THE

ITALIAN SYSTEM

OF

BEE KEEPING;

BEING AN EXPOSITION OF DON GIOTTO ULIVI'S

ECONOMICAL

FRAME HIVES AND HONEY EXTRACTOR.

By ARTHUR J. DANYELL,

Late Capt. H.M. 31st Regt.

LASTRA A SIGNA, FLORENCE.

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PREFACE.

HAVING been asked to edit the following notes during their original publication in the columns of the *Field* newspaper and their republication in the present form, I have had much pleasure in acceding to the request.

The principle of the Giotto hive is not new, it being a slight modification of the leaf hive designed by Huber. Its merit lies in its simplicity and cheapness, and in the admirable manner in which it is capable of being worked with the inexpensive honey extractor or smielatore.

With regard to the home manufacture of the hive, I would suggest that anyone, living within reach of a saw mill, would find it much more advantageous to obtain the pieces for each frame separately, as rods 3ft. 0½in. long, 1⅜in. wide, and 1in. thick, could be procured cut to the exact size, and at a much cheaper rate at a saw mill than they could be cut out of planks.

It gives me much pleasure to be the means of introducing so practical and useful a system of bee management to the English public.

W. B. TEGETMEIER.

Finchley,

London, N.

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ITALIAN BEE KEEPING.

CHAPTER I.

INTRODUCTORY.

ITALIAN INGENUITY has lately produced some improvements n bee hives and appliances, which I believe would be of great advantage if introduced into England, and with the authority f Don Giotto Ulivi, the inventor, I wish to describe them for the use of English bee keepers.

Even after several years residence in Italy, and personal experience in bee-keeping, I should not have ventured to recommend this new system, were it not that I see that it is adopted in preference to any other Italian, Swiss, or German system, not only by individuals, but by whole communities in Italy; as for instance, at Forli, and at Urbino (Raphael's birthplace), where the Societa Agricola sent for Don Giotto Ulivi to transfer some hundreds of stocks of bees from old-fashioned hives to new ones on this his system; and I myself can vouch for the great success of Don Giotto's inventions from my experience with twenty hives in my own apiary.

In order that English people should adopt, or at least try thie new hive, and also the invention for taking honey, it is necessary to show that both not only pay, but pay most handsomely; and that these hives are as cheap, more simple in use, and more ingenious in design than many kinds of hives with which they are already acquainted; and that the honey extractor is inexpensive. The machines by which honey can be extracted in one minute by centrifugal force from the combs (which are then replaced to be refilled by the bees), were sold for six francs, or about 5s., at the Florence exhibition of appliances for apiculture.

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This Italian system can be introduced at a very trifling expenditure in establishing an apiary, and without entailing any after expense in maintenance beyond that of new hives for new swarms.

Anyone possessing even a small garden can commence bee-keeping on this system at a very small outlay. A swarm of bees, if bought in England, costs from 10s. to 20s., and if this swarm be carefully kept, from it alone an entire apiary can be populated.

A new Italian hive of eight frames to begin with, as any number can afterwards be added when wanted, will cost in Italy about 8d. To this must be added the cost of newly-invented machine for taking honey, about 5s.

After the first year, if the season be favourable, the beekeeper may take about 30lb. of honey a year, which, if sold at 8d. a pound, makes £1; while the next year, for a further outlay of only 2s. 6d. for thirty more frames to complete two hives, 60lb. of honey may be taken, worth £2. As average example, in one season from one hive with frames I took 30lb. of honey, and at the end of the season I left the hive fully stocked with about 28lb. of honey, not calculating the weight of frames, wax, or bees. In Florence the Marquis Ridolfi's honey (taken by these centrifugal machines) is sold for 1fr., or 10d., per lb.—a price readily paid even by frugal Italians, as the honey is the purest possible, being entirely free from pollen or wax. Let us consider this honey, or money, as the interest only of the money invested in bees, and remember each hive will yield one artificial swarm a year by the system here advocated. I think these considerations may induce many people to give Don Giotto's system of bee-keeping a trial.*

Some of the previous remarks on the advantages of bee-keeping would apply to that pursuit in general, but I now wish particularly to bring to the notice of English people the new Italian system of managing bees, which has many improvements, some, I think, quite new, which might be introduced into England with the greatest advantage. Amongst many of the advantages of the new system I wish particularly to draw attention to the smielatore, which is a very simple and cheap machine, by which in a few seconds the honey is extracted from the comb in any of the frames of which a Giotto hive is composed, and afterwards the frame with comb is replaced in the hive, and in a few days the bees re-fill it with honey, and then again the honey may be taken. This system may be applied to every Giotto hive in an apiary. Also I wish to

* These calculations must be regarded as rather too favourable for England, where, taking an average of the seasons, one good, one moderate, and one bad occur every three years; again, many districts are very barren of honey yielding flowers.—W. B. T.

show the great facility of making artificial swarms (as explained hereafter), thus saving much time and patience, which are required in watching old-fashioned hives lest swarms depart unnoticed.

By artificial swarms the number of hives may be increased, as long as the bees find food; while by help of the honey-taking machine vastly more honey can be taken day after day from different hives, or say once a week from the same hive, than by taking the honey once or twice in a season from each old-fashioned hive.

I will now give the details of my experience. In August, when in Italy bees still gather honey, I had already taken, during one average season, from each of several stock hives, from 26lb. to 33lb. of honey, and left each hive with eighteen out of twenty frames with honeycombs full. I never fed them at all during the honey season. This weight is not extraordinary. Don Giotto Ulivi told me that one exceptionally good season he took 3000lb. of honey from twenty-eight hives with frames. That is over 100lb. per hive.

CHAPTER II.

THE GIOTTO HIVE.

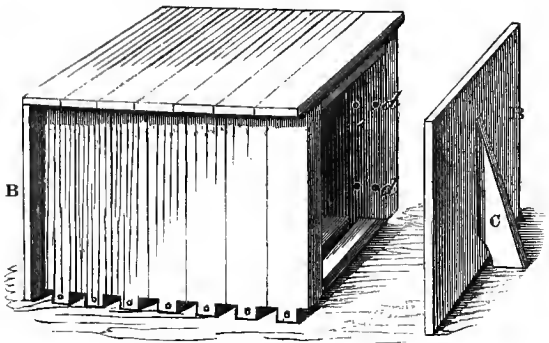
THE Giotto hive consists simply of a number of small wooden frames, in which the bees build their combs. These frames are something like those of the ordinary frame hives so well known in England; but they have this material difference and advantage, that they require no other outer hive to protect them, as they are made of *thick* wood, and therefore, without covering, stand any weather, from the heat of an Italian summer to the frosts and wet of winter. They do not even require to be painted. The Giotto frames are simply solid frames, and a hive is formed by arranging any number of these in a row, on any dry level space, like the top of a low wall (if it he flat and over a foot wide), without any other protection than a few loose tiles (Fig. 1) put on them as a roof. There

Fig. 1.

TILE FOR COVERING HIVE.

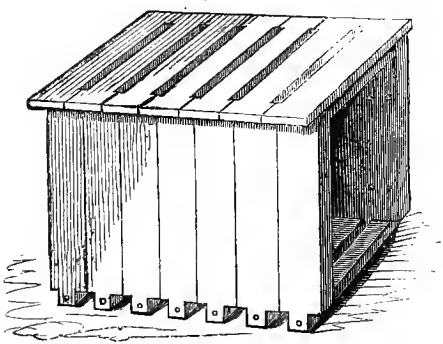
are little passages for the bees to enter between every two frames, and the ends of the hive are closed by two upright boards, B, B, (Fig. 2), which are supported in their places by two struts, C, nailed to them at right angles. These boards at either end can be at any time removed, in order to add empty frames, when the hive is full. In this respect these hives have a great advantage over English hives with bars or frames, as they can be enlarged to any extent, not only laterally, but also by adding one, two, or three stories, or by taking out alternate full frames and replacing them with empty ones, or placing a second story below. In this way the hive can be redoubled in size, and the bees will fill *regularly* the empty frames, not only in the old story, but also in

Fig.2.



SINGLE STORIED GIOTTO HIVE.

Fig.3.



LOWER TIER OF STORIED GIOTTO HIVE.

the new, as there are passages of communication for the bees to pass down between every two frames. The simplest way to increase the hive, without in the least disturbing the bees, is every now and then, when the bees want room, to add a new frame at the end, and thus the hive may be prolonged indefinitely, with the certainty that the combs will be made one by one regularly.

It is necessary here to remark that in case it be determined to make only a long row of hives, then the *top* of every frame must be made as broad as the sides, leaving no aperture (*vide* Fig. 2); but if it is proposed to build up an upper story, then, in the tops of frames for lower story, apertures corresponding in size with those between the lower bars of the frames must be cut (see Fig. 3), so as to allow the bees to ascend into the upper story which is added.

The lower apertures between the frames are in all cases necessary, as, when the frames are set longitudinally, they form channels for all the refuse which accumulates during winter, which, unless removed, will harbour mothe, that may ruin the hive.

The stand may be easily cleaned by raising all the frames together, by putting two stout, straight sticks, one before and one behind the frames, when two persons, one at either end of the hive, can raise the sticks, and leave space for the footboard to be cleansed or changed.

If it is desired to move a Giotto hive to some distance, it is only necessary to pass a tape or cord round the length of the hive, tie it tightly under the projections, and also a long, narrow strip of folded net over the bee entrances and round the foot of the hive, and then it may be carried on a board.

I must now point out one of the advantages of arranging these frames in a long line, instead of piling one story on another. If storied hives are used when the time comes for taking honey from any of the lower stories, it is necessary to lift off bodily the upper story to get at the lower one, and this operation is troublesome. By having only a long row of frames, one person can at any minute go and take as much honey as he likes, by first taking off the roof tiles, then slipping in a table knife between the frames (to cut through the propolis, with which the bees always attach them one to another, to keep out the wet), and then lifting out the frames (holding them by the front and back projections), as easily as one takes a book from between two others on a bookshelf. In this way any or every comb may be examined at any time.

Perfectly pure honey may then be taken in one minute by whirling it out of the comb, by help of the centrifugal machine. Then the frame with the empty comb can be replaced, and the bees will refill it. This process can be repeated throughout the season.

Or the honey and wax also can be taken (and if desired, afterwards separated by the machine) by cutting the comb out of the frame, and putting back the empty frame, but by doing this the bees would lose much valuable time making fresh comb to store the honey in. The secret of success in this system is to take as much honey as possible (always of course leaving combs untouched for the bees) and as little wax; for though the wax fetches a higher price than honey, yet the bees consume much honey in making it, and a hive full of comb will not yield more than 2lb. of wax.

To Make the Frames.

A plank of well-seasoned deal, measuring 12ft. 2½in. in length, 1in. in thickness, and 1ft. 3in. in width, costs in Florence 3fr., or 2s. 6d. English money.

This plank will make forty frames (as shown in Fig. 4), and allowing 10d. for sawing and for 160 long nails, will thus cost 40d., or 1d. each.

To make the frames, this plank may be cut lengthwise into ten long straight strips; each of these should then be cut into four equal shorter strips, or forty in all, every one of these shorter strips will make a frame, for which 3ft. 0½in. of wood in length is necessary; as the plank was an inch thick, the pieces are already of the requisite thickness, and as to the width they should all, to begin with, be planed down to the exact width of 1⅜in.

Take one of these 3ft. 0½in. long, 1⅜in. wide, and 1in. thick pieces, and cut it into four, two of 8in. in length for the two sides, one of 8½in. for the bottom, and the remainder will be about a foot long, which will make the top bar.

One of the two sides (the one that forms the back of the frame) is now ready; but the other, which will form the front, has to have the bee entrance cut at the foot. Only half of the width of bee entrance is cut off the bottom of each, for two frames put together will then have between them a complete entrance. Therefore, take this piece for the front and at ⅜in. from the end, on both sides, rule with pencil lines across the one-inch sides, as *a a* in Fig. 5, and cut through these lines to a depth of ¼in. into the wood, then with a chisel cut away the corners *a b* (Fig. 5), and the end will remain as in Fig. 6.

Then take the piece a foot long for the top, together with the bottom piece; lay the latter on the former, on the side which is 1⅜in. wide. With a pencil mark off the two ends, as *b b* in Fig. 7; so that the space *a b* (Fig. 8) exactly corresponds in length with the bottom piece, and will leave two projections, A and B (Fig. 7), each about 1¼in. in length. Then remove the bottom piece, and saw

through the lines marked *a a* and *b b* ¼in. into the wood, and then saw at right angles *c b* and *d a*, thus cutting away the two corners D D (Fig. 8).

Now commence putting together the frame by fitting the two sides into the gaps made by cutting away these two corners D D. First fix the front with long thin nail No. 1, Fig. 4; then fix the back of frame with nail No. 2.

Lastly, take the bottom piece, and along the side, which is 1⅜in. broad, cut off a strip three-eighths of an inch (which will be wanted), this will leave the bottom bar about an inch wide and an inch thick; then fit this bottom bar in between the two upright pieces, so that the entrance is left clear for the bees; and finally secure it in its place by two nails, 3 and 4, Fig. 4. The only thing now necessary to complete the frame is a small triangular strip of wood, which has to be glued along the middle of the top of the inside bar of frame. When smeared with new wax and honey, this triangular strip will serve instead of guide comb.*

These strips are made by cutting lengthwise into two halves the piece cut off the bottom bar. Each of these two halves will then be ⅜in. on its four sides, and the length is the exact length wanted. By cutting these *diagonally* lengthwise down the middle, as through line *a a* in Fig. 9, you will thus make four strips for four frames.

Take one of these bits and glue it on the last cut side, which will be the broadest. Stick it to the top of the frame, where it will soon attach itself if the frame is left standing upright and upside down, or it may be tacked on with small nails, and the frame is complete.

In like manner each of the other 39 bits of the plank should be cut up, and made into 39 other frames, which, with the simple amateur carpenter's work above described, and the materials specified, will make 40 frames.

Anyone not having tools, or time to spare, could, no doubt, have these frames made by a carpenter for a very moderate price. The greatest accuracy is necessary, as for instance, if the bee entrance is ¼in. too low, *to a bee* it would be about as bad as if the front doorway of a man's house were say 2ft. too low for him.

All the frames will be *exactly* alike if the previous directions are minutely followed.

When these frames are finished it is convenient to have each one marked with a letter or number, so as to be able to keep record of how much honey each hive produces annually, and from which hive an artificial swarm is taken.

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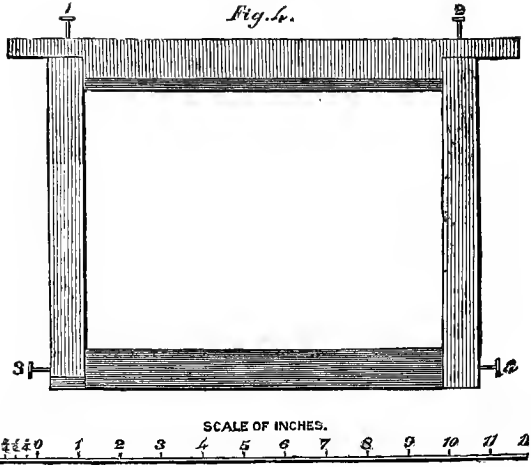
* I much prefer the use of guide comb, as ensuring the combs being regularly formed. Narrow slips of old brood comb are easily fixed with the aid of a little melted wax.—W. B. T.

Fig. 4.



SINGLE FRAME OF GIOTTO HIVE.

Fig. 5.

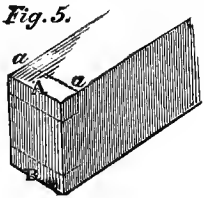


Fig. 6.

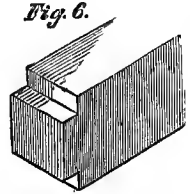


Fig. 7.

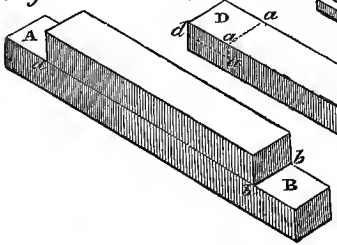


Fig. 8.

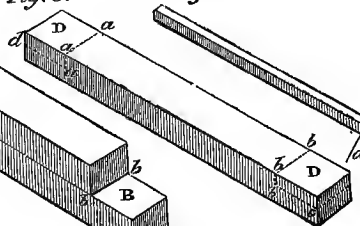
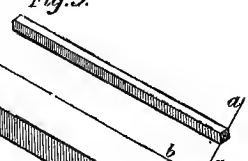


Fig. 9.



CHAPTER III.

GENERAL MANAGEMENT

Situation for Hives.

The situation of a hive should be determined before the bees are put into it. I have already suggested as a site the flat top of any low wall in a garden or courtyard; but it would of course be much better to arrange a regular stand by taking any long plank, if it be at least a foot wide and 1½in. thick, and, having built up two brick pedestals about one foot high, and a little less far apart than the length of board, let the plank rest on them.

On this stand many frames may be placed, arranged in a row, or even three or four rows one above the other; but if the weight is increased, the foundations must be also, and the plank must be a sound one.

I have never found inconvenience arising from several hives being placed upon the same board, nor have I found that it encourages pilfering, although I have ten hives, each containing twenty frames, piled one hive on another, upon one thick plank only 6ft. 6in. long. I have also seen hives with frames placed as close one to another in the apiary of Don Giotto Ulivi.

It is most desirable that frames be arranged in a row, and not story upon story, as it is then easy to operate upon one hive without disturbing the whole.

If more than one hive be placed on the same stand, after allowing ample room for frames to be added as wanted, a small space must always be kept clear between the end of one hive and the beginning of another.

To avoid being Stung.

To avoid being stung, it is necessary for most people who keep bees to use a veil, and a pair of very thick knitted wool gloves. I am aware that experienced bee keepers can take honey from these hives without any protection against the bees, and, by acting very gently and patiently, anybody can do without a bee dress; but, for beginners especially, a bee dress gives confidence, and enables them to attend to their work without noticing the bees, who are then unable to hurt them.

The gloves used in Italy are made of the thickest white wool knitted in the ordinary way. I have used mine for years, and have often had them covered with angry bees, but they cannot sting through them; and, moreover, when they have tried they do not leave their stings in the wool, but fly away unhurting and unhurt. Whereas when I employed thick English leather hedging gloves, they often stung me through them, and always left their stings in the leather, not only entailing the death of every bee that stung the gloves—for they die after leaving their stings—but after a time, when such coverings were used, the accumulated venom of so many stings attracted the other bees, and they always scented from afar the hand of an enemy in the venomed glove; whereas wool gloves are not open to the same objection, as they can always be washed.

Having put on the gloves, the coat sleeves must be tied over them round the wrists, so that no bees can crawl up the sleeves. The legs of the trousers should also be tied round the boots. The other article of dress necessary is a black veil, made of a piece of ordinary black net about a yard long and two feet wide. The two long edges are sewn together, and then the two ends are bound round with elastic bands; one of these ends with elastic is put round close to the ribbon of any hat, and then the hat and veil are put on; and the lower elastic band is arranged close under the shirt collar, and the coat may be buttoned across the neck and chest.

Thus arrayed, no man *can* be stung, for the bees don't sting through ordinary cloth clothes. This I know from long experience, and I always take swarms and honey wearing a pair of loose white duck trousers and an alpaca coat over a cotton shirt. I am obliged, by the excessive heat of Italian summer weather, to dress in this manner, but I have never been stung through these garments.

Transfering Combs from Old to Giotto Hives.

Supposing that at least eight frames, with end pieces, have been made as directed, a site for the hive fixed, and the dress to take the bees prepared, then the next thing to do is to put bees into the hive. There are two ways to begin with, viz., to transfer combs and bees from an old-fashioned hive, or to take a new swarm as soon as it has alighted and settled, and put it into the new hive. When once you have a hive or two, artificial swarms may be made.

In Italy, and perhaps in England, it is rather difficult to get a hive of bees to begin with, as the contadini or peasants, who generally keep them, are very superstitious about *selling* a hive of bees, as they say a hive *sold* brings ill-luck to buyer as well as seller. Possibly because, if the hive is not taken far away, the bees will

not return to the hive when it is placed in a neighbour's garden, but will return to their old home, where of course they don't find their hive, and are thus lost to both buyer and seller. However, in Italy peasants will *barter* a hive of bees for a measure of corn.

Supposing a hive of bees to have been secured, then, according to Don Giotto's advice, it is necessary to wait till twenty-one days after this hive has swarmed a first and also a second time. I only repeat this bit of advice, because it will be more easy to get a hive after it has swarmed than before.

When you intend to transfer your bees, first prepare the frames by boring four little holes (*d d*, Fig. 2) on the insides of the two sides of each frame, leaving the space of the thickness of a comb between every two holes; then make as many little wooden pegs as you have made holes, and see that these pegs fit into the holes. When the combs are cut down to fit into the frames, the pegs keep them in their places until the bees themselves have fixed them to the frames.

If you have secured a hive at some distance, it must be brought home tied up in a stout bit of canvas, and put in some convenient outhouse, where also must be prepared a table with two large knives and the new frames.

Then, having put on your veil and gloves, and tied your sleeves round your gloves, and the trousers round your boots, unpack the old hive and put it quietly on its side on the table.

Perhaps some people in England would next give the bees two teaspoonfuls of chloroform on a bit of rag, and, then turning down the hive on it, wait until the bees were stupified for half an hour, during which time the operation of transferring the combs to the new hive could be accomplished, and on the bees recovering they might find their way into their new home then arranged (with queen inside) on the table beside them. However, this is not the way Don Giotto acts.*

Perhaps I had better describe now how he transferred for me the combs and bees from an old box into a new hive. My first swarm came to me by chance. It alighted on a fig tree in the kitchen garden, and, having no hive ready, I bored some large holes in the side of a little square box, and when the swarm was shaken into it and the lid closed, the bees made it their home. A year afterwards I wished to have some honey from this swarm, but I could not, because the bees had attached their comb to the lid; so I wrote and asked Don Giotto to help me. He kindly came from his mountain home on the Apennines, and, having made preparations

* In this Don Giotto shows his good sense, for chloroform is fatal to bees.—W. B. T.

as above described, he leisurely proceeded to take the box to pieces. When he had taken away two adjoining sides, and the combs remained exposed hanging from the inside of the lid, then, although the box, combs, and table were covered with bees, he took off his gloves and did the whole of the rest of the work in our presence, and was only stung twice, when he accidentally hurt two unnoticed bees. He worked very patiently and quietly, sometimes with his bare hands covered with bees, which he quietly allowed to crawl back to their combs. He kept on the veil the whole time. One by one he cut away the combs, and then cut them to the size of the frames, fixing them in their places with the pegs, putting them on each side of the comb. When he had got to about the middle of the old hive he found the queen, for whom he had been on the look-out. He carefully put her on the comb when it was arranged in the frame, and nearly all the bees on the table at once began to flock to the frame on which she was, and when it had been put with the other frames, the bees seemed at once to settle into their new home. He filled a few more frames; then, adding the end boards, and throwing away the remnants of the old box, he carried the little table, hive and all, and placed it in its permanent site.

Anybody can operate in like manner on a common straw hive. I have seen Don Giotto Ulivi transfer, to a frame hive, the comb and bees from the stump of an old hollow chesnut tree which a contadino had used as a hive; but this was a much more difficult operation.

Making Artificial Swarms.

In England the practice of making artificial swarms is already much recommended, to avoid the constant watching which is necessary in order not to lose the swarms from an old-fashioned hive. In Italy also the plan of making artificial swarms is much practised. It is based on the well-known fact that the bees can transform into a queen any recently laid egg of a working bee.

Artificial swarms are made by taking from a well-populated hive bees enough to make a strong new swarm, at the same time leaving enough for the old hive to prosper. With the Giotto hive this may be done by taking about half the frames, with the bees, from the old hive, replacing them by empty ones, and also adding empty frames to the new hive. One hive will then have the old queen; and the other should have, amongst the frames taken to make it, at least one frame with comb containing newly deposited eggs, from one of which the bees will make to themselves a queen. In fact, if one found this distribution in a Giotto hive, I think it would be very easy to cut a long, strong hive in two (passing a knife between the middle frames), and, carrying away one-

half, make two hives, which might be completed by adding empty frames at both ends of each of them.

However, to proceed regularly, this operation of making an artificial swarm should be performed about noon on a fine day in May or June, ten or fifteen days before the hive would swarm naturally. One of the signs of that coming exodus is that the bees cluster by day and night around the entrance to the hive.

The bees then are crowded, and if no more room be given them, either by adding new frames or making an artificial swarm (either of which plans may be adopted with a Giotto hive), the bees will soon emigrate to look out for and populate a new home, as their own has become too small to hold them—or, in short, they will swarm.

To make an artificial swarm, first loosen the frames not only from the floor, but also one from another; then draw out, with the bees clustering on them, every second frame of the old hive, until you have a number certainly not more than half of the frames. As you proceed arrange these frames alternately with empty ones on a small table. When you take them out of the old hive examine them one by one, to see if the old queen is on either of them; you will easily recognise her, as she is very much longer in the body, and has much shorter wings, than the working bee.

If you do not find the queen, then proceed first to replace the gaps you have made in the old hive, by putting in empty frames, and the old hive will then be complete. To complete the other hive, as you have already inserted empty frames, it is only necessary to add end boards.

If you have not found the queen on any of the frames taken, carry away the old hive (in the way already described) to a distant site, and put the new hive in its place.

On the other hand, on examining the frames, should you have found the queen on either of the first frames extracted, so long as you have taken at least four frames, it will not be necessary to take more; and, having added empty ones and end boards, then simply carry away this your newly-made hive, and put it where you like.

When you thus take out many frames, you will have an excellent opportunity of seeing if moths have attacked the combs. If so, at once cut the moth-eaten comb out, and clean the hive.

To Stock a Giotto Hive with a Natural Swarm.

When a swarm leaves the hive it generally at first alights on a neighbouring tree or bush. As soon as the bees have settled, sprinkle them with water to impede their flight, and take as many

frames as will easily accommodate the swarm. If it be a large May swarm, take about eight; if a smaller and later swarm, then take fewer frames. First smear all the triangular pieces along the tops with bits of honeycomb; then tie all the frames together in a row by passing two bits of twine through the frames, next tying one round all the front bars of hive, and the other round all the back bars. When the hive is brought home and put in its place, cut away these strings. Take one side, and also a flat piece of wood, instead of the other with the oblique strut, as the latter would prevent the hive being set upright on end.

Now weigh all these frames while they are empty, and again weigh them when you bring them back full of bees; the increase of weight will of course be the weight of the swarm, on which depends its value. Don't buy a swarm after the middle of June. A May swarm is the best.

If the swarm to be taken be hanging on a low bush, put the hive upright on the simple bit of wood (having first passed a string round board and frames, lengthwise, and tied it with a slip-knot), with the open end of hive directly under the swarm; then (with hat and veil on) with one good jerk shake the swarm into the box, and put the other end board on the top, leaving one corner uncovered for the bees that have not been shaken in to find their own way in. Should there be detached portions of the swarm on small twigs, cut these off with garden scissors, and shake the bees into the hive.

After about twenty minutes, when the bees are nearly all settled in the hive, take off the upper end board, untie the slip-knot, and, having regularly replaced the upper end board, tie the string tightly over it, and then, lifting the hive up by the under bit of board, as with a tray, carry it to its place, and set it down horizontally.

Should the swarm have alighted on a small upper branch of a tree, having first arranged the hive on the ground as directed, then climb up the tree, and gently saw off the branch, always keeping hold with one hand the end with swarm; gently descend, with bees still clustering to the branch sawn off (or, if possible, lower it to the ground with a string without shaking off the bees). Then shake them into the hive.

A large feather will be found very useful, for with it the bees may be gently brushed into the hive. I once took a swarm of bees which were spread over the tiles on the roof of a house. I put beside them the empty hive, and, having with a feather swept the queen and a large group into a fire shovel, I put them gently into the hive, and the rest of the swarm soon followed.

If the swarm, after leaving the old hive, remains long hovering

about before settling, Don Giotto recommends dazzling them with the reflection of the sun in a small looking-glass. I have in vain tried this plan.

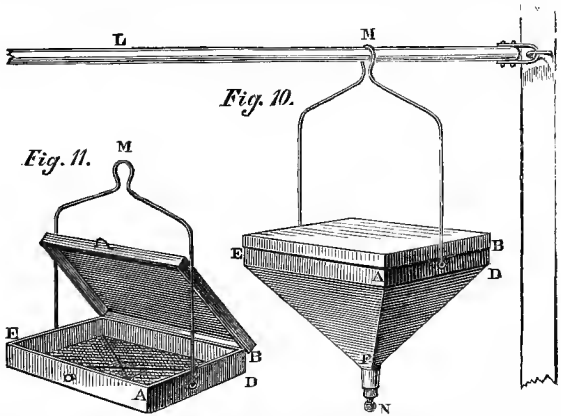
What has now been said is only to give directions for taking a swarm to begin with, or a chance swarm to augment an apiary, as, generally speaking, swarms may always be made artificially, and thus time need not be lost in watching hives for a natural swarm.

CHAPTER IV.

EXTRACTION OF HONEY FROM THE COMB.

THE simple machine used for extracting the honey from the combs can be made by any tin man from the annexed drawings. The upper part is simply a square tin box and cover (Fig. 11), into which the frame full of honey is placed so as to rest upon the wire grating which forms the bottom of the box, and can be removed to be cleaned. This grating is made of wire netting of five wires to the inch, and is soldered round the edges to a frame of strong iron wire. On one side of this grating (the lower one when it is placed in the smielatore) it is strengthened by two diagonal stout iron wires, which cross each other at the centre, the ends being soldered to opposite corners of the frame.

The lower part of the smielatore is simply a funnel, shaped like an inverted pyramid (Fig. 10), at the apex of which there is a round tin tube (F), which is closed by a cork (N) when the



smielatore is whirled round to extract the honey from the comb, and when that operation is finished the cork is pulled out, and the honey flows into any jar placed for it. If the purest honey is

desired, then on the inside of the funnel, at a short distance from the tube, a second and much finer grating may be soldered to the sides of the funnel. For this a piece of the finest wire netting, 4in. by 3in., is required; it is bound with a narrow border of tin, and soldered in its place. This finer grating will clear the honey of any particle of wax, pollen, &c. The handle of the smielatore is of thick iron wire, curved as shown in the figures, and fixed to the two sides of the smielatore.

How to Use the Smielatore.

Having taken a frame with honey in the comb (if the cells are full and have been sealed up by the bees, it will be necessary to cut away the coverings, so that the honey may flow freely), lay it on the upper compartment, shut the smielatore, and hang it by loop M on a stout stick about 5ft. long. By moving the stick swing the smielatore round a few times, then open it, turn the frame so as to take the honey on the other side of the comb, again swing the smielatore round the stick a few more times, and then all the honey that was in the comb will be found in the funnel, and may be drawn off through the tap. Replace the empty comb in the hive, and in a few days the bees will have refilled it. The same operation may be repeated again and again during the season.

To learn the way to swing the smielatore, first practise with it empty. Hang it on any stout stick, and let two people hold the ends of the stick and swing it round at arm's length. Then by degrees let one person hold one end steadily, and the other person will soon find that he alone can swing the smielatore round. Also practise stopping it when the funnel points down, by suddenly with one hand catching hold of the iron handle; for if the smielatore is stopped suddenly when upside down, frame and honey may all fall to the ground.

When one person alone has thus learnt how to swing the smielatore, get a stout straight ashen bar, 5ft. long and 1½in. in diameter (L), and at 1ft. 8in. from one end cut round it a *small* groove (M) (don't cut deeply, or the stick will break), in which the loop of the handle of the smielatore will fit. Fix with screws an iron loop at the end, as in Fig. 10, and at the same time prepare another iron loop, which may be firmly fixed in a wall or the back of a door. Then practise a few times with the empty smielatore, and you will find that it can be worked by one person alone.

Smielatore for Large Apiaries.

When there are forty, fifty, or more hives, it will be necessary to get a much larger machine, which, with wheel, &c., extracts the honey from *four* frames at a time. These are easily procurable in Florence, but I will not attempt to describe them in this short account.

To get Rid of the Bees before Taking Honey.

When a frame is removed from the hive in order to take honey, it is necessary to get rid of the bees before putting it into the smielatore; for, if the bees are long left on the frame, they will suck out much honey, or if they are put into the smielatore they will be hurt. They may be dislodged, when you have withdrawn a frame covered with bees, by jerking the frame so that the bees fall off; they will fall on the ground, and when they have recovered the shock they will return to the hive. Go a little distance from the hive, and, if possible on *grass*, give the frame, which you hold by the projections of the upper bar, one good jerk, then walk quickly away, give another jerk, and so on till nearly all have fallen off. The few that remain may be brushed off with a feather. If you act thus, it is necessary to carefully scan the frame before you begin, as the queen may be among the bees—although this will very rarely be the case if you take out the end frames which contain honeycomb only, the brood comb being always confined to the centre frames—in case the queen is removed put back that frame and take another. If by chance you do shake her off, the other bees will not abandon her, and in that case you will see, even several hours afterwards, a cluster of bees on the grass where you shook them off; then most carefully brush her into a wineglass and carry her back to the hive, where she will be welcomed right royally.

I find it a better plan to drive the bees from the frame *before* I take it out of the hive. This is easily done by taking two common long clay pipes. There is a small hole in my veil (which I generally keep pinned up), through which I then pass these two pipes. One I fill with tobacco, and smoke as usual; the other one, which has the empty bowl inside the veil, I use to puff the smoke into the hive on both sides of the frame to be taken, putting the end of the pipe in at the bee entrance, and puffing the smoke in through the bowl and stem, which is small enough to enter far between the frames. The bees then take refuge in other combs right and left of the one I require.

Cleaning the Smielatore.

As soon as you have done taking honey each day, put all the utensils which you have been working with, such as smielatore, knives, and even gloves (which will then be smeared with honey), near the hives, and in a short time you will find the bees will completely clean them of all the honey. After that the smielatore should be washed.

Register of Swarms and Honey.

When you place a hive, number it and make a note in a small account book, which you should keep for registering swarms and

honey taken. Head each page with the description of one hive ; state the number of the hive, the weight of bees when first taken, if a natural swarm, the date when the swarm was placed in hive, and the number of the parent hive. The rest of the page will gradually be filled by recording, time by time, the dates and weight each time honey is taken. Then you will at a glance see in which hives the bees have accumulated most honey ; and at the end of the season, by adding up the weights taken daily, which should be recorded in the columns, you will see how much each hive has yielded.

Winter Feeding of Bees.

From a strong hive of bees you may occasionally, say in May or June, when you find a frame full of honey sealed up by the bees for winter use, take it, and, instead of opening the cells and extracting the honey by help of the smielatore, put away these frames sealed up as they are, and when winter comes, should you find a weak stock wanting honey, give one of these full frames. In this way you will avoid exposing the weak stock to the attacks of neighbouring hives of bees, who would scent food if otherwise administered to an individual hive.

If spring comes late, and many of the hives want feeding, then, having boiled 2lb. of sugar in a pint of water with a teaspoonful of rum, you may place this food in a large dish some yards distant from any of the hives.*

Storing Empty Frames.

As winter passes, whenever you find frames from which the bees have taken all the honey, and which are almost abandoned, take them out and store them in a box, packing them with *dry* sand to prevent moths from entering and destroying them. If moths have already begun their work, then fumigate the combs with sulphur, or cut away the infested part of the combs.

When in this way you take out an empty comb, close the hive together to fill up the gap and keep the bees snug. When spring comes you can easily elongate the hive, and put back the frames with empty comb, which the bees will then soon fill with honey.

* The plan proposed of feeding outside the hive is not in favour with English bee keepers, who find that it leads to fighting and injurious excitement of all the hives in the apiary. A much better plan is to remove a frame of empty comb, place it flat on a table, and fill all the cells on one side with syrup ; it can then be replaced in the hive, when the syrup will be immediately stored in the centre frames by the bees. This operation may be repeated as often as required.—W. B. T.

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