upper edge of the brood, large enough to insert the queen cell. It should occupy the same position in the new as the old hive. When adjusted, fasten with a bit of wax, or anything that will keep it to its place. In a few days the apiarian will have the satisfaction of seeing a beautiful Italian queen in the hive.

Following close upon that, Her Majesty, the Queen, leaves the hive for her bridal tour. She meets with the pure Italian drone, and the result is the bee keeper thereby gets just as pure a queen as could be got in Italy.

Having shown you how to Italianize your own colonies, I will now proceed to tell you how to raise queens by the quantity, or so as to supply the rapidly-increasing demands for pure queens. Follow the plans just laid down, and, in particular, the advice as to having your drones out very early—long before the black drones make their appearance. By that move, you have it all your own

way for a month or two. In making your preparations for raising queens by the quantity, it will necessitate your making a number of nucleus boxes. They should be made large enough to hold three or four full-sized frames, the same as those in your colonies. The nucleus boxes should have a movable top, with an aperture at the bottom, through which the bees can pass out of the boxes; it now being in readiness, take one frame of comb, containing brood, bees and honey, from as many hives as the nucleus boxes will hold; give each nucleus a queen cell, as before stated in this chapter. Make up as many nuclei as you have queen cells. Black bees being as good as any to raise queens, let the young queens remain in the nucleus until they are fertilized and begin to lay. They are then ready for market, and may at once be taken out, supplying their places with new queen cells.

In this way the nucleus boxes may be supplied with queen cells as fast as the young queens are taken out. The combs in the nucleus boxes must be taken out occasionally, and their places supplied with fresh comb from the large hive, this being done to keep up the strength of the nucleus.

In making this exchange, the bees should all be brushed clear from both combs before proceeding, and but one comb should be taken from the nucleus boxes at the same time. By adopting this plan, every nucleus can be kept strong, and at the close of the season you can double them up, and make strong colonies of them without any loss at all.

QUEEN BREEDING LATER IN THE SEASON.

We now come to a period of queen breeding that is not quite as pleasant as the one first treated of. The black drones are out, and should they come across your beautiful and well-marked Italian queen, while on her bridal trip, her progeny would only be hybrids. This leads us to the consideration of the best method of preventing the meeting of the Italian queen with the black drone. Be-

fore this can be accomplished with safety, the bee keeper will be obliged to Italianize every colony of black bees within five miles of him, which is not the easiest thing in the world to do, as you will find—more especially if there are wild bees to be found in the woods about you. So no alternative is left our queen breeder but to test all the queens before sending them away. Or he might ship them to his patrons to be tested, agreeing that if they do not prove to be pure, to furnish them with others.

This has led to the sale of many hybrid queens, and their progeny are scattered throughout the United States, and palmed off as the genuine article, although there have, without a doubt, been many sent off by the breeder when he was unconscious of their impurity; and the purchaser, not knowing the pure from any other, finds himself in a "fix."

Some of our queen breeders assert that the Italian bee is only a cross between the Egyptian and black bee. If their opinion is well founded, then, indeed, we have nothing but hybrids in the States, or anywhere else. If this be so, we have been importing nothing but hybrids.

We can only confess that we are not prepared to accept such a theory. Our belief is that the Italian is a pure, distinct bee, and is perfectly capable of reproducing itself. We might produce evidence to support our belief, but do not deem it necessary at this point of the question. In laying it on the shelf, to be aired at any future time, we simply give it as our unbiased opinion that what gave rise to the hybrid theory is this: that all writers who have preceded us have asserted that an Italian queen, when impregnated by a black drone, her progeny would be hybrids, except the drones, and they would be pure. We were once of the same mind, but while engaged in raising Italian queens, we have seen enough to convince us that the drone produced by the hybrid queen is impure. We say to every queen breeder, don't tolerate for a single moment in your apiary a queen that has mated

with a black drone. If you do, you will soon have trouble on your hands. Keep none but good and pure drones. Let us say, in connection with this, that the finest and brightest drones we have ever seen were the progeny of a queen that had mated with a black drone. The observing queen breeder can detect the hybrid drone as readily as the hybrid bee. We will not pursue this subject further at present.

QUEEN BREEDING IN A NURSERY.

We have raised many queens in Dr. Jewell Davis' Queen Nursery, and will proceed to tell you how this is done successfully: The nursery is made just the size of your frame, whether that be big or little, the compartments being movable and of sufficient capacity to hold the queen cell and a small bit of honey in the comb to supply the queen with nutriment. As soon as the queen leaves the cell, the empty queen cells are to be removed from the nursery, and each compartment filled with new cells. Remove a frame from the center of a strong colony, then set the nursery where it will be continually surrounded with bees. Should have stated before, not to cut out the queen cells before they are at least nine days old. By removing earlier, you endanger their safety, as the least touch will kill them. As soon as the young queens are one or two days old, remove them to the nuclei boxes.

We have now reached a fine point in our lessons, and this, no less than the introduction of the virgin queen to the nucleus box or colony of bees; but if the bee keeper will follow the plan I shall now set forth, virgin queens can be introduced without the least danger of their loss. We will illustrate our plan as follows:

Suppose that we have a nursery full of virgin queens, the next step would be to make up as many nuclei as

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we have queens—this must be done as before described, by taking from three different hives one frame each, each comb containing brood. Set them in the nuclei boxes. Let them stand about one hour, then let the young queen enter the hive from below, and they will receive her kindly. But if your nuclei have been prepared or used previously, then give them a good smoking; examine the comb carefully; cut out any queen cells the bees have started, shaking the bees off the comb in front of the nuclei, then let the young queen go on top of the comb before the bees enter, then close up the nuclei, and there will be no danger of losing the queen. The object in smoking them is this: the bees fill their jackets with honey—after so doing they will be harmless.

We will now direct your attention to another important part of queen breeding, that of the fertilizing of the queen bee in confinement. It is thought by many of our apiarians that queens can not be fertilized in confinement, they believing it to be unnatural to confine them. Their view of the case looks feasible to those who have never tried the experiment. We, having tried various plans with the view of accomplishing their fertility, (although failing in most of our efforts) we are forced, through our own experience, to emphatically assert that it can be done successfully.

And here to explain it in such a way as the novice will, at a glance, comprehend our meaning, and succeed; Mrs. Ellen S. Tupper, of Iowa, being the first to discover that queens could be fertilized in confinement. We do not know if Mrs. Tupper has given her view of the matter to the public. Since then, many others have tried different plans to accomplish the feat—and we mention from out the number, Dr. Jewell Davis, Gen. D. L. Adair, Wm. R. King and N. C. Mitchell. Each of the above named have invented a fertilizing cage, hoping to so simplify the operation that any one might succeed in fertilizing their virgin queens when in confinement. We have not the space to describe the different fertiliz-

ing cages now in use; but will try to describe as minutely as possible our own.

We make it about five inches square, and ten inches in height. The sides are made of thin boards. Near the top you cut or bore a hole one inch in diameter, cover the hole with wire cloth; then cut a second hole and let it be large enough to introduce either queens or drones—cover the bottom of the cage with wire cloth, the top being covered with glass, with a board over the glass to shut out the light. The cages can be made larger and so constructed that four fertilizing cages can be set upon the top of the hive. Having the cages ready, we next proceed (as soon as the queens are hatched) to cut out the brood comb that has been capped over, and out of which the young bees may be seen crawling. The comb must be cut to fit the inside of the cage, and when set in, should be about four inches in height. Two such combs are enough to each cage. The comb must come in contact with the wire cloth at the bottom of the cage, that when the cage is set on the frames of the hive, it may be in close proximity to the bees, so that the heat arising from the bees may keep the brood warm. The comb must contain honey as well as brood. All being ready for the young queen, we now put her in the cage—the best time being as soon as hatched, or it can be done before. The queen cell may be cut from the comb and at once be carried to the fertilizing cage. Place it between the combs in the fertilizing cage, small end down. When she is a day or two old, catch four or five drones as they are leaving the hive. It is best to have a wire cage to put them in, that they may not be hurt or frightened. Let them crawl from out the cage into the fertilizer.

Now let us see what we have in the cage—brood, comb and honey. The young bees keep crawling out Indian fashion, but as they will show no desire to leave their cage before being sixteen or twenty days old, they will be perfectly safe to use their own discretion up to that

time. Next in hand, is, we have one queen and four or five drones, which we keep in darkness, not permitting one ray of light to penetrate their dungeons. When the queen is five days old, at the hour of one or two, (day) we remove the board from off the glass and let in the light; then if the queen is ready for her bridal trip, she and the drones make for the top of the cage to the light, and will then accomplish the end for which they were created. Expose them to the light but thirty minutes, then close them as before, keeping them in the dark until the next day at the same hour—remove the top, and if the queen refuses to leave the comb, you may rest assured that she has been fertilized.

We have found this to be the most simple and cheapest way to fertilize in confinement, and one that the novice can understand and succeed in as well as those that are ripe in experience. And as this subject is of so much importance to bee keepers, we will yet notice one more process by which the virgin queen may be fertilized without the danger of meeting the black drone. We now refer to the Kohler process. Have in your apiary one or two stocks in which there is a multitude of fine drones; put them in a dark place, so dark they can not get one ray of light; leave them there till five o'clock, (evening) of the next day, when all the black drones will have returned to their hives; then open every hive containing fertilizing cages, set them around at different points, being careful not to remove the cover from the glass; and in that case, there should be a place of egress at the bottom of the cage. All now being ready, take the large hive from the dark room, put it upon its stand, open it, and out rush bees, drones and all; then, quick as possible, open the lower aperture of every fertilizing cage and let out the queens and drones. This maneuver may be repeated until you have succeeded in having all your queens purely fertilized.

We have now given you a plan which can not fail, and one which the novice will readily understand and not

fail in any quicker than the experienced. The reader will notice that we have continued this subject at great length. We have done this because it is our belief that it will prove instructive to our readers, and of importance to bee keepers, it being a subject he will have to meet, from the fact that the Italian bee is now bred all over the United States. Many are seeking a more thorough knowledge, with a view to raising pure Italian queens, not only for their own use but for the market. We have given our opinion a thorough ventilation on this subject, and hoping that we have done some good, with your permission, dear reader, we will take a breathing spell.

WHAT ARE WE TO UNDERSTAND BY PURE ITALIAN DRONES?

To arrive at the truth, this question is being discussed pretty thoroughly by writers who have preceded us, and they, having taken their side of the fence, show up their views as follows: That a pure Italian queen mating with a black drone is just as good as mating with a pure Italian drone, inasmuch as her drone progeny would be just as pure as though she had mated with the Italian drone. To substantiate this theory, they have elucidated the matter thus: That the Italian (virgin) queen that has failed to meet the drone in the proper season can, in part, propagate her species by the depositing of eggs in both worker's and drone's cells, but when nursed and fed by the bees will produce drones only. It is also claimed by different writers that if a virgin queen can deposit eggs that will produce the drone, or male be, then the fertilizing of the queen does not affect her drone progeny in the least. Their position in this seems well taken, and shown up in a feasible light, and with a determination not to be ousted from the standpoint they have taken; and to sub-

stantiate the assertions already made, they hold up to your astonished eyes the old fertile queen bee, and by her they show that the eggs, while remaining in the ovary, are not fertile, but as they pass out through the oviduct on their way to the cell are fertilized as they pass the mouth of the spermatheca, the queen having sole control of every egg, and can fertilize them or not, and that every egg that is deposited in the cells of the workers touches the male sperm deposited in the spermatheca, but the queen, when depositing eggs in the drone cells, closes the mouth of the spermatheca, so the eggs can not come in contact with the male sperm. In other words, the queen can, at will, fertilize every egg or none at all, and that it is wholly optional with the queen. We rather like the position they have taken and the way it is handled, which may be the true solution of the matter, but many believe the eggs are fertilized by the queen in the act of laying, by the compression of the abdomen, which they claim is done when the queen enters the cell of the workers for the purpose of laying eggs, but that when the queen enters the cell of the drone for the same object, the cell being large, there is no compression of the abdomen. Hence, they claim that the compression of the abdomen is the sole cause of fertility. We must say that we do not look with favor upon such an explanation of the subject. We do not think it well considered. It may hold good in theory, but not in practice, and it is the practice we have to face.

We will offer but one reason why we can not believe the compression theory. Bee keepers will notice that when a swarm leaves the parent hive, the old queen goes with them, and so soon as the bees have started comb, the queen may be seen depositing eggs in the incipient cells that are as yet not more than one-eighth or one-sixteenth of an inch in depth. Now, if the compression theory is correct, then every egg laid in the shallow cells would produce drones only, but it is known to every bee keeper that they universally come out workers, and that

a swarm of bees rarely ever build drone comb the first season. We do not think it necessary to follow up the compression theory with argument, as we think enough has been said to show the fallacy of such a theory that can not stand even a moderate sifting.

Now, having given you the theory of others upon this question, we would leave the subject as it is, but some of our prominent authors and writers upon apiculture have taken a very decided stand, and force us to our feet, and we must take our chances against them, as they claim that the Italian bee is nothing but a hybrid, a cross between the Egyptian and black bee; and what, we would ask, has led them to such a conclusion? Nothing but the theory that the fertilization of the queen has no influence upon the drone progeny. This theory has led our queen breeders astray, and finding something wrong, they declare as their belief that the Italian bee is only a cross. If so, it only amounts to this: we have been importing hybrids, we have been breeding hybrids, and selling hybrids. This being true, why say anything about the purity or impurity of the Italian queens or bees? If such were the facts of the case, it would make but little difference whether the bees had but one, two or three beautiful bands encircling their abdomen; they would only be hybrid after all. And just here we leap the fence and thereby leave some of our ablest writers, as well as our own teaching, on the opposite side, and it now remains to be seen and proved by practice, as well as theory, which is right. As we can not go with them, we are necessarily against them. We once held the same opinions, and gave vent to them, but by a series of experiments, we were compelled to give up the theory that the fertilization of the queen bee did not affect her drone progeny, for we find that, to insure the purity of both queens and bees, it is very essential that the drones be pure.

We will go still further, and say that if there is or must be a taint of impurity in either, let it be in the queen rather than the drone. Writers and authors that

have heralded their opinions on this subject, throughout the length and breadth of the world, go on to say that the fertility of the queen has nothing to do with the purity of the drone's progeny. Their assertions remind us of the Indian that strayed away from his home, who, after searching in vain for his hut till weary, he chanced upon a white man at work. The Indian asked "where is wigwam?" White man answered "Indian lost." Indian replies, "Wigwam lost, Indian here." That little story has its moral in the foregoing.

But to resume the subject, we affirm that the Italian bee is a pure and distinct species of the bee, having nothing in common with the other species, and that they can be kept pure. And the far-seeing and judicious breeder will see this and keep them up to the highest standard of purity, which can be done; or more, can improve them so as to reach any possible standard of bee perfection. Question.—"How can this be done? how reach that standard of purity?" Answer.—The first step to be taken, must be to secure a queen of known purity to breed from. "But," says one, "how shall I know when I have a pure queen?" I reply as heretofore, that queens that breed bees that are uniform in color and show three distinct bands of golden hue encircling their abdomen, you can rest assured the queen that bred them is pure, but not by any means, always a sure test.

We will now give you the only sure and reliable test, and one that will never fail, and will say that any queen that can duplicate herself every time is a pure queen; in other words, all the young queens bred from her eggs should be an exact counterpart of the old queen. But the queen that breeds some queens of light and some of dark, and yet others of very dark color, is not to be relied upon as being pure.

In this connection, we must remark that the queens bred early in the season are of a lighter color than those bred later. Again, the comb has something to do with the fine coloring of the queens. The queens bred in new

comb are always a shade lighter than those bred in the old comb. We make mention of this that the novice in bee culture may have a guide by which he may test the purity of the queens.

The queen breeder will say, if you apply this standard of purity you destroy our market for the sale of Italian queens. Not a bit of it; for the queens you are now breeding are worth to the bee keeper all they are paying you at present; but a queen that will duplicate herself every time is worth to any one breeding queens all the way from twenty-five to one hundred dollars, and the breeders that bring their stock up to this standard can sell every queen they raise for twenty-five dollars, and that just as readily as they now sell them at five dollars each.

We have said, to keep the stocks pure, the queen must be one that can duplicate herself every time, and both queens and drones must be bred from a queen of known purity. The queen breeders that follow minutely the plans laid down will, in the end, see that they have done wisely and well, and that their labor has not been in vain. Their queens will be even more beautiful than when they first began breeding queens.

At this point we will say it would be well for breeders to exchange queens occasionally with breeders that live some distance from you, and by doing this you prevent many things that are so injurious in raising stock; and now, as we have told you how to breed and keep your bees pure, we will proceed to give you the reasons for adopting so high a standard of purity.

In the first place, the standard heretofore adopted has been too low, and has led many to think the pure Italian bee exists only in name, and has laid the foundation for much quibbling, and resulted in the disappointment of many queen purchasers. The queens purchased not meeting their expectations, they find fault with the queen breeder, when, the truth to tell, the breeder is perfectly innocent, and unconscious of doing his fellow-man a

wrong, himself being led astray by following the theory laid down by our scientific writers upon apiculture.

We will now give you our opinion in regard to drones raised from the eggs of a virgin queen, and with them we will class the drones bred from a fertile worker bee. In appearance, they are the same, and to all appearances they both seem to be fully able to propagate their species, inasmuch as they possess the same functions as other drones; but, to our mind, they are not reliable, and should be destroyed at once. I believe that a queen that has become impregnated by a drone of this description is but little better than a drone-laying queen, and in the end will amount to nothing more. Our experience in this matter has not been carried so far as we would like in this direction; but, from what we have seen of them, we feel justified in saying what we have upon the subject.

We come now to the most important part of the subject, and that is: Does the fertilization of the queen bee affect in the least the drone progeny? We affirm that it does, and offer as proof that the drones bred by a queen that has been impregnated by a black drone are very finely marked, and to look upon, they are very beautiful; indeed, so much so, that the bee-keepers would resort to every means to have their young queens fertilized by them.

Now let us look at the drones bred by a queen that had been fertilized by a pure Italian drone, and what have we?—a drone that looks very much like the common black drone; his marking is scarcely perceptible, and that is usually under the lower part of the abdomen.

Now let me ask, if the fertilization of the queen bee has no influence upon her drone progeny, why should a hybrid queen produce more beautiful drones than the pure bred queens? Here is an argument that any one can satisfy themselves as to its truthfulness. And to carry this line of argument still further, and that without fear of successful contradiction, that the drone does more towards keeping the stock pure than the queen,

were I to-day to choose between which I would rather have to commence with,—a pure queen and an impure drone, or a pure drone and an impure queen, I would always say, give me the pure drone,—then I can improve my bees.

Let us now take a black queen; we pair her with a pure Italian drone; now we have half-bloods; we raise queens from her eggs, and again pair them with pure Italian drones. Follow this up for a few generations, and what have we?—a bee that no one can detect from the pure stock. And we may follow this up until every queen will duplicate herself, and every taint of black blood will have disappeared.

Now let us take a pure Italian queen, one that has been fertilized by a pure drone; raise young queens from her eggs. See how beautiful they are! We cross them with the black drones. Follow up, and when you have made but few crosses, all traces of the Italian bee will have disappeared. Does not this show conclusively that it is more essential to always have pure drones?

Again, upon this subject, we will say, select a drone whose mother was a pure Italian queen, except that she had been impregnated by a black drone; cross your Italian queens with them, and your stock will soon run back to the black bee. In making these assertions we know whereof we speak; and every queen breeder can soon learn if these assertions be true or false, and the sooner they learn the truth of the matter, the better it will be for them and all interested in apiculture.

It is admitted by the most of our learned apiarists that the drone dies in the act of fertilizing the queen bee. The reason is obvious. His male appendage is transmitted to the queen, who retains it about twenty-four to thirty-six hours—long enough to complete fertilization for life. Then, let me ask, is it not reasonable to suppose that the fertilization of the queen bee does affect her drone progeny? 'Tis our opinion the drone, when in the act of fertilizing the queen, transmits to the queen the

very germ of his existence, that germ becoming a part of the queen; and upon that alone depends the purity and the very existence of the species.

Then, may we not in justice claim that all eggs laid by a virgin queen or fertile worker are unnatural, and that the drones raised from such eggs are worthless and can not be depended upon to propagate their species.] And, again, that any drone that has not been bred from a pure Italian queen, should be thrown aside as worthless; and whoever engages in the culture of the Italian bee, and wishes to keep them pure, must pursue the same course they would to keep their stock pure. To improve the breed of your stock, the very best male is selected to propagate their good blood; and till we are ready to adopt the same theory in the culture and breeding of both the drone and queen bees, we can not expect to breed either in their purity.

We leave this subject with the hope that we may be the means of awakening more interest in the culture of the Italian bee in its purity; and the idea of the Italian bee being nothing but a hybrid should be discountenanced, no matter from what source it comes, and if the apiarist will follow the plan laid down by us in this chapter, he will soon acknowledge the truth of our assertion that the Italian bee does exist in its purity.

FERTILE WORKERS.

The fertile worker bee, so often found in queenless colonies, are a great source of annoyance to the bee keeper. The fertile worker bee very much resembles the common worker bee, and can only be detected by the most experienced eye. They have a little of the queen look. Her wings do not quite reach the entire length of her body.

It is thought by many that the fertile worker at some time before emerging from the cell has partaken of the food prepared for the queen alone.

It is our opinion that the fertile workers are brought into existence in the following manner, and to illustrate it, we will remove a queen from a colony of bees, and they will at once commence to build queen cells to supply the deficiency. Some colonies will complete every queen cell to perfection, while other colonies will only bring to completion a portion of the queen cells, and cap the others over, while portions of it are in an incipient state, and when coming from the cells they have a little of the queen look about them, and the novice might easily be deceived, and think them real queens; but when they are older they look still more like a worker bee—in fact, so closely resemble them that 'tis a difficult matter to detect the difference.

What has confirmed us in the opinion that they are bred in the incipient queen cells, is that we have seen them time and again crawling from the cells, and afterwards have seen the same little pests laying eggs just as busily as if they could propagate their species.

EVIDENCE OF A FERTILE WORKER.

Whenever you find more than one egg in a cell, you may know at once that you have no queen in the hive; for where the fertile worker is found you will find a number of eggs in each cell.

How to get rid of her. That once puzzled us, and not knowing how, we destroyed them in order to be rid of them.

Last summer (1870) we had several colonies that had lost their queens. We found, upon examination, that they had fertile workers. The next question was, what should we do with them? We had tried many plans, but all had failed. We had introduced queens a year before, only to have the fertile workers destroy them; we had

given the queen cells, only to have them torn out by the fertile workers as fast as we could put them in.

It then occurred to us that we could open one of our hives and select a brood comb containing a queen cell, and remove it, bees and all, to the hive containing the fertile worker. That proved too much for the fertile worker, she being at once superseded, and in a few days the young queen was out, and the colony was soon in as prosperous a condition as any colony we had.

We afterward found that by giving a colony that had a fertile worker a frame containing both young brood and bees, that they would invariably supersede the fertile worker, and raise for themselves a queen from the larvæ just given them.

We have now given the novice in bee culture a few plain facts to go upon, by following which they can at once get rid of a fertile worker, and if not dispatched at once, the colony will soon be reduced in numbers, so as to be worthless for any purpose. If the apiarist should not discover their condition until the most of the colony have become drones, our advice is, destroy them at once and get rid of the drones.

SHORT QUESTIONS AND ANSWERS.

Question.—How should bees be kept so as to yield a large annual income?

Answer.—By having your bees very strong or numerous at the beginning of the honey season.

Question.—How can this be done?

Answer.—By stimulating your bees early. Give them four parts of water to one part of sugar; bring to a boil and skim.

Question.—How shall I feed it?

Answer.—Feed in the top of the hive, in anything that is convenient; if in an open-topped vessel of any kind, lay in the syrup enough straws to keep the bees from drowning.

Question.—What good is there in feeding early?

Answer.—By feeding the bees it starts the queen to laying eggs, and if fed every day all they will take, by the time the flowers are out you have an army of bees to gather the honey.

Question.—If I feed my bees as you direct, how much surplus honey can I rely upon getting?

Answer.—If the season is good, and you remove the surplus honey just as fast as capped over, you can take from one hundred to five hundred pounds of surplus honey from each colony of bees.

Question.—How can that be? I have kept bees all my life, and have never got more than twenty-five or fifty pounds of surplus honey from the best colony of bees.

Answer.—That may be true, but you are to blame for it, and not your bees.

Question.—How am I to blame for not getting more surplus honey?

Answer.—You should have kept your bees in a movable hive, with small frames above for the bees to store all surplus honey, and then you should have removed the small surplus frames as fast as capped over, and supplied their place with empty frames.

Question.—What advantage would there be in removing the frames as fast as capped over.

Answer.—That the bees may always have new frames to build comb in, and that would tend toward keeping them constantly at work, both night and day; whereas, if left in the hive, it would only be in the way. When capped over, it is somewhat like the apple when ripe on the tree—they must be gathered when ripe, or they may be lost.

Question.—But should I conclude after all said, to let all the honey remain in the hive till it was full, and the honey all capped over, what would be the difference?

Answer.—If not taken out as fast as capped over, the bees will fill the hive and then prepare to cast a swarm, and hundreds will be idle around the entrance of the hive—nothing to do and no where to deposit any honey they may gather.

Question.—Is there any other reason that it would be better to remove the honey as fast as capped over?

Answer.—Yes, and that is a very important one. Soon as the surplus boxes or frames are full, if not taken out, the bees are apt to encroach upon the quarters of the queen, that is, enter the brood chamber and fill up every available cell with honey. They have even been known to remove not only eggs, but young larvæ from the cells, in order they might have a place to store the honey gathered; hence the great secret in bee culture, is to give the queen plenty of room to propagate her species, and the bees plenty of store room for surplus honey, then all will go on smoothly.

Question.—What should honey be put up in to sell the best, and bring the highest price?

Answer.—Honey stored in small frames that will hold from one to three pounds each, sell more readily, and is in better shape for the grocery man to handle, there being no cutting, waste or breakage of comb in retailing.

Question.—How could the honey be carried to market in small frames?

Answer.—As the frames are taken from the hive they, should be set in a box purposely made to hold them—large enough to hold three or four frames, the frames being fastened so as not to allow the honey to touch. The boxes should have an observatory glass, so the contents could be exposed to view without the opening of the box, that would enable the person or persons to see the quality of the honey without opening the box.

Question.—What is the next best way of having honey stored for market?

Answer.—In small boxes, and they should hold from three to four pounds of honey each, and no more, if you want it to bring the highest.

Question.—Tell us how to ship our honey to market?

Answer.—Put up your honey in small packages so that each package will freight from fifty to one hundred pounds each. Pack so that the glass ends will be on the outside—that will enable all to see what they are handling. Better have handles at each, both ends of the package, so that the boxes or crates can be handled with great care, then mark it this side up. Add anything else you may think proper, to keep them from rough handling.

Question.—When should bees be fed?

Answer.—Late in the fall and after the bees have quit gathering honey.

Question.—What is the best method of feeding.

Answer.—When combs containing honey can be had, it is best to give them honey in the comb, otherwise, take the rate of four pounds of coffee sugar to one quart of water, boil to the consistency of thin honey—all impurities should be removed as fast as it arises to the top. Feed it in the usual way.

Question.—Should not bees be fed in the spring of the year.

Answer.—Yes. If they are short of supplies give them sweetened water just enough for them to take it readily. When you commence to feed in the spring, feed every day enough to keep them breeding until the flowers are out in all their loveliness, then they can find enough to supply their wants. We caution you not to forget to feed your weak colonies of bees in the spring, and feed them regularly; for one day's neglect might be the cause of losing the young larvæ. With this suggestion we close this work.

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ILLUSTRATIONS.

We have concluded to present our readers the cuts of hives used long ago in both America and Europe. For descriptions, see the following pages.



Fig. 1.

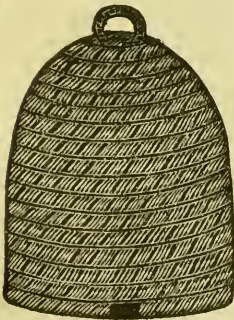


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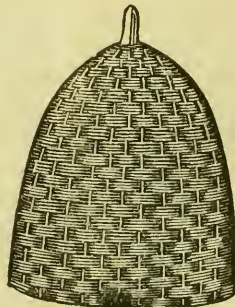


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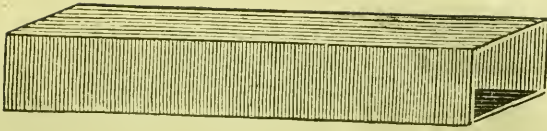


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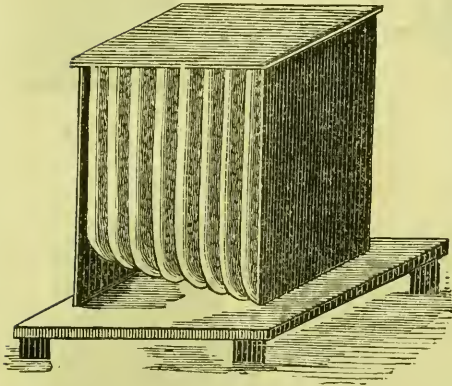


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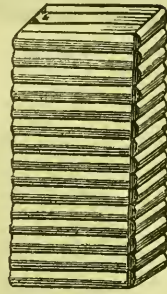


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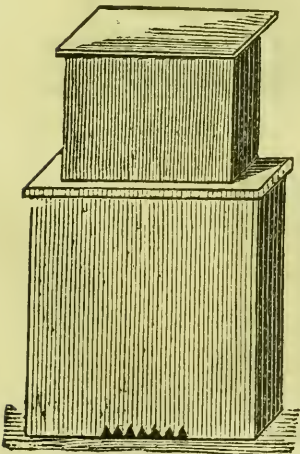


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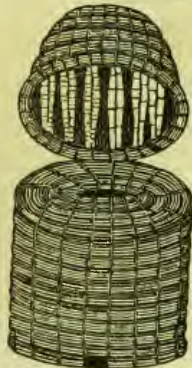


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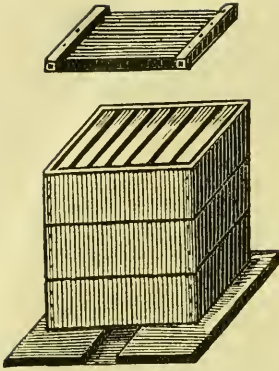


Fig. 9.



Fig. 10.



Fig. 11.

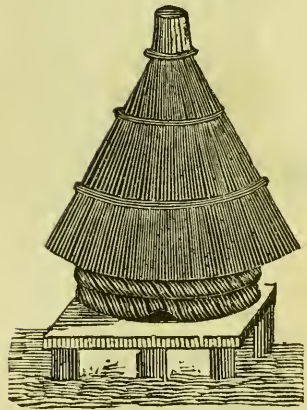


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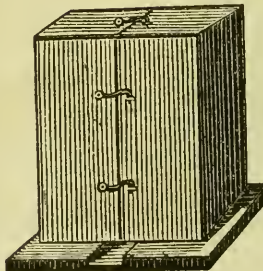


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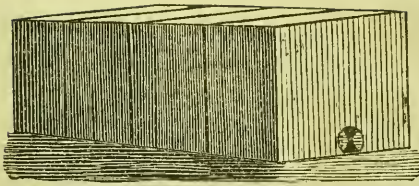


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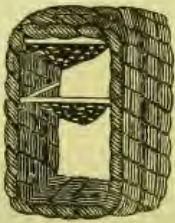


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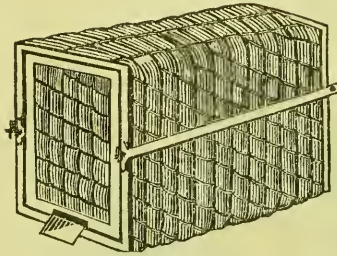


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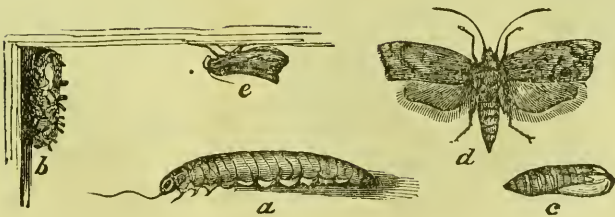


Fig. 17.



Fig. 18.



Fig. 19.



Fig. 20.



Fig. 21.



Fig. 22.



Fig. 23.

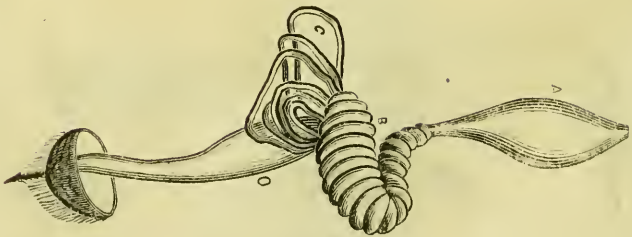


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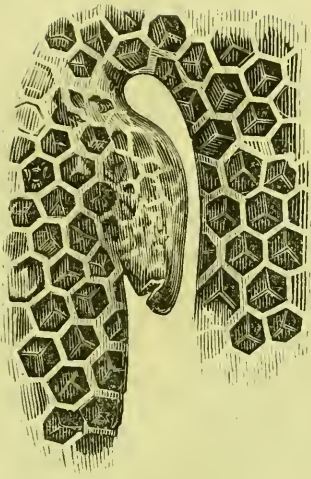


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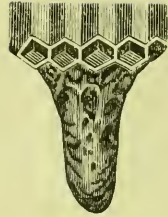


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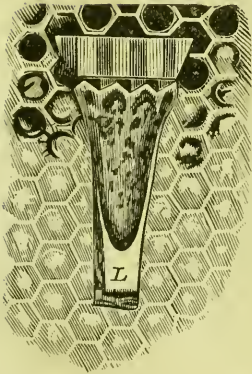


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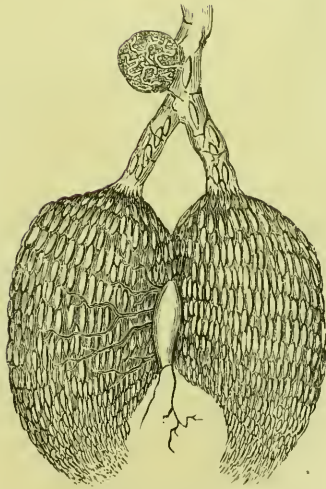


Fig. 28.

EXPLANATION OF CUTS.

Figure 1 represents the old American hive used by our forefathers. The pattern would lead one to suppose it to be the same as one that was used in the Ark.

The people of Europe have the honor of inventing and using Figure 2, which is a willow hive, covered with cow dung and lime.

Figure 3 represents an old-fashioned straw hive.

Figure 4 represents the Venetian hive, composed of four boards six inches broad and three feet in length. This hive is entirely open at both ends. In the fall the bees are destroyed by brimstone, and the contents of the hive taken out.

Figure 5 shows the hive of Calabria (South Italy). One side of it is always open, and the bees are protected on three sides only against their enemies in summer and the cold in winter.

Figure 6 shows the African hive, made with sticks of wood. This is probably the most useful and reasonable of all common box hives.

The following hives, Figures 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, inclusive, are old European movable-comb hives. For cuts furnished for old European hives, we are indebted to the kindness of C. P. Dadant.

Figure 17, bee moth and her progeny.

Figure 18, the sting of a bee highly magnified. *a* is the spear; *b* and *c* are the poison sacks and cells.

Figure 19 is the tongue of the honey bee magnified. *a* is the hollow tube through which the sweet nectar or honey is sucked. The other large appendages shown appear to be feet, for enabling the bee to support itself while sucking up the nectar, and also for enabling it to retreat when it has all it wants.

Figure 20, Italian queen.

Figure 21, Italian drone.

Figure 22, Italian worker bee.

Figure 23 represents the abdomen, or body portion of the bee, showing more particularly the manner in which wax is secreted, which is in little, fine scales, as shown in the figure.

Figure 24 represents in part the anatomical view of the worker bee, showing its natural structure in a magnified state. *a* represents the honey sacks, or honey bag, as it is sometimes called, or first stomach, partially filled; when distended, it will hold about one drop, and is of the size of a common pea; in this sack the bee carries the honey from the field to the hive; *b* represents the second or regular stomach; all honey that passes from the honey sack to this, goes for the nourishment of the bee, and for the elaboration of wax; *c* represents the small intestines; *o* represents the rectum and sting.

Figures 23 and 24 are copied from "Kidder's Secrets of Bee Keeping."

Figure 25 represents sections of brood comb and a queen cell, from which the queen has just emerged.

Figure 26, queen cells cut from the comb, ready to insert in any other comb.

Figure 27, comb containing mature brood, also queen cell inserted.

Figure 28, the ovary of a queen, highly magnified.

Figure 29, copied from "Hive and Honey Bee."

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The Rev. L. L. Langstroth Testimonial Committee.

Mr. Clarke, of Canada, of the Committee on the Langstroth Testimonial, reported as follows:

"The committee to whom was referred the matter of a testimonial or donation to the Rev. L. L. Langstroth, beg to report that, after a protracted thorough and, to some extent, confidential investigation, they have come to the following results:

"1. They find that, owing to a series of untoward events, Mr. Langstroth has received but very meager compensation for his great services to American apiculture

"2. That Mr. Langstroth, in his old age, is not only in straightened circumstances, but is afflicted with a malady which renders close and continuous thinking perilous to him, so that he is precluded from application to study or business.

"3. That, in view of all that Mr. Langstroth has done to promote the interests of bee culture, it is incumbent on the apiarians of America to make an effort for his comfortable maintenance in the decline of life

"4. That in furtherance of this object, the following measures be taken, viz:

"That the Vice President, Secretaries and Treasurer of this Association be organized into a committee, to be called the Langstroth Testimonial Committee.

"That a general appeal be made for subscriptions on behalf of this object, as proposed and commenced by Mr. King at the meeting of the Association yesterday.

"That a proposal, submitted to this committee by N. C. Mitchell, to furnish a large photograph of Mr. Langstroth to all and sundry at one dollar, out of which at least seventy-five cents shall go to Mr. Langstroth, be published as widely as possible, with the warm approval of this Association, in the belief that a large multitude of persons, bee-keepers and others, will be anxious to possess themselves of such a *souvenir* of one who has so distinguished himself in the domain of apiculture.

"That whatever is obtained in the ways above enumerated be transmitted to Mr. N. C. Mitchell, by him conveyed to the Rev. L. L. Langstroth, and reported to this Association as a part of the Treasurer's official statement.

"All of which is respectfully submitted.

"WM. F. CLARKE, *Chairman*"

On motion, it was agreed to make the price of the Photograph \$1.00 without and \$2.00 with Mr. Langstroth's autograph.

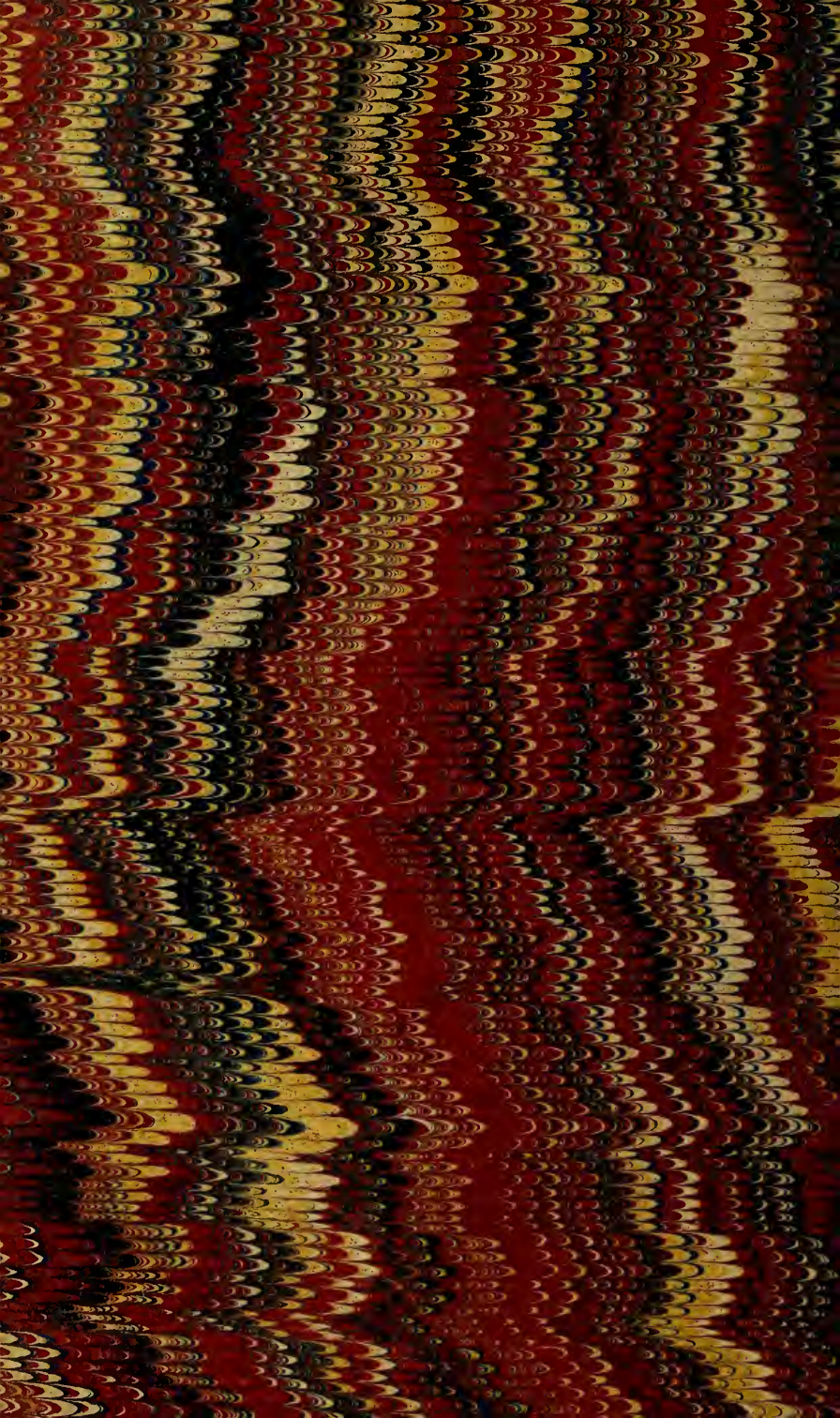
To the above, which was copied from the Proceedings of the American Bee-Keepers' Convention, we wish to add, that we are now ready to send, post-paid, a large-size Photograph of Rev. L. L. LANGSTROTH—without the Autograph, \$1.00, with Autograph, \$2.00. We will also send the NATIONAL BEE JOURNAL, Mitchell's "FIRST LESSONS IN BEE CULTURE," and Langstroth's Photograph, for \$2.25; the same, with Langstroth's Autograph, \$3.25.

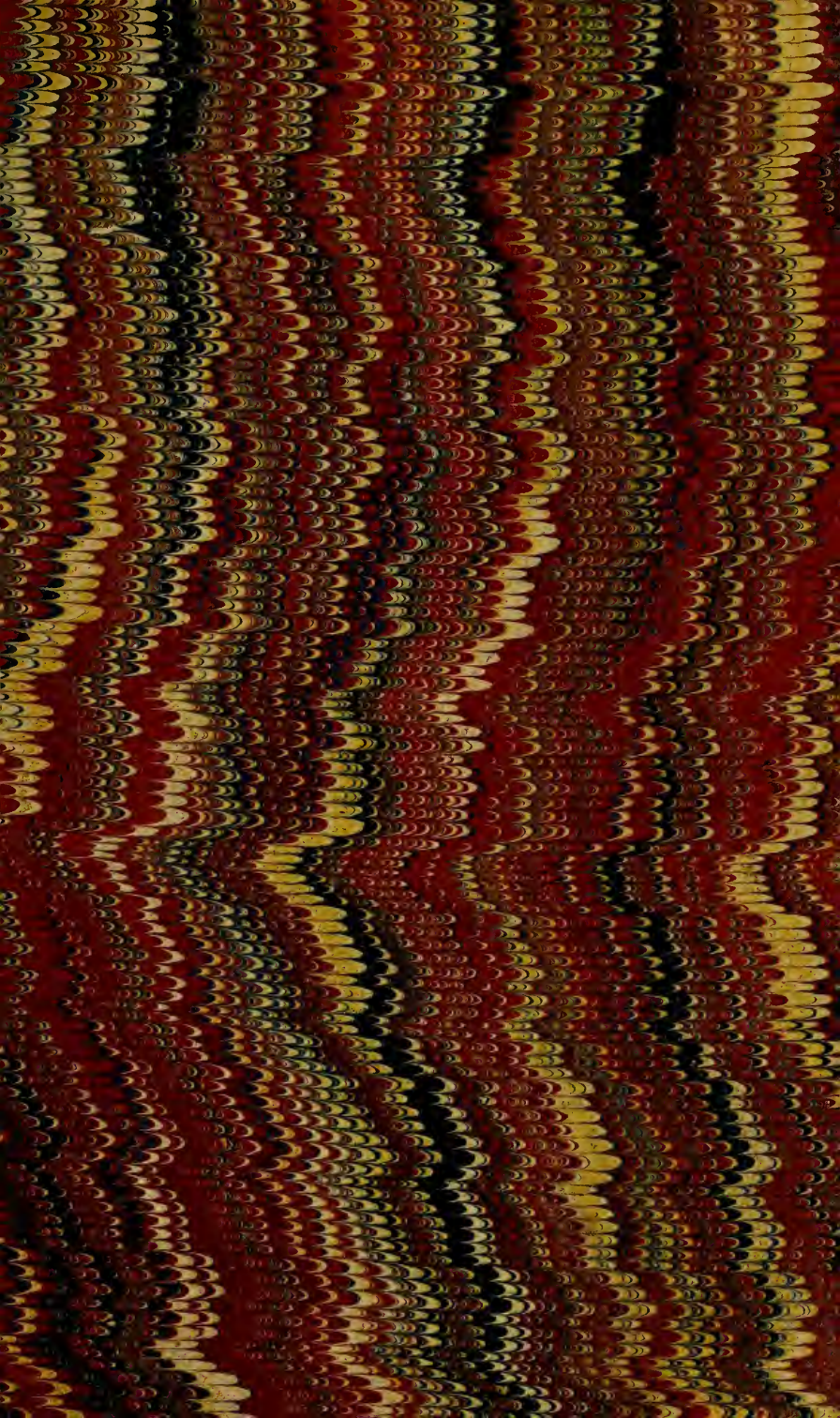
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