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CHAPMAN'S HANDY-BOOK ON THE HONEY BEE.

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HOW TO MANAGE

THE HONEY BEE

IN

NEW ZEALAND

COMPILED BY AN OLD BEE-KEEPER

REVISED BY

H. J. HAWKINS, Belvidere Fruit Nursery

AND

DAVID HAY, Montpellier Nursery

AUCKLAND

GEO. T. CHAPMAN, BOOKSELLER AND PUBLISHER

QUEEN STREET

1867

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P R E F A C E .

THE author of the "Bee-keepers' Manual" says that he was disgusted with the few miserable straw hives or skeps which are to be seen in every part of Great Britain, enveloped during the winter season in filthy rags, or covered with turf, or shut up in a little wooden hovel, which have more the appearance of pestilential prison-houses than the comfortable abodes of a refined and busy population. This awakened his sympathy for the poor bee, and it at once occurred to him to write a treatise on their management. Our reasons for compiling this work are of quite a different character.

As a branch of colonial industry, requiring not much capital, and but very little time and attention, our object is to encourage country settlers to take to bee-keeping as a matter of profit, for the country seems peculiarly well adapted for it, the native trees, shrubs, and flowers, giving a constant succession of bee-food nearly all the year round.

We have made our instructions as plain and practical and in as few words as possible, telling the best and easiest way of accomplishing the several operations connected with the craft.

Mr. Cotton treats the matter of hives lightly, and seems to think that almost anything will do, while in England, at the present day, this is considered of great importance, there having been much controversy, talking, and writing on the subject. What we consider the

best hives we have described at page 21; the Cottage Hive, which may be made either of wood or straw, can be maintained at any temperature, and you may take honey from it nearly all the year round. At page 23, we also describe the celebrated Stewarton Hive—it is much talked about, and extraordinary quantities of honey seems to have been got from it; this hive should be ordered from a competent tradesman, and it should be well and carefully made; these are the two best hives of the present day.

We have to thank Mr. David Hay and Mr. H. J. Hawkins for the very great assistance received from them. They have advised and assisted us throughout, and, in a great measure, the work embodies their experience in bee-keeping in New Zealand. Mr. Hawkins, after examining the printed sheets, says, with regard to moving bees a short distance, say from two to four miles, he merely closed the entrance with a bit of paper, and tied the bottom board securely to the hive. He also says:—At page 18, the “The Times Bee-Master” is reported to say that bees never touch double-flowers, and that though the hedge rose and sweet-briar are favourites with the bees, they never alight on the magnificent and deliciously perfumed varieties of the rose. These remarks are altogether opposed to experience—many kinds of double-flowers are visited as freely by the bees as are the single varieties of the same kind, viz., the fuchsia, balsam, hollyhock, &c.; and I think I may safely state that any kind of double-flower that will produce seed will be found to yield food for the bees. In opposition to the “Times Bee-Master,” I must state that the bees have a great partiality to the rose, both in its single and double state; and as a proof of this, it may frequently be seen, before the bud is expanded,

forcing its way to the centre between the unfolding petals, and I have frequently cut buds of some of the more open varieties, such as Safrano, General Jacqueminot, &c., and carried them some distance with the bee in the centre. Judging, from the number of bees to be seen and heard around a bed of sorrel when in flower, I conclude it is their favourite plant; still I cannot conscientiously recommend its culture, even to bee-keepers.

It is stated at page 18, that bees will eat sugar in every form. Wasps will; but it must be partially dissolved before bees will consume it. The opinion of naturalists (page 19) that bees when foraging confine their operations to single species of flowers I believe to be also erroneous. In the spring such would probably be the case, as a bee alighting upon, say, a peach tree in full bloom, would have no occasion to wander farther for its load, and consequently the pollen would be all of one color; but such is not the case in autumn when flowers are scarce. Then the bees have to fly from one species of flower to another; and should they confine themselves to one species, which they do not, the pollen of the different varieties of that species often varies in color with the color of the flowers; the pollen from a white fuchsia being very different to that from a crimson variety. Bees may be seen now (June) when the weather is favorable, collecting "honey all the day from *every* opening flower." In connection with Swarming and Hiving he says: I procured my first bees in the following manner:—A swarm was discovered on the branch of a tree hanging over a precipitous side of a gully from whence it was impossible to hive them in a box. I therefore made a rough sort of hoop of a piece of supple-jack and placed it in the mouth of a bag; the

bag was then fastened to the end of a pole and held under the hanging swarm; with another long pole the branch was struck or violently shaken by my companion which caused the bees to drop into the bag, from which they were immediately shaken into a box procured for the purpose. The box was then turned over and left on the ground with the bag by its side, that the bees that were adhering to it might join their companions, and in the evening when the bees were quietly settled, the box was carried home. Of other swarms discovered in the bush, I have always found it more convenient to take them in a bag and thus carry them home, than to carry a box to the swarm.

On the general management of bees I can offer no remarks. The book will, no doubt, be found sufficient, and I believe many settlers will be glad to begin bee-keeping when they find from this Handy-book how easy and simple is the management, and how much pleasure and profit it will bring.

H. J. HAWKINS.

Belvidere Fruit Nursery,
North Shore.

1867

The PUBLISHER will be glad to receive hints and suggestions from the experience of settlers on the management of Bees.

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Therefore doth heaven divide
The state of man in divers functions,
Setting endeavour in continual motion;
To which is fixed, as an aim or butt,
Obedience: for so work the honey bees,
Creatures that, by a rule in nature, teach
The act of order to a peopled kingdom.
They have a king, and officers of sorts:
Where some, like magistrates, correct at home;
Others, like merchants, venture trade abroad;
Others, like soldiers, armed in their stings,
Make boot upon the summer's velvet buds;
Which pillage they with merry march bring home
To the tent royal of their emperor;
Who, busied in his majesty, surveys
The singing masons building roofs of gold,
The civil citizens kneading-up the honey;
The poor mechanic porters crowding in
Their heavy burdens at his narrow gate;
The sad ey'd justice, with his surly hum
Delivering o'er to éxecutors pale
The lazy yawning drone. I this infer,—
That many things, having full reference
To one concent, may work contrariously;
As many arrows, loosed several ways,
Fly to one mark; as many ways meet in one town;
As many fresh streams run in one salt sea;
As many lines close in the dial's centre;
So may a thousand actions, once afoot,
End in one purpose, and be all well borne
With defeat.

SHAKSPERE. *Henry V.* Act i. Scene 2.

THE HONEY BEE

IN

NEW ZEALAND.

THE management of the Honey Bee in New Zealand is so very different to what it is in Great Britain that we are not surprised when new settlers who wish to profit by Bee keeping, as they were accustomed to do in the old country, so frequently ask for some information on the subject.

The author of "My Bee Book" published a series of letters in a Wellington newspaper some ten years ago, but so full of quaint humorous stories it is hard to tell when he is in earnest and when in fun; for all that Mr. Cotton's system is the most sensible and humane, and is now recommended by nearly all intelligent bee masters in England and in the Colonies.

The Rev. R. Taylor says (Notes and Queries, 8th Dec., 1855) Bees were introduced into New Zealand before Mr. Cotton's arrival, but the chief supply is derived from his stock. Mr. Cotton arrived in Auckland in company with Bishop Selwyn on 29th May, 1842, and although there are several things connected with New Zealand bee keeping he was not aware of (these we will explain as we go along), Mr. Cotton remained long enough to prove the fact that *New Zealand will be a great honey producing country.*

Introduced by

Wm H. Osborn

in 1840

As a sample of Mr. Cotton's humour we copy the following from "My Bee Book," page 96, That dear old man John Evelyn seems to have fancied that the bees sit upon their eggs like hens. This must be a queer sight, and I should like to see it. Evelyn says in his calendar

for January, turn up your hives and sprinkle them with a little warm sugar and sweetwort—do it dexterously; what should we think of a doctor who when called to visit a patient in a low fever and very weak, orders a gallon of broth to be poured upon him as he lies in bed and then leaves him to dry himself as he can, or even opens the window on a cold frosty night when he is in this pickle? We should say *this man died of the doctor*, which, I fear, says Mr. Cotton, is a very common complaint.

A French naturalist says, the bee has been known and admired in all ages of the world on account of its industry, policy, and curious economy; it has alike furnished a study for the naturalist and a theme for the poet, and from its lowly dwelling philosophy has received the most exalted lessons of prudence and wisdom.

The history of the Honey Bee carries us far back in the history of the world: thus in the Bible they are first noticed as chasing and destroying the chosen people 3350 years ago, and soon afterwards we find Samson taking the honey comb from the carcass of the dead lion and eating it, and hence the first riddle or conundrum on record, "Out of the eater came forth meat and out of the strong came forth sweetness." And then we have poor broken hearted king David complaining that his enemies compassed him about like bees, thus shewing that he was not an enthusiastic bee-master.

The natural history of the bee is also extremely curious and interesting, but in the present work we do not enter on that subject as nearly all the English Bee Books give that subject great attention. We will confine ourselves to

The Management of the Honey Bee in New Zealand.

One very popular writer says that a hive of bees should be considered as a sum of money deposited in a savings' bank that will repay good interest if the original stock is preserved. He supposes that a cottager has his original hive and a swarm from it in the middle or end of May, (this would correspond to our November in New Zealand) let him adopt the following plan—place a straw cap on the hive, having previously cut a hole at the top of the

hive three or four inches across, the cap having a small bit of glass inserted in it, which will serve to show when it is filled with comb and honey; when this is the case take the cap carefully off, carry it to a little distance and place it on the ground, the bottom upwards, and with a bunch of feathers whisk off the bees as they appear on the surface. They will soon return to the parent hive, and thus not a single bee need be destroyed. A fresh cap should be in readiness to be placed on the hive, except, indeed, the first should be removed late in the season, in that case the hole should be covered by a piece of slate or tile and plastered over with mortar. If the first cap is removed early in the season, say the end of May (November in New Zealand, remember) or beginning of June (December), a second cap may be filled provided the season is a very favorable one; the bee owner will thus have a very profitable return and retain his original stock of hives; should he indeed wish to increase it he may wait for an early swarm, and when this has been secured he may place a cap on the hive which has given him a swarm, and if it is a good season he may expect to have it filled. I have also placed a cap on a very early swarm and also had it filled, in which case the honey in it is particularly fine and white; now, as you will be informed farther on in this work, the above plan of taking the finest honey by the use of the bell-glass or cap may be adopted, at least in the Province of Auckland, at almost any season, as the bees work nearly all the year round.

Position of the Hives.

The same writer goes on to say,—Some years ago I was a very extensive and also a very successful bee owner, and I will now give a short account of the method I adopted with them. In the first place I invariably placed the entrance to the hive towards the setting sun, and for the following reasons—first, if placed to the rising sun they are tempted to leave the hive, while the dew is on the flowers, and thus get their wings wetted, and are consequently unable to fly back to the hive. Second—Bees work late in the evening, and if the hive is placed to receive the rays of the setting sun they more readily find

their way back to it. Third—If the hive is placed towards the setting sun the bees leave their hive later in the morning, when the dew is off the flowers, and thus escape the destruction which attend the early workers. It is quite true that at certain seasons, when food is scarce or the weather stormy, bees arrive late in the evening; this is another reason why the opening to the hive should be towards the setting sun. This will be as true in New Zealand as in England. Your own dwelling house should face the north-east and the beehive should face the north-west, but of course different localities will modify this a little.

Bee-houses.

The "Times Bee Master" (Dr. Cumming), and all practical bee keepers, object to the bee house. Mr. Jesse says, I have a dislike to bee houses. We believe they serve to harbour and breed vermin. Mr. Cotton says, some of you do not fancy wooden boxes, because you say the bees do not like them. Now, I would ask whether wild bees live in wooden trees or in trusses of straw? They choose wood, and wooden boxes, if thick enough, are warmer in winter, cooler in summer, freer from insects, and more handy than straw hives—for ventilation and side room, have three boxes, swarm the bees into the middle box and if never afterwards disturbed, there the queen lays her eggs, there the nurse bees do their work, there they lay up honey, the side boxes are barns where they lay up spare honey for you, and which you may take as fast as they are filled—there is a slide at the top and bottom of the middle box working from the front, which opens or cuts off the way from the centre box to the sides; always keep one of the side boxes empty, as soon as the one on the right hand gets pretty full of honey, to prevent the bees from swarming, pull out the slide and let the bees into the left hand box—as soon as they have taken to this new barn carry off the full one, empty it and place it back again to be used as soon as the left hand one gets full, the boxes must be about eleven inches on the inside by nine inches high, but always remember the size is of little consequence, as a Polish hive is five feet high. The hives must be sheltered from the

prevailing winds, and yet not blocked up in front by high trees or buildings, open to the sun in the morning, and yet so constructed as to screen the hives from its direct rays at midday, this may be done by an overhanging roof, which will also keep the drippings of rain from the hives; every one may use his taste in the form of his bee-house, this is of no consequence if the hives be only screened from the sun and sheltered from the wind; and yet I think a shed open in front, so that the air may circulate freely about the hives and keep away damp, with room enough for one or more persons to pass along at the back of the hives, and look into any which may have windows or glasses on the top, is as good a form as can be; it is not, indeed, at all necessary to have any house at first, the single hive, with which a settler begins his bee keeping, may stand on a stool in some sheltered nook of his garden within sight of his door, and when not his single hive alone, but a goodly row of off-shoots is seen in his garden, when the owner of them finds bee keeping a pleasant and profitable employment, he may then think of putting up a permanent shed for his favourites.

It is recommended that the first swarm you get should come from a distance, even miles away, the farther the better, as they appear to thrive better than when got from a neighbour. Having described the bee-house and the position of the bee-hives, we come now to tell

How to get a Swarm conveyed to a distance.

The plan recommended by Mr. Cotton is, get a swarm from a friend early in the season, that is in October or November, in order that your stock may be well established before the swarming season is over (the end of February), by which time you ought to have several hives in your bee-house, for if you begin bee keeping later in the year, and your single stock meets with an accident in the winter, you may perchance get discouraged at having to begin again. In buying or getting from a friend, upon no account take an old swarm, if the comb is not white reject it; notice that the first year the comb is white, the second it is brown, and the third year it

is black; see that the bees are lively, not quiet and languid, and paying no attention to you when examining the hive. Now then, after making your selection, you wish to move your bees some distance, therefore, when your hive is stocked, tie it up securely in a cloth, that same evening, and carry it to the place where it is to stand. It must *on no account be moved again except to a considerable distance*. The situation of the hives ought never to be changed, but I have seen people shift about their hives very inconsiderately; the change of place invariably weakens them, as the bees will return to their old residence, the environs of which are so familiar to them. A hive should remain as fixed to the spot as the ancient oaks, in the hollows of which they delight to establish themselves, where they have their young, their companions, their beloved queen, and all their treasures. When the young bees take wing for the first time, they do it with great precaution, turning round and round, and fluttering about the entrance, to examine the hive well before taking flight. They do the same in returning, so that they may be easily distinguished, conducting themselves nearly after the same manner as the workers of a newly hived swarm.

When they have made a few hundred excursions, they set off without examining the locality, and, returning in full flight, will know their own hive in the midst of a hundred others. But if you change its place you perplex them, much the same as you would be, if, during your absence, some one lifted your house, and placed it a mile off. The poor bees return loaded, and seeking in vain for their habitation, either fall down and perish with fatigue, or throw themselves into the neighbouring hives, when they are speedily put to death.

When hives are transported to a considerable distance, there is no fear that the bees will return. But this inconvenience would be sure to take place, and many of the working bees would perish, if they were removed only a few hundred paces from the spot they have been accustomed to. The hive may not perish, but it will be greatly weakened. In my opinion, if the situation is to be changed at all, they should be removed at least a mile and a half.

A new swarm may be confined for a day or two, if you want to carry it more than an evening's journey, for bees swarm with their honey bags full, and their first employment is to make wax, which is indoor work. The cloth which is tied over the bottom of the hive must be of such an open texture as to admit air freely, and yet not so open as to let any bees out. The stuff which I use for the purpose is that which is, I believe, called dairy canvas, and is made for straining milk. But if you want to take your bees to a great distance, down the coast for instance, and the voyage may last a week or a fortnight, it is best to let the hive stand for ten days or so in your friend's apiary, then tie it up in the cloth as before, and hang it somewhere in the ship out of the light, or at all events, screened from the sun, where it can swing freely without fear of knocking against the side of the vessel, and then you may carry your treasure to the most distant part of these islands in safety. A common straw hive is certainly the most handy for carrying bees any great distance for the cloth is more easily tied about it. You must look at it every now and then to see whether the bees are forcing their way out. They will try to do so, and when the cloth is taken off you will find that portion of its surface which was exposed to the bees carded into a sort of lint, by the action of their jaws. You will see their feelers pushed through the canvas in great numbers, searching for a passage into the open air. If you find they are making a hole, through which they will soon force a passage out, nothing is easier than to tie another fold of cloth over the bottom of the hive. Should the swarm be in a wooden box, the best way of securing it is to lash it firmly to a bottom board, with no door at all cut in it, and then push in little wedges between the box and the board, so as to raise the hive about an eighth of an inch all round. This will both tighten the lashings, and also give the bees a sufficient supply of fresh air; and it is much better to give it them in this way than at one single doorway, through a piece of perforated zinc or tin. For, in this latter case, the bees seeing light at only one point will often crowd so much to it, as to prevent the free entrance of the air.

Such few bees as die on the passage will also be carried to the entrance, which they will help to block up, so that at last the whole swarm may be stifled. But by wedging up the box all round, the bees will have breathing places everywhere, and you will see them, if you peep in, not struggling to get air at one place only, but running about in every direction on the floor board, like children playing at puss in the corner.

The reason why I advise you to take with you a hive of about ten days old, and from that to three weeks, is this, that a swarm of that age will have built a certain quantity of comb, and laid up honey enough to serve them for the voyage, and yet the combs will not be so heavy with honey or brood, as to put them in danger of breaking down; or even should you be so unfortunate as to get one, or even all the combs, broken down by a sudden blow, the bees will not be smothered in their own honey, as I have known to be the case with a heavy hive. They will get themselves clear in a very short time from the fallen combs, from which they will draw enough food to last their voyage, whilst they themselves will hang in clusters from the top. When you reach your new home with this large batch of fellow immigrants, do not set them at liberty till the evening. If you are in a hurry, and open the hive directly, the bees will rush out in great confusion; many of them, if they have been long shut up, will fall on to the ground, and if it be wet will not rise again. Or a still worse result may follow. If the combs have all been broken down during the voyage, and the bees much annoyed at it, the whole swarm, Queen and all, will rise at once, and take to the woods as irregular squatters, instead of remaining to colonize your garden in a systematic way. Wait, I say, till the evening and just after sundown, if you hear that the bees are all quiet, undo the lashing, and get somebody to lift the hive up a little from its board; then, if any combs are broken down, remove them quietly, and the following morning you will have the pleasure of seeing your fellow-colonists going as regularly to work as though they had been in their new station for years. *I only hope you may be as industrious, and then like them you will most probably succeed.*

In the winter a heavier hive may be safely moved to a new station, for by that time the combs will be more firmly fixed, not only to the top of the hive, but also to the sides; and as there will be no longer any brood in the combs, they will be relieved from this great weight. But as most people choose the summer for their own movements, I suppose that bees will generally have to make the journey at the same time. And this journey they always should make in company with any settler going to a distant station; for the benefit they will do to him is very great; but more of this when I come to speak of bee produce.

Some people put cross sticks in all their hives, thinking them needful to support the combs. If very securely fixed, they may be useful in hives which are to be carried to a distance, but in no other cases ought they to be used, as I shall presently show; they are the greatest nuisances when you come to take the honey, and are useless at all other times. A comb will not break down as long as the hive is not moved, and is protected from the direct rays of the sun; *trust the bees to do their own work securely; there are no bunglers amongst them.*

One other hint I will now give touching the removal of your bees: when you come to turn a hive up, to lash it to its board, to look inside, or to cut out some honey-comb, first ascertain how the combs run in the hive; I mean from front to back, or from side to side. The combs, you know, are all parallel to each other, like a number of books hung up to dry on strings, with a quarter of an inch between them. When you know which way they run, be very careful to turn up the hives so as to keep the combs *always in their own planes.* This may be rather too difficult for some of my readers; but it is of the greatest importance; and as I bought my own experience dearly, by making a miserable smash of a fine parcel of combs in a hive which I turned up the wrong way, I am willing that you should have it at a cheaper rate, without making your bees pay the penalty of your ignorance. We will now suppose that you have got your bees and have set them to work,

but you may have the complaint we often hear, you may have no garden, or your garden is too small, or you may be a settler in the country where flowers are few and far between, and as you look around not a vestige of cultivation visible, nothing but fern, flax, and ti-tree, a popular writer says never fear for your bees, for in the very heart of a town, without a flower in sight, the bees will thrive as well as in the richest garden, for one or two miles round on all sides is yours for the use of your bees, never mind though the pasture be entered on other peoples' title deeds. If you have space for a bit of flower garden near your beehives the food they provide will save a few journeys to the bees and pay you well in the increase of honey—first then, have no double flowers in your garden, as the bees never touch them. The "Times Bee Master" says, "On that magnificent standard rose, so rich in delicious perfume and so very lovely, a bee never alights, but the sweet briar and hedge rose are favourites and much frequented." Sow, then, near your hives lemon thyme in abundance, and cultivate rosemary, lavender, laurustinas, primrose, violet, sweetbriar, honeysuckle, wall-flower, (single) sage, borage, mignonette, mallow, lime. hyssop, Spanish broom, hawthorn, heath, sunflower, St. John's wort, and melilotus leucantha, as they are all rich in honey and farina.

Observe a bee, says Kirby, that has alighted on a flower. The hum produced by the motions of her wings ceases, and her work begins. In an instant she unfolds her tongue, which was previously rolled up under her head. With what rapidity does she dart this organ between the petals and the stamina! At one time she extends it to its full length, than she contracts it; she moves it about in all directions, so that it may be applied to the concave and convex surface of the petal, and sweep them both, and thus by a virtuous theft, she robs it of all its nectar. All the while this is going on, she keeps herself in a state of constant vibratory motion.

Flowers, though the chief, are not the only sources from which the bee derives the material of honey and wax. She will also eat sugar in every form, treacle, the

juice secreted by aphides ; and, in fine, the juice of the bodies of nymphs and of eggs of bees themselves.

When the industrious little creature has filled its honey-bag with nectar, it proceeds to collect the pollen, of which it robs the flowers by brushing it off with the feathery hairs with which its body is covered. As the honey is called the NECTAR, so this pollen, or the substance bee-bread, into which it is converted, may be called the AMBROSIA of the hive. Together they constitute the food and the drink of the population.

When the bee has so rolled itself in this farina of the blossoms of the garden and the field, that its whole body is so powdered with it, as to give it the peculiar colour of the species of flowers to which it happens to resort, it suspends its excursions, and sets about to brush its body with its legs, which, as already explained, are supplied with brushes for this express purpose. Every particle of the flower thus brushed off is most carefully collected and kneaded into two little masses, which are transferred from the fore to the hind legs, and there packed up into the baskets provided for its reception and transportation.

Naturalists generally are of opinion that in each of its excursions a bee confines its foraging operations to a single species of flower. This explains the fact that the colour of their load after such excursions is uniform, depending on the particular species of flower which they have robbed of its sweets. Thus, according to Reaumur, some bees are observed to return loaded with red pellets on their thighs, others with yellow, others whitish, and others with green.

Kirby observes, that it seems probable that the bee confines its operations in such excursions to flowers of the same species, and that the grains of pollen which enter into the same mass should be homogeneous, and consequently fitted by their physical properties to cohere with greater facility and firmness.

We come now to the matter of

Hives: their Form and Material,

best suited to make them. Mr. Cotton, in his peculiar

and facetious style, says:—As I told you to send your own hive to the friend who has promised you a swarm, I must now speak of the best shape and material. In this respect the bees are in no wise particular. I have known them do well in all sorts of places, from a hollow tree to an old watering pot, with the spout stopped up. A man's hat is no bad thing to hive a strange swarm in, if he sees one settled on a bush. He may carry his prize safely home in this strange hive, and when the even comes shake them into a more befitting home. One who has his wits about him, and his eyes too, and who is unable to beg or borrow a swarm, will, as soon as our woods are stocked with bees, be often able to make a beginning in this way. I have known still stranger hives (if I may call them so) even than a hat, made use of at a pinch. A maori having seen a stray swarm settled on a branch, and having no hat to his head, managed to hive them in a garment he did possess, his only one in addition to his blanket. He took off his shirt, and wrapping it carefully round the bees, cut the branch off, carried it home, and put them into a box. I have since heard of another maori at Coromandel Harbour, who used his trousers for the same purpose, having first tied up the legs with a bit of korari. But you may say, what is the use of all this? I tell it you to prove that bees are not particular as to the hive they are put into, that they will build combs and make honey anywhere. At one time I was an advocate for the system of side boxes, and the application of ventilation to them; but I have had reason to think that boxes on the storyfying system are better adapted to this country, that the honey may be taken from them more easily than from almost any form of hive, and that they are both the cheapest and the best. Do not, however, go away with the idea that there is any magic in the form of box which I recommend, or that bees will make more honey in them, than in a hive of the rudest form—an old candle box or tea chest I have seen full of honey,—all I wish to do is to point out the form of box from which the honey may be obtained with the greatest ease. The box should be made of $1\frac{1}{2}$ inch stuff, which will plane down to inch

and a quarter. It should be fourteen inches over all, which will leave $11\frac{1}{4}$ inches in the clear. The top is a moveable board prevented from slipping sideways by a projecting fillet which fits over the side of the box loosely, like the lid of a hat box. If the bees were hived in this box, as it is now, they would fasten their combs to the lid and to the sides, and there would be no means of getting them out. But ten bars made of quarter of an inch stuff, and exactly one inch wide, are to be countersunk in the sides of the box, so that the bars may be flush, and the top fit down close upon them. These bars are to be fitted with exactly a quarter of an inch between them, and one eighth of an inch between the outside bars and the sides. The width of the bars, and their arrangement, is a matter of the greatest consequence, and that which is most frequently overlooked. The box should be about nine inches deep; with other boxes having similar bars across the top, but of a less depth, say four inches and a half or five inches, to fit on the top. One lid of course will do for a set. Windows you may put into the sides of these boxes of any size, and covered with shutters of any pattern, if you wish to see the bees at work;—but when you have a great many boxes made, you will like to get them as cheap as possible, and the windows may be omitted altogether; for an experienced bee master will tell by the weight of his hives when they have honey to spare for him. The bottom board should project at least an inch round the hive, and pieces clamped across the ends to prevent it twisting. The entrance for the bees should be countersunk in the bottom board, four inches wide, and a quarter of an inch deep, running up to nothing; a semicircular lighting board five inches wide should be under this doorway.

The Management of the Cottage Hive.

Previously to hiving the swarm, dress the inside of the stock hive with honey diluted with one-third its quantity of water, or with sugared ale of the consistence of syrup, without sticks across it; then carefully shake the swarm into it, and gently put it upon the ground near the spot where the bees are. Immediately the bees are settled, after being hived (which will be fifteen or twenty minutes)

place the hive properly in the situation where the stock is intended permanently to remain; this should not be delayed longer than the evening of the same day.

Varying from fifteen to twenty-five days after the swarm is hived, the bees will have filled the stock hive with comb, and in a great measure with honey; but as this portion of the hive is intended for the breeding of the bees, no part of the store should be removed therefrom. As soon as the hive is found to be full of comb, the holes on the top may be opened, and a glass or glasses placed over the same, with the perforated tubes in them; or, if one large glass should be preferred, it may be placed completely over the four holes; but care must be taken to cover the glass or glasses with flannel or green baize, to keep up a proper degree of heat. In three or four days the bees will have commenced working in the glasses, and from time to time the Apiarian can watch the progress of the labours of these industrious and wonderful little insects. It will often afford amusement to be able to watch the daily progress of building the comb, and this is readily done by sticking a small slip of paper on the glass at the extremity of the comb; it is often found the work has advanced more than an inch in twelve hours. As soon as a glass of honey appears to be filled and sealed over by the bees, it should at once be removed, and another substituted to be again filled, and the Apiarian need not be afraid of taking the glasses away when full, for the stock hive is always well stored before anything is done in the glasses. To encourage the bees the more readily to commence working in the glasses, attach small portions of the edges of honey-comb (not brood-comb) at the top of the glasses; this can be done by warming the glass on the outside where it is intended to fix the comb, and then place the piece of comb so provided inside the glass, melting it slightly to cause it to adhere; the direction of the guide-comb may be according to fancy, so that the Apiarian may cause the bees to work in almost any way he pleases.

To take the glasses when filled, it will be necessary to proceed as follows, namely,—first to thrust between the

glass and the board a thin spatula or wire, and then gently turn the glass on one side, just high enough to slip under a piece of thin zinc or tin to cover the bottom of it; remove it, and cover the hole on the top of the hive with the zinc slide or another glass; darken the glass so removed with a covering, place it upon the ground near to the hive, still having the zinc or tin under it: keep it thus dark for one or two hours; then gently raise the glass on one side and let it rest on the edge, allowing room enough for the bees which may be inside to escape,—this they will do in a few minutes, and when they have all left, the glass should be taken away, or they will return and take the honey back to the hive. It is desirable to wait until the glass is quite full and comb sealed over before taking it, as the greater part of the bees in that case will have retreated to the hive or to work in other glasses to complete them.

In all operations with bees, endeavour to be as cool and collected as possible; do nothing in a hurry (lest you create suspicion), and they will scarcely notice what is going on. Contract the entrance in the winter, so that only one bee can go in and out. Protect your hives from wet and damp. Clean the floor-boards two or three times in the spring, on mild days, giving them common attention to ensure success.

The Stewarton Hive

Is composed of from four to eight boxes; the body boxes are furnished with nine bars each, $1\frac{1}{8}$ inch broad, with a space between of $\frac{3}{8}$ of an inch approximating pretty closely to the natural formation of the combs. The honeybox has only seven bars for the purpose of obtaining more massive combs. There is also a shallow eke which is used to great advantage both as regards wintering a strong stock and as a great means of inducing the bees to take to the honey box, by removing it and putting on a honey box when the hive gets quite full and the honey season commences; a fourth or fifth box should be added whenever the honey box is well begun, the bars being furnished with guide-combs or narrow strips of wax sheets.

These hives will produce upwards of 100 lbs. honey,

about 40 or 50 in the supers, the rest in the body boxes. Mr. Thomson, of Blantyre, says that with the Stewarton hive the increase is on an average 7 to 8 lbs. each day, the highest increase being 29 lbs. in three days, but he has been informed that the increase has been as much as 33 lbs. in three days.

In the *use of rings or supers*, as they are called, Mr. Jesse tells us that if bees hang in clusters, as they often will do, on the outside of the hive late in the season and show no disposition to work, it is evident that there is a want of room in the hive. Three or four rings should be cut from the bottom of a straw hive, or what is better, the hollow cylinder recommended by Mr. Cotton, placed on the stand and the over-loaded hive put over it and the junction plastered with clay or mortar. The bees which hang idly outside will then return to the parent hive and begin to work. This hint should not be lost sight of in moist warm weather.

We have now arrived at the most important process connected with bee keeping—

The Swarming and Hiving.

A popular writer says, in speaking about bees, that a swarm will occasionally emerge from hives and bee-boxes in spite of every plan of preventing it. The signs of swarming are some of them appreciable by the most expert bee masters only. A common sign of the emergence of a swarm is inactivity in work and clusters of bees hanging from the alighting board, and if the weather is moist and warm the swarm, may be expected with a certainty—from 10 a.m. to 3 p.m. has been stated as the period within which swarming occurs. A strong swarm, let us observe, will consist of from ten to twenty thousand bees; a second swarm of about five thousand, and to assist in counting—two thousand bees will fill a pint measure. Few sights are more exciting than a swarm of bees—the air is clouded with them and vocal with their united music. As soon as the queen bee settles, the bees cluster around her and hang from the branch on which she is; then when the great mass forms a compact cluster, take your bee box or hive, hold it with

one hand, mouth or bottom upwards, beneath the swarm, enclosing as many of the hanging bees as the situation will allow; with the other hand shake the bough from which they hang, and on the great mass tumbling into the hive, carry it away half-a-dozen yards, set it upright on the bottom board or a white sheet previously spread on the grass, raise the edge of the hive a few inches from the ground with a bit of wood or stone, and then cover it with some branches to keep off the rays of the sun. If the queen is inside they will all gradually enter the hive; but if not, and the queen is still outside, you will find the bees leaving the hive, and clustering either on the same branch or near it; if such should be the case, you must just repeat the operation.

In swarming, the bees are led by the old queen, the young one remains in the hive and ascends the throne, a second swarm is led by this one, and another younger one, of course, takes her place.

In England a swarm will remain about twenty minutes to half an hour on the first branch or bush or whatever they fix upon, and if not hived will then take to flight a second time, and are invariably lost to the owner; but in New Zealand, this is not the case, although Mr. Cotton was not aware of it, for the swarm will sometimes remain twelve hours on the first branch or bush, and even longer, and begin to build comb.

Mr. Cotton thus describes his plan of hiving a swarm. He says, in New Zealand:—A September swarm does not differ so very much in value from a February one; for the swarming season ranges between these two months. I have known a swarm of the latter month support itself very well through the winter, and in the following spring become a most productive hive. Still, as I said before, a young bee master had better get a stock early in the season, and then he will have a whole row before it is over.

Swarming is an act of colonization on the part of the bees. They fulfil thereby that part of the instinct implanted in them by their Maker, which leads them to spread themselves far and wide over the surface of the earth; so that if a single swarm of bees had been

brought into these islands, and left to themselves in a protected situation, in a very few years every good locality would be inhabited by as many bees as the flowers of that district can support. This is now the case down North, in the Hokianga, Bay of Islands, and Kaipara districts, where the bees have taken to the bush and multiplied exceedingly. What I have now to do is to speak more particularly about the act of swarming itself.

In September or October, as the season is early or late, the bee master must begin to look out for swarms, if his stocks are in good condition. There is no sign, as far as I know, by which he can tell to a day or so, when the *first* swarm will rise; the after swarms give clearer signals. For this reason I said, that the first stock with which a bee master begins his apiary should be within sight of his door, or else he may chance to lose some of his early swarms; and this in the first year of its establishment will be no trifling loss to him. In after years, when he has from forty to fifty parent stocks, he may well afford a swarm or two for the department of the woods and forests, having, I suppose, by that time fully supplied all his private friends. Look at your hive in the quiet evening when the work of the day is over: if the bees stand about the doorway, fanning with their wings, and pleased as it were with the prosperity of their large family,—if a pleasant and wholesome smell comes steaming from the mouth of the hive—and I know no smell so pleasant as that of a healthy beehive, unless it be a fine dairy of cows at milking time,—if you have seen a number of young bees on the lighting board for the last few days, (and you can tell them by their being at first covered with a greyish down, and quite damp, as they issue from the cell),—if, in fact, all be going on well with your hive in the month of October, look out for a swarm. Your children, if you are so fortunate as to have a fine swarm of them, will soon learn to stand sentry over the hives, and will take a pleasure in calling by their own names the swarms which they have seen rise.

And now for the act of Swarming.

At some period of the day, from 10 o'clock till 2, an unusual bustle is seen at the mouth of the hive:—single bees rush out in a hurried manner, and after running about for a minute or two on the lighting board, as though they were looking for something, and perhaps crawling up the front of the hive, enter in again. All work seems suspended for a time, at least no fresh labourers leave the hive to collect honey, although such as have completed their loads keep returning home, pushing their way through the crowd of loiterers who are blocking up the door. Now the confusion increases; keep your eyes fixed on the hive, and you will soon see a wonderful sight. A stream of live creatures begins to pour out, increasing in volume, until at last it is as wide as the doorway through which it passes: no longer do the bees run about in an irregular way, but presses forward, each in his own place, walking steadily along, and making a peculiar sound with their wings, which is heard at no other time. As the bees reach the end of the lighting board they take wing, and fly backwards and forwards, wheeling about as in a joyous dance, and waiting for their mates who are to follow. The stream has now flowed on for two or three minutes, and is still as dense as can be. Keep your eyes steadily fixed on the board, though it may chance to make you dizzy, just as when you look fixedly on a column of falling water, and you may perchance see the queen. There she is: besides other marks which are not so easily noticed, you may know her by this—her body is much longer than that of the common working bees, and is of a redder tinge. She turns back as though unwilling to leave the hive where she has reigned queen; but she is unable to stem the torrent of her subjects, which is still rushing out. She is forced by them along the lighting board, and at last takes wing. You may still follow her in her course, for she is heavier in her flight than her subjects: at last she is lost in the cloud of bees which fill the air; and a glorious sight it is. Now give them their swarming music; the proper instruments are a warming pan

and the house key; but in default of the former, a tin pail or a kettle will do; rattle them well together to make the swarm settle. Whether this rough music has any such effect, I cannot pretend to say; but it is a good old custom, and can do no harm: I will presently tell you what good it can do. The cloud of bees now darkens in one particular direction. They will pitch on that apple tree: no, farther off still; they are gathering upon a gooseberry bush. The nucleus is formed; and, in a few moments, by a sort of animal chrySTALLIZATION, all the bees are deposited upon this point, and hang down in a cluster like a bunch of grapes in shape. Thus ends the first act of swarming, which is in fact the gathering together of the body of emigrants at a common depôt, where they quietly remain, till some scouts whom they send out, to look out for a place for them, return back to the main body, and tell them that all is ready. Then they rise, and not before; they no longer wheel round and round, as though searching for a lighting place; and the bee master who has not put his swarm into hive before they start on this second course, has little chance of ever calling them his own. He may follow them, indeed, as I have done twice in my life for more than a mile, but 'twill generally be as fruitless as a wild goose chase; for the bees rise higher and higher, and the last he sees of them, as they are sailing away over the top of the highest trees, is a thing like a thin but well defined cloud as it is borne rapidly along by the breeze. But the object of the bee master is to give the bees a hive before the scouts return. Your hives should be at hand, that there may be no hurry or delay when the time comes for using them. If the swarm has settled on a spot exposed to the direct rays of the sun, it is as well to screen them by throwing a cloth over the bough, or by any other shade which the place will allow you to use. The mode of hiving bees will depend much upon the place on which they have settled. It is well to have a number of low shrubs planted near your bee house, as, if the swarm light on a high tree, you will have much additional trouble in securing it. But there is no place so awkward that a bee master need despair

of hiving his bees which may have settled there, if he but set to work quietly and perseveringly. Do not use thick gloves, or any of those other articles of bee dress which you will sometimes see recommended. For any thing which hinders you from moving about with ease—anything which prevents you handling your bees with a gentle touch—anything, in fact, which makes you awkward, or shows that you are timid amongst them, will be less likely to protect you from stings than to draw them down upon you. The bees, too, are particularly gentle when in the act of swarming, however irascible the parent hive may have been up to that time.

If the swarm has alighted on a small bough, nothing is easier than to hive them. Spread a cloth on the ground, and on it place the bottom board of the hive. An assistant must then hold the stem, on which the bees are settled, on each side of the cluster, so that it may not fall to the ground, when you with a sharp knife cut it off. Place the twig, with the bees hanging to it, gently on the bottom board, and then set your hive over it, propping it up on one side, that the bees which are still on the wing may find their way in. Lap the cloth round over the hive on all sides but this one, and otherwise shade it well from the sun, and your work is done till the evening, when you must set the hive where it is to stand. You should, however, keep an eye upon them, or else when you go to move your hive you may find it empty, the bees having flown.

The Rev. J. G. Wood says truly that for the most part all the details of bee-management can be best learned from practice, and the study of the essential objects which details are intended to secure. It is also to be observed, that such details are unsettled to this hour, and vary among the best apiarists.

Almost the entire success of bee management depends upon the capabilities of the apiarian to take advantages of all the various changes which must take place according to the variations of temperature, locality, and seasons. While, therefore, it would display great presumption on the part of a beginner to dispense with the rules which the extensive experience of veteran bee-masters has enabled

them to lay down, it would also be the mark of a mind very contracted and deficient in resources, were he slavishly to follow these rules without deviating from them, when circumstances would point out that a different course must be adopted. Great caution must be observed in acting on new principles. Many treat their bees as if they were utterly insensible beings, who cared not the least how they were lodged or fed, and who fancy they can manœuvre a hive of bees as easily as they can a flock of sheep. Bees *must* be treated according to their instincts, and if constantly thwarted by the ignorance of their master, will never thrive properly. Indeed, a man who hopes to get a decent harvest from his hives, and at the same time to manage them on a wrong principle, will effect about as much success as a gardener might, who strove to improve the quality of a peach by grafting it upon a strawberry. The principle of grafting here is right enough, but the application is wrong. So if a man learns any number of correct ideas from books, yet if at the same time he does not learn the application, he will do but little good.

So with regard to the much vexed question of theory and practice: a mere theorist will never succeed in securing any particular harvest, while the narrow-minded man who rests his whole hopes upon acting in precisely the same manner in which his fathers acted, will never advance the culture of bees one item. To make a perfect bee-master, then, practice and theory must be united—the theory sound, the practice decided. And this is a point that cannot be too closely attended to. When the apiarian has made up his mind to adopt any particular course, he must carry out that determination in a most decided manner. And here I may remark, that to learn by heart a number of instructions respecting any operations upon bees—say hiving a swarm—and acting upon those instructions, are two very different things. When, after carefully committing to memory certain rules, the young apiarian goes out, hive in hand, to attack a swarm which has just settled on a branch of a tree, he naturally finds a slight misgiving steal over his mind as he approaches the living mass, and gets within range of the stragglers that

are dashing about with a very ominously sharp hum, that appears to his mind very suggestive of stings, and causes him to assure himself of the exact locality of his bottle of hartshorn. However, he nerves himself for the attack, recollects that the hive is to be placed below the swarm, and then a smart tap is to be given to the branch. So he sprinkles sugar and beer in the hive, places it under the swarm, takes a very long stick, and standing at a respectful distance; administers a rather feeble tap to the fatal branch. No effect is produced, and he gives another tap rather more powerful than the last. The obstinate bees still remain fixed to their branch like a quaker's hat to his head, and no perceptible effect is produced excepting a kind of general movement in the swarm, which appears to indicate an intention on the part of the bees to hold together rather closer than before. Having now gained some courage, he once more uplifts the stick, and permits it to descend upon the branch with rather more violence than in either of the former assaults. Down go some hundred bees or so into the hive, where they are heard buzzing away in a most frantic manner, and filled with indignation at the unceremonious manner in which their wings are clogged with the sticky compound in the hive, while the remainder rise in a disturbed mass from their branch. The terrified bee-keeper, losing all the remainder of his presence of mind, throws the long stick at the swarm, and takes to his heels, too happy to find any place of refuge from his winged foes. In a few minutes he emerges just in time to see his swarm disappearing over his hedge, and immediately the vigorous tinkling of keys and warming-pans assure him that others are engaged in the pursuit of the bees which he has permitted to escape. Next time he remembers that if the swarm be intended to fall into the hive, the branch must be struck very sharply indeed.

In this as in every other occupation, great decision is necessary, as the bees are very irascible creatures, and any fumbling about their dwellings or themselves irritates them marvellously, while a bold and rapid course of proceeding appears to astonish them out of the power of doing injury. Indeed it is said that a skilful operator can turn up a hive

and cut out combs with impunity while the bees are hard at work within.

To return to what Mr. Cotton was saying:—If they settle on a branch which is too long to cut off, or one which you do not like to destroy—an apple tree, for example—you must vary your mode of action. Have the hive held close under the swarm, so that the long beard of bees may hang down into the hive itself, till it touches the bottom (or rather the top), then give the bough a sudden shake, and the bees will fall down into the hive; brush off into it with a feather any clusters which may still be clinging to the bough; then, still holding the hive in the same position, put the bottom board on it, as a sort of cover to the bees. By the help of another person turn the hive into its proper position, and set it on the ground, near the foot of the tree on which they settled. After four or five minutes' confinement, raise up one side of the hive by means of a stick, so as to give the bees who are still flying about access to their fellows, and if the queen is safely hived, they will all speedily join her. But if you see that the stream of bees is setting out of the hive rather than into it, you may suspect that all is not right; search any cluster which you may see lying on the ground near the hive, any bunch which may still be on the tree, and if you see the queen, seize her gently and put her into the hive. If you have not nerve sufficient to enable you to search for her majesty, just wait till the cluster outside is large enough to be sure the queen is among them, and do the same thing over again. There is a *daring gentleness* required in managing bees that can only be learned by practice—that both Mr. Wood and Mr. Cotton tries to impress upon young bee masters.

Second Swarms

give more certain signals of swarming. If you put your ear close to the top of the hive in the still of the evening, some days after the first swarm has risen, you will hear these signals, cries very unlike any other ever heard from a beehive. One cry is that of the reigning queen, the other is that

of a full grown queen bee, still confined in her cell, where she is kept by the worker bees a close prisoner; for if she had her will, and was allowed to come forth before the moment of swarming, either she, or the reigning queen, would fall in single combat. When this noise is heard in a strong stock, look out for some more swarms. A bee master who has only been used to the English rate of increase, will be perfectly surprised, and as it were overwhelmed, with the multitude of swarms which will issue from his hives in one season, after his apiary has been established a year or two. So he does not get his hives ready in time, and he is often in great straits in swarming time. I will give one amusing instance:—A carpenter who has been many years in New Zealand, *and is perhaps in consequence very procrastinating in his habits*, was surprised by his first swarm rising when he did not expect it. He had no hive at all ready. Fortunately he had heard that the queen may be captured, and that when she is so, the swarm will not go away: so he poked about with his finger among the cluster until he found the queen; caught her, and put her in a tumbler to keep her safe. He then went to his house, thinking it time to set about making a bee box. It was a very hot day: so he left his door open. He had not been long at work when he saw the whole swarm follow him into his house where his bench stood, upon one end of which they clustered, while he was hard at work with hammer, plane, and saw, at the other. It seemed as though they had come in to see what he was about, while he was so long in bringing them a hive; and they found, as many customers had done before, that his work was not begun, when it ought to have been finished. However, he tried to make up for lost time, and hoped they would not be in a hurry to go. Just half an hour and he would be ready for them. He never plied his hammer so fast before. He had not even time to whistle a tune: so, whilst he worked the bees sang. They waited quietly, expecting their future home; were safely housed in it as soon as finished, and were doing well when I last saw them, as I trust he may be doing;—the first carpenter who ever built a house with so many homeless tenants watching its completion.

Further increase will no longer be an object with him. What he will then desire is to get as much honey as possible from his existing stock. How this is to be done I purpose to tell you when I speak of bee produce. I forgot to mention above that there is one state of the weather which often induces a swarm to rise later in the afternoon than two o'clock. When it has been raining in the morning, and for several days before, and then the sun bursts out, and a hot sultry evening succeeds; on such an evening as this, a swarm which has been some days baulked by the weather will often rise as late as four o'clock: have your eyes well open then, as indeed you always should amongst your bees, either to do something for them, or to learn something from them.

How to take Honey from a Hive.

The different hives are thus described by Mr. Wood as chiefly of three sorts, the Nadir, Collateral, and Super. The Nadir hives are those where the additional hive is placed under the original; the Collateral, those where, as the name implies, the hives are placed side by side. Of these, the Collateral are much to be preferred, as in the Nadir hives the bees are exposed to many inconveniences, among which may be reckoned the labour of mounting up through two hives, to deposit the honey or pollen which they have brought home, a task which to an already wearied and heavily laden bee would be an addition to its labours. Moreover, the brood combs are apt to be distributed unequally, so that the bee-master is never sure of getting a hive full of pure honeycomb, as he can in the collateral hiving. Super-hiving is where the additional hive or box is placed above the mother hive. To this nearly the same objections apply as to the nadir system.

Mr. Cotton goes on to say that the bees glory in making honey, while they rob the flowers, they give full payment for what they take. They fertilise the yet half formed seeds, and help on the multiplication of those flowers from which they get their greatest supply.

To give an instance: Every one who keeps bees near

clover paddocks, knows how rapidly his hives increase in weight when the white clover is in flower; indeed the bees gather more honey, and of a better quality, from this plant, than any other I know.

But what do they in return? Before bees were brought into this land, the white clover did not seed at all, or very scantily. Every bushel sown was brought from England at a heavy cost, and at great risk of being useless when it arrived.

But now, as much can be gathered in the country as is wanted; and this being fresh, is certain to grow: so that every one who has some paddocks well and carefully laid down, free from weeds and other plants, may get sufficient seed for his own use, and have a surplus to dispose of to his neighbours.

Every one, too, who has an orchard, will find his advantage in having a hive of bees near. The difference in the yield of a tree before and after it gets this help is very remarkable; so that it seems to me that flowers are furnished with nectaries from which honey is secreted, not so much that it may be gathered for the use of man, as that the bees, when busy rifling the hidden sweets, may aid in fertilising the seeds of that flower from which they increase their store.

There is no form of hive from which it is impossible to take honey without killing the bees. Bees will make honey anywhere, but the form and construction of the hive is of importance, because purer honey, and in greater quantities, may be taken from those of a good construction than from those that are faulty.

In taking honey, to do the thing well, some little preparation must be made. A surgeon, when about to perform an operation, gets all his instruments ready, lays them out carefully, that he may know where to put his hand on each, and not have them to seek at the moment when he wants to use them; he also has his assistants, in whose steadiness he can trust, and in their knowledge too, as far as it goes. A surgeon's tools cost a good round sum; but the only instruments wanted by the honey taker, are, a knife, made to the following pattern:—it is a rod of

iron about two feet long, with a square blade at one end, sharp at the bottom and side, and a lancet shaped blade at the other, an inch and a half long, and a quarter of an inch or less over: a bunch of feathers: a basin of water to keep your hands free from honey: and a roll of linen rags, in order that you may be able to blow some smoke, as wanted, into the hive.

The most complete form of the bee-smoker is this:— Have a little tin box made two inches each way, put together with hard solder, so that it may not give with the heat which it will have to bear. A pipe should be soldered into the bottom of the box, and fit tightly into a pair of bellows. Out of the lid another pipe should come to carry the smoke into the hive. The best kind of bellows are the patent circular bellows; for they keep up a continuous stream of air, and the bottom of the box itself may be fitted into their mouth. This is nearly the same thing as gardeners use for fumigating their choice plants; and as gardening and bee keeping are twin sisters, a pair of fumigating bellows may be made to do double duty. But any kind of bellows will do, if the smoking box be carefully fitted into the nozzle.

The linen rags must be quite dry. I find it best to roll them up loosely in the shape of a sausage, and then cut them into lengths of an inch and a half, so that they may go easily into the box. Get the slice of rag well alight with a smouldering fire (not flaming), and then put it into the box, with the lighted end towards the bellows, rolled loosely together, that the air may pass freely through. When the rags are alight, give the bellows to one of your assistants, whose business it should be to keep them so, by giving every now and then a little puff, so as to be able to put the smoker into your hand whenever you want it, ready for instant use. Another of your assistants should in like manner be appointed knight of the feathers, and a third have charge of the comb knife, so that either may be put into your hand directly you call for it.

If you cannot command so many pair of willing hands, have a spare table by you, on which to lay down your different tools, that you may know where to put your hand

on them as wanted. No one but your assistants should come near you whilst you are operating.

Mr. Wood has a caution in the management of this fumigator of Mr. Cotton's:—In the first place, great care must be taken that the smoke of the rags, fungus, or other material used for the purpose is not admitted into the hive at too high a temperature. If this is the case, the heat of the smoke will in the first place scorch and kill the bees who will rush to the entrance of the hive on the first intrusion of the fumigating tube, and will also melt the wax of the combs, and do considerable mischief. The tube, therefore, should be a very long one, and small in diameter. There is no hurry about the operation, work the bellows quite deliberately, and the danger of burning the poor bees, or spoiling the combs will be avoided. There is hardly a more pitiable sight than to find on turning up the hive a number of bees lying on the board, with scorched and shrivelled wings—a loss of no small importance, as you will want every bee to set to work immediately, to repair the devastations committed in the hive. Another mistake not unfrequently occurs in following Mr. Cotton's directions too literally. It is not sufficient to have the fumigating box merely made of tin, as will most certainly be done if that order is sent to a tinman, for the heat of the ignited puff-ball will speedily melt the solder, and the whole apparatus will fall to pieces. A case of this kind occurred very recently. The box and tube were made according to order, the clay prepared for stopping the entrance of the hive round the tube, the fungus was duly lighted, placed in the box, the bellows fitted, and then vigorously worked. Suddenly while the operators were complacently puffing away at the bellows, and congratulating themselves on securing both honey and bees by this method, the box fell in pieces, the tube, consequently, was drawn out of the hive door, and out rushed the bees in a tumultuous state of indignation, thereby putting their would-be captors to an ignominious flight. So lest you meet with a similar misfortune, give particular orders to have the whole affair made fire-proof, and then you may proceed without the least danger. Of course this

must all be done some hours after dark, or the bees, who are already out, will soon signify their dislike of finding intruders when they return to the hive. It is also necessary to be very quick in cutting out the combs, as the bees do not remain long in their state of torpor or intoxication, and are quite ready on their revival to employ their stings. Always examine the combs that are removed, to see if any bees are left in them, as not unfrequently, when they begin to find that they cannot overpower the vapour, they dive to the bottom of an empty cell, and sometimes are so protected by this precaution, that they revive rather sooner than their less fortunate companions. The wax of the combs thus obtained is much whiter than if sulphur is used, and, of course, will fetch a higher price in the market, besides being free from a slight tinge of sulphury flavour, which hangs about them for a long time.

For fumigating, the circular bellows, set in motion by a winch, are much superior to the double bellows, as a constant stream of smoke is introduced into the hive, instead of a series of puffs. Mr. Pettigrew recommends (probably because they can be more certainly obtained when wanted), cotton rags, tightly rolled up in the form of a candle, and applied in the same way as the fungus. If so, it will be found advisable to steep the rags in a solution of nitre, as otherwise they are very apt to go out before a sufficiency of smoke has issued from them. The solution, however, must be weak also, or it may do mischief instead of good, for ignited nitre is apt to send forth sparks, especially if it is urged on by a draught of air. It may be possible that ether or chloroform may answer better than either fungus or rags, but the experiments do not yet appear to have been sufficiently numerous to enable one to speak with confidence. At all events, although chloroform and ether may not supersede fungus and nitre in stupifying bees, the smoke of puff-balls threatens to supersede chloroform and ether in their anæsthetic power as applied to human beings. We are bound to observe that fumigation may not be altogether so harmless as is supposed, and therefore should not be used without necessity.

When, after carefully applying the fumigating appa-

ratus, as has been described above, the stillness that reigns in the hive indicates that the bees are in a state of insensibility, the hive may then be turned up for any necessary operations. If honey is wanted, choose the side combs, so as not to interfere with the brood in the centre, and be moderate. Replace the violated hive carefully, and the bees will soon recover from their state of partial intoxication, and set to work to repair the ravages that have been made in their stores.

We have always been in the habit, when taking honey, by cutting out the comb, to operate after sundown; but Mr. Cotton says, the time fit for the operation, should be the middle of a sunshiny calm day, between eleven and twelve, when the number of workers who are abroad is greatest; you will so be in less danger of crushing a number of bees as you cut out the combs; besides, if it is later, such bees as may be daubed with honey will not have time to get themselves set to rights by their fellows. In very hot weather take your honey still earlier in the day; for the noontide heat makes the wax so soft, that it is difficult to handle the combs without spoiling them. A damp, cold day, or one when showers may be expected, should not be chosen, as those bees which fall to the ground will be chilled; but some of my pupils may say, how am I to know when my bees have honey to spare? If they are in hives of the candle-box construction, you cannot look in upon them as you may in properly made boxes, which are furnished with windows. But you have their weight to guide you. It is a very good plan to weigh each of your hives and bottom boards before you put bees into them. Mark the weight on the outside, and then simple subtraction will at any time give you the weight of the contents. Even if you have not as yet taken this precaution, you may give a tolerable guess by lifting it a little in your hand, bottom board and all, just before sundown.

In the autumn and winter, when the breeding season is over, the weight of the box will give you the actual weight of honey and comb more nearly than in spring and summer. In the latter seasons, a great part of a heavy hive is filled with brood.

When all is ready, blow a few puffs of smoke into the doorway of the hive which you are going to take honey from. If you turn up the hive without so doing, the sentinel bees will most likely fly up into your face; and if you do not take it quietly, you may chance to be stung. The smoke drives the sentinels up amongst the combs, and deprives the whole swarm of its combativeness. How it affects that organ, I do not pretend to say, but so it is. Have an empty hive ready to put down in the exact spot on which the full hive is standing, in order that the bees who are not at work may have some home to go into as they return. They will be surprised, indeed, at finding no comb in it—no cells in which to deposit their loads: you will see them running about in great anxiety; but as the numbers increase, they will gradually cluster inside; more readily, if you put a single comb in the hive to attract them, and remain tolerably quiet till you have done your work, and are ready to return them to their own home. This substitution of the empty hive for the full one is of great importance, as it gives the homeward bound bees a house of refuge, and prevents their straying into neighbouring hives, where they are instantaneously apprehended, and put to death. Then turn up the hive, taking particular care to turn the combs *in their own planes*: place the hive gently down on a table. If the box is not all full of comb, begin to cut out as much as the bees can spare at the side where the vacant space is; because it is easier to drive the bees from this end of the box, than from the other. Do this with a few puffs of smoke, and as soon as the bees have left the first comb quite clear, cut it from the top of the box by means of the lancet shaped bee knife, which is made just long enough to cut through the combs. Don't let the comb fall down in the box, but support it with one hand; and when it is quite free, lift it gently out, letting it lay on your hand with the side downwards, which is quite free from bees, and brush off with the feathers into the hive any stragglers which may be remaining on the upper side. A good deal of dexterity is required in handling so heavy, and yet so fragile a thing as a piece of white honey comb full of honey; and yet such

is the strength of the form made use of, that it is possible to lift a full comb without damaging a single cell. The art seems to be in spreading your fingers as much as possible in order to support the comb in many different parts.

By the aid of the bee knife, honey may be taken in the same manner from a common straw hive, if made of a proper shape. Those which are straight sided, and have a conical top rising to a point, are the very worst pattern. The purest honey is deposited in the very crown of the hive, which should be nearly flat, that each comb may be as nearly square as possible: besides, the bee knife will not work to advantage in a hive of this shape; a large piece of comb will always be left in the top: whilst in a box, or flat topped straw hive, it will make clean work. Those also which are contracted at the bottom are very difficult to get honey from. They are made so, I believe, from a mistaken idea of giving support to the combs. But trust your bees to know how to fasten their combs securely to the top of a hive. They are no bunglers, and make sure work of it. It is utterly impossible to get a comb out of one of these bungling hives, without previously cutting it down the middle; and every such cut spills honey and daubs your bees. Cross sticks are equally pernicious. Many persons insist on putting them into their hives from the same mistaken idea of supporting the combs. The advocates of this skewering system will also tell you that they are useful for a new swarm to hang upon; but it is no such thing. A new swarm hangs from the very top of the hive, and from live ladders, as it were, of their own bodies, up which the labourers mount without needing the cross sticks.

In describing the wooden boxes, I said that their chief advantage was in the ease with which honey may be taken from them. When a top box is quite full, and the cells sealed over, remove the cover, and blow some smoke with the fumigating bellows down through the bars now exposed. When the greater part of the bees have gone into the lower boxes, remove the top one

steadily on to your operation table. If it is quite full of pure white honey, and you wish to keep it until you use it, you may get rid of the few bees which linger about their stores, by removing it a short distance from the hive; cover it over with thick cloths, so as to darken it entirely; prop up one side of the hive, so as to leave free exit to the remaining bees. They will naturally come to the light, and fly straight home to their parent hive, so that in a short time you will be left in undisputed possession of your spoil. If the bees cling obstinately to the box which you have removed, you may suspect that the queen is there. You must then cut out the combs one by one, driving them out of the way of your bee knife by your smoking bellows, and taking care not to crush any of them. When you have got to the last comb, you will find all the bees collected about it, and on the side of the box. Smoke the bees off this comb, remove it, and then shake all the bees with a smart blow on a broad board—a japanned tea tray does very well. Hold it close to the mouth of the parent hive, and you will see what I think is, next to swarming, the most beautiful sight which falls in the way of a bee practitioner. Gently tap the under part of the tea tray; the bees will not take wing as you might expect; the noise will only rouse them from their half torpid state; and as at beat of drum, they will march up in straight lines to the mouth of their hive, which they will enter, making the same buzzing noise with their wings which they do when swarming. Now is the time to keep a look out for the queen. You may often see her returning in triumph to her royal residence in the midst of her attendants. I was perfectly amazed at the order and regularity which the bees keep under these circumstances, when I first accidentally hit on this method of returning the bees to their hive. And I have since delighted very many people with the sight. It must be seen to be credited.

If you find that the box which you remove from the stock has some brood in it, cut out the combs till you come to those which are thus filled, and then return the box to its own place. I never return drone comb, which

you may know by the cells being of a larger size; for there is no lack of these non-producers, but terrible consumers, in every large apiary, during the breeding season; but keep them to feed up young chickens or turkeys, who relish them highly. Returning a box with some brood comb in it to its own position has this good effect, that it induces the bees to take immediate possession of the box so returned. They cluster upon the brood comb, and straightway proceed to fill the vacant space with honey comb. Even if there is no brood to return, I generally tempt the bees to re-enter the top box by placing in it a piece of honey comb. And here is the great advantage of having all your boxes made to the same guage; the bars will then fit all your hives indifferently, and you may transfer one with a piece of comb attached to it, from a full hive to an empty box which you wish the bees to occupy.

After the breeding season is over, that is about the end of February or March, the bees will fill the empty brood comb with honey, and when the cells are all sealed over, will often almost entirely desert the richly stored box, which may then be taken with very little trouble. During the breeding season, the loss of the queen, should any accident happen to her during the operation, is easily supplied. There will generally be young queen grubs ready to take her place; or if there happens to be none in the hive, the common egg may have its prospects in life changed from that of a maid of all work to a reigning queen. After the breeding season of course this cannot be done; and the loss of the queen is necessarily followed by the gradual extinction of the whole hive.

The season of the year at which the greatest quantity of honey may be taken will vary of course in the different parts of these islands, as they extend over so many degrees of latitude. In the northern districts they work during the entire winter (though in the English sense this is not an appropriate word.) The queen rests from her maternal toils, though the workers make no pause in their honey gathering; so the very purest honey may be taken during the winter months.

In the latitude of Auckland, the work of a hive is suspended for a month or so, varying of course with the season; whilst in the south, I think their state of torpor will be found to extend over a longer period, and the habits of the bee will differ less from those of their English brethren. Experience, therefore, must teach bee masters what season is the best for a great take of honey.

In describing the management of the cottage hive, at page 22, we said that fifteen days after swarming was the time to put on

The Bell Glass or Super.

Mr. Cotton goes on to describe that, by means of bell glasses, or in lack of them, small straw caps, pure honey may be taken in the height of the breeding season. Put your glass on the top of your box the very day* the swarm is put into it; and if it be a strong one, they will immediately take possession of the glass, and store up honey there; while the queen will confine her breeding operations to the box below. It is a very good plan to fix a bit or two of pure comb in the lower part of the glass, as a foundation or beginning for them. This may be done by holding the glass to the fire till it becomes as hot as the hand can bear; then steadily, yet firmly, press a piece of pure comb to it, which will melt where it touches the glass, and setting again almost immediately, will firmly fix the whole comb in its place. Take care not to put the comb topsy turvy, but in its natural position, as it stood in the hive where it was made. Take the glass off directly it is full, and all sealed over. The bees always swarm with their honey bags full; and they often take the greatest part of the honey from a bell glass, as provision for their journey, leaving nothing but empty combs where the day before there was plenty of honey. I like the bell glass to stand, as I have said, on the bars themselves, and not on the

* Mr. Cotton is wrong, for the brood comb is more generally the first work of the bees, and this, in New Zealand, is completed in about 14 days.

lid, with small holes cut in it, which is the common way of putting them in, for the bees have a freer passage to the glass. The manner of taking them when full is very simple: I have one of the rims which run round the top board pinned to it, and not nailed: this is removed when a glass is to be taken, and a thin carving knife passed under the top, to separate the comb and the glass from the bars, to which they are generally firmly united. In no other way is it possible to take away a full glass, without certainly breaking the comb, and possibly the glass itself. The bees which happen to be in the glass at the time it is taken are easily got out of it by the means recommended for the top boxes.

Dr. Cumming, in a letter to the *Times*, says.—In answer to another inquiry, do I approve using stupifying fumes, as of puff-ball, &c., in order to expel the bees from supers full of honey?—I say, certainly not. It may not injure the bees if judiciously administered. Some highly recommend it. But it is not necessary. The bees will leave the super on its being detached from the hive and carried to a little distance, and will return in an hour or two to their home and their queen. The only case in which I have recourse to fumigation is when any portion of the comb, through accidental admission of wet, has become mouldy. A few whiffs of puff-ball may be injected during five minutes by means of an instrument sold for this purpose. As soon as the humming noise ceases, lift the hive and cut out the mouldy portion of the comb, replace it, and in twenty minutes the bees will again be at work. This is the only case in which I like to employ either this or tobacco-smoke, which answers as well if not too long continued.

Your apiary or bee-shed should be placed as near your dwelling as possible, sheltered from the north and north-east winds (south and south-west in New Zealand), and at the greatest possible distance from poultry. Frequently, but quietly and unobtrusively, visit your bees, watch them at work in your bee-glasses, or by windows in your bee-boxes. Let your children play beside them. They are fond of children, and unless violently irritated they will not injure them. I can state this from very

ample experience. At the same time, it is proper to state, that some few persons are so offensive to bees that they must not approach them. Plenty of soap and water and fastidious cleanliness are essential to a bee-master's continued popularity with his apiarian family.

The Profits of Bee-keeping

Is estimated by the editor of the *Family Economist* to a cottager at from £10 to £15 a year. Rev. J. G. Wood says he made £20 a year for three years, and that another person cleared £100 by bees. He says that 50 or 60 lbs. of honey have frequently been taken from a single hive in a season, and occasionally as much as 100 lbs. One writer recommends the *Polish* hive as being less expensive and more profitable, less scientific, less artificial, but more agreeing with the natural habits and laws of the bees. As a proof of the superiority of the Polish method in the management of bees, he says where are the cottagers of any other country of Europe who earn every autumn from 5 to 20 barrels of 400 to 500 lbs. each of pure honey, and from 50 to 200 lbs. wax; and Mr. Cotton goes on to say that the increase from a single stock in New Zealand in four years, was:—

The first year.....	31 lbs.
Second year	205 lbs.
Third year.....	721 lbs.
And fourth year	1211 lbs.

Or, 2168 lbs. in four years.

If this, the produce of a single hive, does not make English bee keepers open their eyes with astonishment, I shall be surprised. It certainly should encourage New Zealand bee masters to study the gentle craft.

When our woods are fully peopled, then will be the time for honey without stint, and wax in such plenty as to become an article of export. The maories make capital bee hunters; their accurate power of observation exactly fits them to track a bee to its home; and their ingenuity, to adopt the best method of preparing honey and wax. We have hollow trees in abundance.

Many of them at the Bay of Islands and other districts are already tenanted by bees, and honey in considerable quantities is constantly being brought in by the maories for sale; and they will learn to track the bees to their home after the American fashion, which is this: Put a piece of honey comb in an open space in the woods as a bait to the bees, who are soon attracted to it if their hive is within a reasonable distance. They gorge themselves, and then their instinct leads them to make the best of their way homewards. The direction of their flight is accurately marked; the same operation is performed in another place at right angles to the line of the first bees' flight, and the intersection of these two lines leads the hunter to his prize. Another plan is to catch the bee while feeding on the bait, and with a little gum attach a small piece of swan's down or feather to its body, which, without materially impeding its flight, makes its course through the air more easily observed. By hook or by crook the maories find the wild bees readily enough, as the woods in many places are full of them.

Uniting or Driving Hives or Stocks.

The union of hives is a branch of the craft which does not so much belong to the young bee master as to those who are in possession of a fully stocked apiary, but when two swarms which have risen on the same day, and which you intend to unite, are each safely hived, leave them for the evening near the place where they lighted, remembering to screen them well from the direct rays of the sun; for, the action of the direct rays of the sun is the usual cause which makes swarms run away after they are safely hived. After sundown the same evening spread a cloth on the ground, near where the hive stands which you wish to double; then take the other steadily in your hands away from its bottom board, and strike it with a smart blow upon the cloth; this will knock all the bees out in a mass; they will not take wing, but will remain lying on the cloth whilst you steadily and carefully place the other hive over them. Three or four pieces of wood must previously be placed on the floor

where you strike the bees down, that they may not be crushed by the edges of the box which you put over them; then lap up the corners of the cloth, and your part of the work is done. You will hear a loud humming noise, and the bees whom you have dislodged will ascend into the new hive, and peaceably amalgamate with the other swarm. Just at dusk, carefully unlap the cloth, and if any considerable cluster of bees is gathered outside of the box, as is sometimes the case, brush them gently down with a feather, or with your finger, if you prefer it, and guide them under the hive; for bees are tractable creatures, and gentle withal, if they are gently handled; but they are not deficient in courage; if you provoke them through ignorance or carelessness, you must take the consequences. When they have all gone up into the hive, put them quietly on their bottom board, and move them into your apiary where they are to stand, or else make this your first work the following morning. Give the double stock sufficient room, and they will set to work vigorously. Two contiguous hives in my apiary united themselves one year; one swarm deserting four or five combs which they had begun to build. It may be that they had no queen, for I found no grubs in the cells which they left. This double hive has since received a fresh accession of strength, a large portion of another swarm having joined them, going "promiscuous like" into the hive, where they were, to my surprise, well received. Had a single bee *pokonoad* into the hive, she would have been immediately seized and put to death. And now this stock is the very best I have in my apiary, filling four boxes, and working away vigorously too in a glass, which I put on the top of the original hive the day it swarmed. Fifty strong hives are worth more, and will give more honey to their owner, than two hundred and fifty weak ones.

Stocks may be united in this same way, though they do not swarm exactly on the same day. In this case you will of course knock the fresh swarm on to the cloth, and place over it the hive in which the combs are already begun. It is as well previously to turn up the latter

hive (in the plane of the combs, remember), and give the cluster of bees a good sprinkling with syrup. The new comers will be at once attracted by the smell of the syrup; will mingle freely with the daubed bees, who have something else to think of than to repel intruders; they will help to set them to rights, by licking off the syrup; and though you may call it a selfish act of kindness, it will cement a friendship between those whom you wish hereafter to be peaceable inmates of one home.

The union of swarms in this manner will to a certain extent prevent your apiary from growing to an outrageous size. Such hives as exhaust themselves by swarming, should have their old black combs cut out, and they will then be ready to have a new swarm put into them. Don't let an exhausted stock stand doing comparatively nothing in your bee house, when you have daily fresh swarms ready to tenant the house, if you take the trouble to put them in possession. It may be done, not by the ejection of the original holders, but by reinforcing them by a fresh colony. The number of your hives may be brought still more within limits in the autumn, in the following way:—If you have ninety hives which you wish to reduce to thirty, you must join to every hive which you intend to leave, its right and left hand neighbour. I think May is about the best season for doing this; but the proper time will vary in different districts. It should be after the breeding season is over, and when the hives are the heaviest. Cut out the combs entirely from the side hives by the aid of your three instruments, the smoke-bellows, the bee knife, and the bunch of feathers, and return the bees, as directed above, into their now impoverished hive. Place it where it stood before, till the evening, when they will have formed a large cluster inside the hive, just as if they were a new swarm. A stranger coming to see your apiary, and not knowing what you had done, would think this your very strongest stock; for the entrance will be crowded by bees rushing in and out, carrying away broken bits of comb, and doing their best to set their pillaged house in order. They are nothing discouraged by what has happened; but, like a sensible man under similar cir-

cumstances, make the best of it, and always seem to me to be singing all day long, that song which I wish were better known, or rather more generally acted upon, by us men creatures—"Try, try, try again." More than once I have allowed them to make the trial. I have fed them for a day or two with the refuse combs, which they thankfully accepted, in lieu of the thirty pounds or so which I took from them; the feeding was necessary to enable them to get their new combs built with as little delay as possible. The season proved favourable for honey gathering, though this experiment was made in the beginning of winter; in fact, the trial succeeded, and this family of persevering bees are now one of my best stocks.

But the object of the bee master who has a fully stocked apiary, should be not only to take a large quantity of honey by this process, but also to reduce his stock to the number which he wishes to swarm the following spring. So at sunset he should unite the bees of this deprived hive to its next neighbour in the mode last described. The doubled hive should be moved midway between the places lately occupied by the two. If three hives are united, do not displace the middle one, but take away altogether those which you have emptied. The bees will then have no difficulty in finding their new home, especially if, for a day or two after, you prop up the front of this hive with some little wooden wedges, so as to make the doorway much handier. But the greatest confusion and loss will be occasioned by the attempt to join bees from different parts of the apiary—for, says Jonas de Gelien, of Edinburgh, in the "Bee Preserver," bees that have not swarmed voluntarily return to the place they have been accustomed to, even after having been shut up for months. The same thing happens if you unite swarms distant from each other. Next day, or the day after, you would have the mortification to see the bees return by hundreds to their old residence, flutter about for a length of time, and lose their lives, either by falling down from fatigue, or throwing themselves into the neighbouring hives, where they are put to death. Not having left their new dwelling with the same precaution that a swarm uses to reconnoitre the one it has chosen, or

that has been given to it, and supposing themselves at home in spite of the disorder of the night before, they rush out on a rapid flight, and returning from their excursion, go back to the place of their ancient domicile; and thus the purpose of fortifying your hives, and of preserving them by uniting them, is defeated. I have frequently tried to unite distant hives, and always met with this result.

In Walsh's *British Housekeeper*, page 242, we find a new method very similar to what has been already given.

To Prevent Swarming.

Procure two boards an inch and a half thick, or perhaps a little more, and of a size a little larger than the base of the hives. Cut a sloping way out of two adjoining sides (say the front and right side of one and the front and left side of the other, so that when they are placed alongside of each other and a hive placed on each board, there is an entrance to each hive and a passage also between the two), the breadth of the mouth of the hives, and reaching from that part to the edge of the board. Before swarming time, a hive full of honey is to be placed on one of these, and an empty hive on the other, with a piece of wood covering the narrow vacant space between them. Next stop up the doorway of the full hive, so that the bees cannot avoid passing out through the empty one, and shift both on the foot-board until the new entrance is opposite the situation of the old one, when by sprinkling a little honey, the bees soon become reconciled to the change. In this way double the former room is given, while the queen and her nurses set to work to rear a fresh brood, and the honey storers fill the new hive with honey. When this last is also filled, it must be removed in the following manner:—A fine day should be selected for this purpose, when most of the bees are out at work; then cut off the passage between the two hives by slipping a piece of metal or wood between them. Slip the old entrance back to its old place, and stop up the new one. At this time, if there is a great commotion in the new hive, it is a sign that the queen is there, and it is necessary to postpone the removal till she has left it, in which case the separation must be removed. But usually

she is in the old hive and no notice is taken of the change in that case, and the two may be left quiet till the evening, when, a little before dark, the entrance to the new hive may be opened, and the imprisoned bees immediately fly out to seek their queen and find their way to the old hive. The new one may now be removed with its contents, substituting another empty one in its place, and treating that exactly as was done before. As no queen bee will lay eggs in a temperature below 80 degrees, and if the new hive is maintained below this, there is no danger of any such result. She will, on the contrary, remain in the old hive to lay her eggs, where the workers also will deposit their pollen from the flowers to form the bee-bread for the grubs, while in the ventilated hive nothing will be stored but the finest wax and honey.

Feeding.

In this country the bees are generally, I am thankful to say, able to feed themselves all the year round, and lay up a surplus for their master likewise; so that I shall not say much on this head. There is hardly any season, at least in the northern parts of the island, in which the bees do not work nearly all the year, as there is a perpetual succession of flowers in the woods: so whenever a bee master has a hive which is dwindling away, he had better unite it to its next neighbour, rather than attempt to restore its vigour by feeding. Indeed, in nine cases out of ten he will find that the loss of the queen, and not a lack of honey, is the cause of its failure; and after uniting the bees, as explained, he will have several pounds of honey, and at least a pound of wax. Unite, rather than feed, when you have your apiary fully stocked. But as there are three or four circumstances under which feeding may be required even in this country, I must not altogether pass the subject by; and they are these: When you have only one stock hive in your apiary, and some accident has happened to it; the combs, perhaps, have all been broken down by clumsiness in moving it to its new station. In this case nothing is easier than to feed it by placing before the hive, on a fine day, the honey combs which have fallen.

The bees will soon empty them. If you think they want some more food, boil some sugar with water or mild beer into a syrup, about the consistency of thin treacle; do not use the very coarse sugar—for this the bees do not like—nor boil the syrup longer than is necessary to dissolve the sugar: stir it also, that it may not burn. Then pour some of this syrup out of a bottle, or tin made like an oil feeder, into the cells of the comb which has been emptied, and place it before the hive as before. Remember that there is no better food for bees than honey, when it can be got (it is mother's milk to them), nor any better feeder than a piece of empty honey comb.

Another time when feeding is necessary, is if a succession of very bad weather sets in after a new swarm has been hived. I have told you that each bee swarms with her honey bag full. They convert this into wax during the first and second days. You may observe that very few bees stir out the first day; after that they want a fresh supply: and if by stress of weather they are prevented from going abroad to seek it, a few pounds of honey or syrup will be well bestowed, and amply repaid. It is not like an alms given to an idle beggar, but a seasonable loan to an industrious tradesman.

Water for Bees.

There is one other sort of food which bees require, and which they cannot do without, viz., water; which you will do well to supply them with, if they do not find it near their hives. It is bad to have your hives quite close to a large river or pool of water, for thousands of bees will be beaten down into the water by high winds, when they are returning heavily laden to their hive; but a small rivulet is a good thing to have near: in the summer season you will see a great number of bees standing on any little stones or bits of grass which may be by its edge, drinking to their heart's content. In defect of a stream, they will find out any pump or water butt which is handy to their hive, and satisfy themselves there; or at places where the water they get is stagnant, or even impure. But as water carrying is heavy work for bees as well as for men, it is

well, if their natural supply is far off, to set pans of water near the hives, filled to the level of the water with stones or moss, lest the bees should fall in when they alight to drink. A very convenient means of supplying them is to have a small wooden trough, with a piece of wood floating on the top of the water, not getting light, but so that it will always sink to the water level; the bees will perch on this board, and drink their fill from between it and the sides of the trough. I was led to think that bees are fond of salt water, and I placed near my apiary one trough of fresh and one of salt water: for one bee that went to the fresh water there were twenty at the salt lick. But they seem to be very capricious in their tastes.

Bees' Enemies.

These to the poor bee are common both to England and New Zealand. With them the bees, and the bee master, have to fight in both lands. The most deadly are the spiders. But there is another foe peculiar to New Zealand of a very nasty nature: I mean that stinking beetle, whose real name is *kekereru*. When a hive dwindles away to nothing, and the bee master turns it up to see what is the cause and extent of the damage, he will often find a number of these black rascals in possession of the empty combs. If you find them, take the law into your own hands. Fowls should be kept away from the apiary; they are very destructive. The large species of dragon flies catch a great many. There are many of the New Zealand birds which, I doubt not, seize the bees in their flight. The *korimoko* I have taken in the fact; and I strongly suspect the *tui*, and other honey eating birds.

The Bees' Sting.

A bee sting is the same all over the world: the pain is sharp for a minute or two; and it is not pleasant to have an eye entirely closed, or a nose twice as large as nature intended it. As the sting of the bee is the same here as it was in England, I can have nothing new to say on the subject. I do not think, however, that the bees are near

so irascible here as they are in England; and I account for it in this way: They have not so many enemies to contend with; the absence of wasps, in particular, enables them to preserve a more equal temper. *I wish all Englishmen were as much improved in this respect as the bees are.*

Many remedies have been given for a sting; above all, pull the sting completely out, as it is barbed like a fish-hook, and will work into the flesh; then squeeze the poison out with the pipe of a small key, as you would a thorn, and put a little honey on the place, just to keep the air away: if this is done at first, the swelling will generally be a mere nothing. The pain only lasts two minutes; at worst, it is only a swelled eye for a day or two.

Another very common nostrum for rubbing on the place, after the poison is squeezed out with a key, is the washerwoman's blue-bag. Above all, never blow on your bees, they will try to sting directly, if you do. If they come all about you, making the noise which you will soon learn to know as a sign of anger, go quietly away, and put your head into a thick scrub, if any is near. This will brush them off. If you want to catch any of the bees, make a bold sweep at them with your hand, as though there was no such thing as a sting in the world; the bee will be so astonished that she will not sting at first. Then hold her in your closed hand, without pressing her, and she will not sting. I have so caught three or four at a time. If you want to do anything to a single bee, catch her, "as if you loved her," between your finger and thumb, where the tail joins on to the body: she thus cannot sting you.

Honey and Wax for Domestic Purposes.

Dr. Cumming says that:—It has been urged as a commercial question that honey is not now of the same importance as it was before the sugar-cane was discovered, and that gas has superseded wax candles. I am satisfied from many considerations, that if people would eat honey at breakfast instead of rancid London butter and nasty greasy bacon, not only would their health be

better, but their temper would be sweeter. I find invariably that people who like honey are persons of genial and affectionate temper. If Mr. Cobden and Mr. Roebuck had only taken honey at breakfast, or a very choice fragment of virgin honey at dessert, they would never have given utterance to those vinegar and acetic-acid speeches which did them no credit. I wish somebody would send Mr. Spurgeon a super of good honey. Three months' diet on this celestial food would induce him to give up those shockingly bitter and unchristian tirades he has been lately making against the clergy of the Church of England. The producers of honey never draw their stings unless in defence of their homesteads, and the eaters and admirers of honey rarely indulge in acrimonious language. I believe a great deal of bad feeling is not moral or mental, but physical, in its origin. If you have in a congregation, or in a school, or in a convocation, some one who sets everybody by the ears, treat him to a little honey at breakfast for six months, and the "thorn will blossom as the rose."

Therefore, as you take the honey combs out of the hive, separate those which are quite full from such as are only partly so; those which are pure white combs from such as are dark in colour, or have some of the cells filled with bee bread. This separation may easily be made by having several dishes or milk pans by you, in which to lay the different sorts of comb as they come to hand. By making this division at once, will save a good deal of honey; for if all the combs are heaped together in one vessel, the dark combs, which are the hardest, will crush and otherwise injure the pure white combs; in them the wax is very thin and fragile, hardly able to bear the weight of the honey which they contain, and sinking immediately under any external pressure. Often you will find two sorts of honey comb, the pure and the impure, in the same cake. Separate them at once with a sharp knife.

If you take a top box or a glass entirely full of pure honey, you need not be in any hurry to cut it out; it will keep better where it is, if only you place it in security, where no bee on a foraging excursion can possibly find it out.

If you have more pure honey comb than you can sell or use yourself, run it out in this way: give two cuts to each comb with a sharp knife, so as to slice off the covers of every cell. This is in fact uncorking all the bottles in which the bees have stored their honey. Then set the sliced combs in a sieve or colander to drain, with a vessel below to catch the honey as it runs. If you have large earthenware pots to store your honey in, it is best to let it drain from the seive or colander into this at once: you will thus avoid having to pour it from vessel to vessel.

When all the honey has run from the white combs—and almost every drop will drain from them if you cut them sufficiently—place the comb in the middle of the apiary on some fine day, and the bees will take care that none of it is lost. They will extract every atom of honey from the wax.

You'll be surprised to find the great difference in the honey which your bees make at different times of the year. The best, perhaps, that ever I tasted, was made in the neighbourhood of a number of almond trees while they were in full flower. It is one of the few cultivated plants which materially affect the quality of the honey, and may be profitably grown to a great extent in this country. The honey, also, from clover paddocks, is very plentiful, and beautifully white. Many native trees, too, are excellent honey producers; whilst some few others impart to the honey a peculiar, and to some people a disagreeable, twang. But there is one peculiarity in a great deal of the New Zealand honey, which I must mention, namely, its great readiness to crystalize. In some districts whole boxes will be found with the honey crystalized in the cells in one solid mass, as difficult to cut through as a very solid cheese. The white combs filled with this species of honey are exquisitely white, and the honey of such good quality that it may be eaten quite as a confection. The comb, when cut through, shews hardly any appearance of wax; it seems one solid mass of sugar; and yet the shape of the cells is clearly discernible.

You can be in no doubt what to do with this sort of honey comb. It will keep any length of time, if the combs

are wrapped up in white paper, and carefully packed away, or put a number of them together in a box. It is one of the best specimens of New Zealand produce with which to surprise and please our friends at home. But it affects what I am now telling you about running your honey in this way. It is difficult, nay, impossible, to get it from the impure combs by any of the ordinary methods; it will not run—pressure is equally useless.

And now for the second article of bee produce—the wax. It is by far the most valuable of the two: for this reason—because there will be an unlimited demand for it. I have spoken of honey and wax, the produce of bees in their first and simple forms. The bleached wax of commerce is easily prepared by increasing the surface of the wax, and then exposing it to the action of sun and air. A simple way of bleaching wax in small quantities is to run it into cakes in the usual way, and then bleach as before; only be careful not to overheat your wax, or you will spoil its colour, and deprive it of many of its useful qualities.

The uses of wax for domestic purposes, and in the arts, are various and extensive. The greater portion of that imported into England is used perhaps in candles. But I have already said that I hope the day may come when wax candles of our own make will take the place of dips. But there are many smaller articles which a careful house-keeper will like to have at hand, to say nothing of the pleasure of sewing with a well waxed thread. Lip salve and cerate are no bad things to have in the house—the latter is made by melting an ounce of wax, and heating an ounce of sweet oil, not boiling either. Pour them together at the same temperature, and keep stirring steadily until they leave the fluid for the buttery state. If you leave off stirring just at the setting point, the wax and oil will separate, and you will have to melt again. But if you stir steadily all the time, you will have a substance soft as butter and smooth as oil—of such excellent healing powers, that I have sometimes wished to have a sore place to test its virtues. The cerate may be made harder or softer by altering the proportion of oil to the wax.

The softer cerate is best for dressing a blister; nothing

better,—the harder, for spreading on linen, to apply to any sore made by long confinement in bed. An excellent ointment for a burn is made by dissolving a lump of camphor in the oil before you add it to the wax. Remember what I said about stirring.

Many other things may be made of wax—lip salve, &c.; but I shall not stop now to give receipts for them, as almost any old woman knows how to make them.

Now, to speak of the uses of honey: It will save you many a sugar bill if you have plenty of it; and many a bill for other things too. Excellent wine may be made from it, which, when it has been kept for some few years, can hardly be told from sherry. First-rate beer may be made from honey. Without reckoning the worth of the honey, it is found to stand the maker at a penny a gallon. And what hard working man can have any excuse for sopping in a pothouse, when he can have a drink so strengthening and wholesome as this, if taken in moderation; with his wife, too, to share it after the labour of the day is over?

Mead or Hydromel.

This is of two sorts; the weaker, and the stronger mead, or metheglin.

If your mead be not strong enough by the refuse of your combs, then put so much of your coarse honey into it as will make it strong enough to bear an egg the breadth of a twopence above the top of the liquor, which is sufficient for ordinary mead; and afterwards, till night, ever and anon, stir it about the vat. If you would make a greater quantity, then you must add a greater measure of water and honey; namely, six gallons of water to one of honey. Some will boil this proportion of six to one, to four; but I think to five is very sufficient. The spices to this proportion are cinnamon, ginger, pepper, grains of paradise, cloves, of each two drams. The next morning, put to the liquor some of the scum of the honey; stir them together, and stoop the vat a little backwards: when it hath settled an hour or two, draw it off to be boiled: and when you see the sediment appear, stop, and let the rest run into some

vessel by itself, which, when settled, strain into the boiler, and the dregs of all cast into your garden for the use of your bees.

When your liquor is set over a gentle fire, and a thick scum is gathered all over, and the bubbles by the sides begin to break the scum, having damped your fire to cease the boiling, skim it clean, and then presently blow up your fire; and when you see the second scum ready, having again damped the fire, take off the scum as before: and then, having again stirred the fire, let it boil handsomely for the space of an hour, or thereabouts; but be sure you always keep scumming it as there is occasion.

After all this is done, put in your spices according to the former receipt, and let it boil a quarter of an hour more. The boiling is to cleanse the mead, which once done, any farther boiling does but rather diminish than increase the goodness and strength of the mead.

As soon as it hath done boiling, take it from the fire and set it to cool; the next day, when it is settled, strain it through a hair sieve or linen bag into the vat or tub, reserving still the dregs for the bees, and let it stand covered three or four days till it work, and let it work two days; and turn it into a barrel scalded with bay leaves, making the spice bag fast at the top. If you make no great quantity of mead, you may turn it the next day, and let it work in the barrel; your ordinary mead which turns sour will make excellent vinegar.

Metheglin is the more generous and stronger sort of hydromel, for it beareth an egg to the breadth of a sixpence, and is usually made of finer honey with a less proportion of water, namely, four to one. To every barrel of sixteen gallons of skimmed liquor, add thyme one ounce; eglantine, sweet marjoram, rosemary, of each half an ounce; ginger, two ounces; cinnamon, one ounce; cloves and pepper, of each half an ounce; all gross beaten, the one half boiled loose in the liquor, and the other half put into a bag before, in mead; so that after this manner being made, as ordinary mead will not keep above half a year, this, the longer it is kept, the stronger it is, and hath the more delicate flavour and taste.

This was a drink frequently used among the ancient Romans, who, I suppose, first taught the ordering of bees, and brought this wholesome liquor into England. We find by history, it was the approved and common drink of our ancestors, even of our kings and queens, who, in former ages, preferred the liquors of *the* product of the island, before those imported from foreign countries; as did the famous and renowned Queen Elizabeth, who every year had a vessel of metheglin made for her own drinking. A receipt of this queen's metheglin coming to my hands, I shall oblige the reader therewith, as follows:—

Take a bushel of sweet briar leaves, as much of thyme; half a bushel of rosemary leaves, and a peck of bay leaves; and having well washed them, boil them in a copper of fair water: let them boil the space of half an hour, or better, and then pour out all the water and herbs into a vat, and let it stand till it be but milk warm; then strain the water from the herbs, and take to every gallon of water one gallon of the finest honey, and beat it together for the space of an hour; and let it stand two days, stirring it well twice or thrice a day; then take the liquor and boil it again, and skim it as long as there remains any scum; when it is clear, put into a vat as before, and let it stand to cool. You must then have in readiness a vat of new ale or beer, which as soon as you have emptied suddenly, presently put in the metheglin, and let stand three days a working, and then tun it up in barrels, tying at every tap hole, by a pack thread, a little bag of beaten cloves and mace, to the value of an ounce. It must stand half a year before it be drank.

Royal Mead.

In six gallons of water put six quarts of honey, stirring it till the honey is thoroughly mixed; then set it over the fire, and when ready to boil, scum it very well; add one quarter of an ounce of mace, as much ginger, half an ounce of nutmeg, some sweet marjoram, thyme, and sweet briar, together a handful; boil it in the liquid; let it stand till cold; set it working with a little yeast in a barrel, putting the bung lightly on, and filling it up from time to time

with some of the same liquid. When it has done working, bung it up tight, and leave it in the cask several months before bottling it off. When it has been bottled some time it will effervesce like the best English gooseberry wine, and will keep, I doubt not, for years.

N.B.—One quart is equal to $3\frac{1}{2}$ lbs. of strained honey.

Sack Mead.

Put one gallon of water to four pounds of honey; boil it three quarters of an hour, and scum it well. For every gallon of the liquor add an ounce of hops; boil it half an hour, and let it stand till next day. Put it into a cask, and to every thirteen gallons of liquor add a quart of brandy. Put the bung on lightly till the fermentation is over, then stop it very close. If you make a large cask, keep it a year before you bottle it.

Bottled Beer, like Scotch Twopenny.

To fourteen gallons of water add a pound of hops previously steeped in a little water; boil it half an hour; strain it and let it run upon the honey, about a pound and three quarters to each gallon of liquor, more or less. When cool, put it in a barrel and ferment as before. This is an excellent summer drink; as is the following:—

Ginger Wine.

To eight quarts of water put eight ounces of ginger, twenty-four pounds of honey, and eight lemons. Work and bottle as before.

In the two last receipts the strength of the wort may be increased or diminished by varying the proportion of honey.

Honey Vinegar.

Put a pound of honey to a quart of water, mix well, and then expose in the greatest heat of the sun, without wholly closing the bung hole, which must be covered with coarse linen to keep out insects. In about six weeks it will be changed to vinegar of an excellent quality. A spoonful or two of this vinegar mixed with cold water is a very

agreeable summer drink. It may be either used plain or made to effervesce by a little soda.

A cunning housewife, doubtless, would improve on many of these receipts; her main difficulty in supplying a family with these beverages will be in straining the honey, which runs very slowly when of a thick quality. This I think may be obviated by boiling clean honey combs in a due proportion of water, and then letting the liquor stand till cold, when the wax will have formed on the top, and may be taken off. Then proceed as above.

A less agreeable, thou not less useful, application of honey, is in the form of a cough mixture.

Fill a quart bottle three parts full of clarified honey, mix well with this a teaspoonful of Ipecacuanha, then fill up with sharp vinegar: a spoonful or two of this, whenever the cough is troublesome, will have a very good effect.

The "Times Bee-Master" closes his correspondence on Bee Management thus—he says—I have directed your attention to bee-keeping, not as a fancy pursuit, or as an interesting entomological investigation, but as a practical and real work. Hence I have not discussed a variety of toys used as bee-hives, very pretty and very tasteful to the eye of a sentimental apiarian, but so bothering to the bees that they wish such houses were at the bottom of the sea. Simplicity of structure, directness of use, and availableness for deprivation of honey, and yet preservation of the honey-makers, ought to be the guiding law. Bees don't like to be paid too many, too obsequious, or too patronising attentions. I want, however, in this closing letter to turn my largest hive into a pulpit, and to preach a short apiarian homily to cottagers, which I know they will read, and hope they will "mark, learn, and inwardly digest."

A Sermon on Bees.

1. They may carry from the hive to the cottage-hearth a lesson of industry. During work the bees are so intensely absorbed in their duty, that they ignore every distracting and diverging object and interest. They have learnt well a text their masters would do well to

copy: "Not slothful in business." There is no getting on in this world of ours without hard work. It is not work and plenty of it that kills people, but worry.

2. Bees teach a lesson of loyalty. They are monarchical by conviction and in practice. They love a queen, whose sovereignty is motherhood, and whose service is perfect freedom. They detest your republics, and democracies, and radicalism in all its phases.

3. Bees are immensely attached to their homes. They are "keepers at home." No mother of a family gets on by gadding about and gossiping from house to house.

4. Bees are models of cleanliness. The care with which they remove filth of all kinds is something remarkable. They plainly believe what many Christians say, "cleanliness is nearest to godliness." The cottager cannot in this matter do better than follow the example of these admirable sanitary philosophers.

5. Bees set a beautiful example of Christian sympathy. I have seen a wounded bee, accidentally hurt, carried out from the hive and laid tenderly on the bee-board in the warm sunshine. One bee would lick the sufferer with his tongue from head to foot; another would roll him over and over in the sunshine; and at sunset they would carry him into his sick bed. I do not complain of want of such sympathy among the poor. I have seen much of it in the homes of the most destitute, and witnessed personal attentions and sacrifices and services which have never been exceeded, if equalled, in the houses of the great.

6. Bees are very fond of fresh air. A hive is one of the best ventilated homes; and I have some doubt about the wisdom or success of the various arrangements made by some bee-masters for increasing the ventilation of their hives. In a hot and sultry day I have seen successive lines of bees take up their position at the mouth of the hive, and, joining the tips of their wings, work these fanners for ten minutes, and then retire and let the second parallel line come to the front and continue the same process. This example is not efficiently followed in city or cottage. People who are most careful about what they eat and drink and put into their stomachs,

are utterly careless what they allow to enter their lungs. Now, the truth is, it is easier to poison a man through his lungs than through his stomach. My bees would die in a London bed-room in twelve hours.

7. Bees are very early risers. The first ray of sunshine is their matin bell, and by seven o'clock p.m. they are most of them at home. People that live long and are healthy differ in many of their habits, but generally agree in being early risers. Early light has sanitary as well as photographic influences, which post-meridian light is a stranger to. "Early to bed and early up" is an admirable maxim—an axiom among bees, and it should be a habit among rational men.

8. Bees are peaceful and peacemakers. This will appear a hasty statement to all who remember that bees have stings. But a little thought will justify what I say. Bees never give way to aggressive warfare. They never attack those who do not attack their queen or their homestead. Their stings are purely defensive. This is a very curious fact, and very suggestive also. If they had no stings at all, they would be an argument for the Peace Society. But as it is, they prove that the best defence of home is a good preparation to repel the aggressor. When, therefore, Mr. Bright preaches the duty of breaking up the navy and disbanding the army, it would be the conduct of a great hornet impressing on bees the duty of extracting their stings. Were the bees such simpletons as to listen to his plausible logic, and give up their stings, they would be surrounded by swarms of wasps, who would very soon make them give up their honey. As if to teach the bees that their weapons are to be used only in the last extremity, every bee knows that the use of his sting is followed by its inevitable loss and his destruction. It sticks where it strikes, and the violence done to the bee ends always in death. While admiring Mr. Bright's love of peace, I hope every bee-keeper will prefer the bees' way of maintaining it. So sweet and short is a bee-master's sermon.

In conclusion, as Mr. Cotton says, a good deal of the craft of beekeeping is different in New Zealand from that which is useful in England. The length of the

summer, the mildness of the winter, the greater consequent increase of the bees; these, and many other things, require so very different treatment in the colony, that we consider ourselves justified in assisting to develop this very important branch of colonial industry. We will conclude with a few hints that we have not been able to find a place for previous to this. The *Brood Combs* are generally in the centre of the hive; therefore, in cutting out comb, take the outside if you require honey; but if you want to *prevent swarming*, cut out early in the season the brood combs containing the royal cells. *Young broods* are hatched in strong healthy hives throughout the year, but less about July (mid-winter) than at any other season. *Honey* is gathered in mild weather in this country throughout the year. In April, if the hives are small and the first or virgin swarms strong, two or three of the *side combs may be taken out*, and even where the hives are heavy with store honey the bees may be driven into new boxes, giving the bees back the inferior or dark combs to clean, as by feeding in this manner the above operations may be delayed as late as July. *Bees swarm* much earlier if there is too much heat or too little room in the hive. Rev. R. Taylor says that *bees work all the year* and make two kinds of honey—the spring or summer honey is liquid, the autumn or winter honey is solid and completely crystallised. In *building the combs* the bee begins at the top of the hive and works downward. *The sting* of the bee is barbed, and is always left in the wound, therefore instantly pull it out without breaking it and suck the poison from the wound; a key pressed on the spot will stop the pain and inflammation, or hartshorn rubbed on the place, but perhaps the best cure is a little honey; this keeps the air out and is always handy. *A stock* is a hive of bees at the end of the swarming season, or a hive that has sent out one or more swarms, it being the stock left in the parent hive. *Swarms* are those recently hived who have themselves not yet thrown out swarms.

After two years' patient observation M. Duchemin has discovered the source of the parasite which attacks bees. He has found the parasite on the flowers of *Helianthus*

annuus (the sunflower), and on the bees, and he has proved conclusively that it gets upon the bee from the plant, and not upon the plant from the bee.

In the matter of bee books we have copied largely from Mr. Cotton and the "Times' Bee Master." The quotations will easily be distinguished, as we have allowed the authors to speak in the first person. What we have aimed at throughout, is to give practical instructions in the several operations connected with bee management. In some instances the operation is described more than once, but it will be found that the description is different, the process not being altogether the same, although either will effect the same purpose.

There is just one little matter not given in any book we have examined, and that matter we may call the profit and loss of bee keeping. Thus we will suppose you have got your swarm at the proper season, that you have put it all right in your garden in the place specially prepared for it. You very naturally congratulate yourself that (according to this and all other bee books) at the proper season for taking honey—you cannot of course be bothered with supers, bell-glasses, side boxes, or anything of that sort, you merely want, say, 30 or 40 pounds of honey from each hive. Well, the proper season comes and you proceed in your own way to take the honey; you lift the hive or box, and what do you find—plenty of bees and plenty of combs, you find royal cells, worker cells, drone cells, and honey cells—all empty or nearly so. The bees have made the cells and filled them with brood and honey, swarms have gone off, each one taking a large quantity of honey with them till the parent or stock hive, as it is now, got weak in stores and workers, and you find the drones masters of the situation. Bees to be profitable must be attended to; thus a fortnight or three weeks after getting your swarm (the state of the weather will very much alter the dates for the several operations), you must take the extra honey by super, bell-glass, or side box, or you must enlarge the hive and prevent swarming, or you will miss the profit and find the loss.

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