

# **Bee-Keeping for Beginners**

**BEE-KEEPING**  
FOR  
**BEGINNERS**

**WALTER CHITTY F.S.Sc.**

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# BEE-KEEPING FOR BEGINNERS



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# BEE-KEEPING FOR BEGINNERS

*According to the Syllabus of the Board of  
Education for Schools*

BY

WALTER CHITTY, F.S.Sc.

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## PREFACE

THE following little book has been written primarily for schools and in accordance with the syllabus issued by the Board of Education, but it is hoped that it may be found useful to other persons as well. The Author has kept bees for about twenty-two years, and has taught the subject in the Day School, and therefore ought to have something to say on the subject. Whether he has done so satisfactorily or otherwise, he leaves the public to decide. The book has been written according to the *Supplementary Regulations for Secondary Day Schools and for Evening Schools* (from 1st August 1902 to 31st August 1903), from which the author takes the following note :—

“The instruction should be accompanied by as much practical work as possible. *Sections 2 and 8* may be illustrated by diagrams or lantern slides. *Sections 3, 4, and 9* should be illustrated by practical in-door work, in which the pupils should take a part, including demonstrations of the various appliances and the methods of filling them up and employing them. *Sections 5, 6, and 7* should be accompanied by out-door work at the bee-hives at the appropriate seasons of the year.”

WILCOT, *May* 1903.



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# BEE-KEEPING FOR BEGINNERS.

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## CHAPTER I.

ADVANTAGES OF BEE-KEEPING.—USEFULNESS OF BEES: (a) AS PRODUCERS OF FOOD OTHERWISE WASTED; (b) AS FERTILISERS, VALUABLE TO THE FARMER OR GARDENER.—DISTRICTS SUITABLE TO THE INDUSTRY.

THERE are many advantages connected with bee-keeping. Not the least of these is the fact that a great many of the manipulations must be conducted in the open air, and thus both health and strength may be improved. One of the most celebrated bee-keepers was Lorenzo Lorain Langstroth, an American, who was born in the year 1810. He was brought up as a clergyman, but owing to ill-health he was obliged to give up his profession and take to *out-door exercise*. He was ever a lover of insects, and so he took to bee-keeping. His health at once improved, and he attributes his very long life solely to bee-keeping. It has often been said that it is a

good thing for a man to have a *hobby*. If it is a *paying* hobby, so much the better. Bee-keeping is one of the most paying occupations in existence. Bees can not only find their own food, but if kept on intelligent lines will produce a surplus—and a good surplus—of honey for the owners. Here, then, are the two chief advantages of bee-keeping—(1) health; (2) profit. It is a hobby, moreover, that will last all the year round, for long winter evenings may be utilized in making hives and other requisites for bee-keeping. Many instances of the profits of bee-keeping might be given. Pettigrew, who was a very successful bee-keeper, says: “My father, James Pettigrew, was a labouring man, and perhaps the greatest bee-keeper that Scotland ever produced. He was so successful and enthusiastic in the management of his bees that he earned and received the cognomen of the ‘Bee-man’; and by this name he was well known for thirty years in a wider circle than the parish of Carluke, Lanarkshire, in which he resided. The district of the parish in which he lived when he kept most hives, took then the name of ‘Honey Bank,’ which it still bears. While a common labouring man he saved a great deal of money from his bees; indeed, it was reported in the Glasgow newspapers that he realized £100 profit from them one season. The bee-man saved money enough to purchase the Black Bull Inn of the village, and therein commence business as a publican and butcher.”

Many other instances might be mentioned, but they can at any time be obtained.

*Advantages to be Derived.*—Besides the pecuniary advantages of keeping bees, there is the fact that they collect and prepare for the use of man the most wholesome article of food known. This was discovered in the earliest times. “My son, eat thou honey, because it is good,” are the words of the wise king, and it was used and its qualities were well known long before him. Honey is not exactly the produce of the flower nor of the bee, but of the two combined. There is a sweet liquid secreted in flowers which is called nectar. This is extracted by the bees, and swallowed by them. It passes into a sac, and a chemical transformation takes place as the bee flies along home, and when disgorged by them into cells, it is pure honey. But even then it is rather thin, and the excess of moisture evaporates before the bees seal it over. It is true that there are many persons who do not like honey, but even those may ‘acquire’ the taste, and when acquired, they will find it highly conducive to health. One of the principal constituents of our food is sugar, and in honey we have the most wholesome and nutritious sugar known. It is assimilated at once by persons who could not eat ordinary sugar without indigestion. Besides being an excellent food it is also a curative agent of the first water. In former times honey was about the only sweetening thing known, and very probably much of the health

of our forefathers resulted from its use, as we know that our ancestors did not attend to the cleanliness of their skin as we do, and so their good health must have resulted from some other cause. Coughs, colds, sore throats, etc., are quickly relieved by its use, and many more serious complaints which commence with colds are benefited or cured by its use.

There are three small pamphlets written by the Rev. Gerard W. Bancks on the subject of Honey, which are well worth perusal, viz., "Honey and its Uses," "Vinegar from Honey," and "Mead, and How to Make It." No doubt the readers of this brochure will buy and read them through, but meanwhile a few extracts are taken :—

"Probably few people are aware how delicious, wholesome, and refreshing a beverage is to be obtained at comparatively little trouble and cost from honey. It is really surprising that a beverage actually superior, both as regards flavour and wholesomeness, to many of the light foreign wines imported into this country, should not be more generally known and used. . . . It will be best, therefore, to give here three recipes :—

"(1) *For a light and pleasant beverage, containing a small percentage of alcohol, and not intended to be kept for any length of time.*

"For every gallon of water take 2 lb. of run honey and the rinds of two lemons. Boil for half an hour, taking care to keep well skimmed, and then pour into

the cask, straining out the lemon peel. When the temperature of the liquor has fallen to between 90 deg. and 80 deg. Fahr., add a couple of tablespoonfuls of brewers' yeast, also, to a nine-gallon cask, 2 oz. of phosphate of ammonia, and 2 oz. of cream of tartar. Tack over the bung-hole a piece of cream cloth or muslin, several folds thick, and let it stand till fermentation has ceased. As the liquid sinks in the cask, keep filling up. For a nine-gallon cask, at least two or three quarts will be required for this purpose, and should be allowed for at time of making, and kept in bottles or other stoppered vessel."

"(2) *For a good average wine, containing about 15 per cent. of proof spirit, and intended to be bottled, and kept for several years.*

"To every gallon of water add 3 lb. of run honey and the rinds of two lemons, and proceed as above. When the liquor has quite ceased working, bung up tightly, and let it remain in the cask for about six months. Bottle, and cork at once."

"(3) *If such a degree of excellence is desired that the wine produced may vie with the best of its kind, and the palate of the connoisseur be satisfied, we must again alter our formula, and attend to some details not, so far, alluded to.*

"To every gallon of water take 4 lb. of best run honey and the rinds of two lemons. Boil, but take

care not to exceed half an hour. This will suffice to kill off any undesirable ferments that may be present in the liquid ; while if a longer time be allowed, the aroma of the honey will, to a great extent, be lost. Pour into the cask while still boiling.

“With regard to the ferment, it is important that a suitable one be introduced immediately the temperature of the liquid admits, viz., when about 90 deg. Fahr., and that it should develop as quickly as possible, so as to prevent the possibility of undesirable ferments making any progress. In Switzerland it is customary to prepare the ferment from grapes as follows : Take about a pound, quite ripe, crush them, carefully filter the juice, and introduce at once into the cask. Both the receptacle used and also the cloth for filtering should be sterilized. This can be conveniently done with boiling water.

“This method, though doubtless producing the most suitable ferment for mead, will be advisable only under the best conditions of temperature, etc., or there would probably be more delay in producing a vigorous fermentation than with brewers' yeast.

“When fermentation has ceased, fine with isinglass. Dissolve  $\frac{1}{4}$  oz. in a little boiling water and stir into the cask ; in a few days it will be clear. Then draw off into a fresh cask, which must be *quite filled*. Bung, taking care that the air is excluded. Let it mature for six months, and bottle. It should be well

corked with sound corks. If these are grainy, the wine will be liable to be tainted.

“ A sparkling mead may be produced by bottling the wine before the fermentation has quite ceased ; or by introducing into each bottle of the maturer wine a small quantity from another cask in process of fermentation. In this case the corks will, of course, require stringing or wiring over.”

Thus far Mr. Bancks. There is no doubt that the reader will desire to make his further acquaintance and see what a wonderful thing pure honey is, and what a lot of things can be done with it.

But bees are also of immense use to the gardener and farmer as *fertilizers*, and this should be well understood. Bees are the most useful insects in our gardens. It is true they have been accused of spoiling fruit, but this is false. A very great authority on this subject is Professor Cook of the Agricultural College, Michigan, U.S.A. He says that after very careful observation, he has come to the conclusion that bees never attack *sound* fruit themselves. Wasps and other insects *commence* the onslaught, and then sometimes bees carry it on, but they do not commence the attack. Bees have especially been blamed for assaults on grapes, and the learned Professor Cook knowing this well, caused a large quantity of grapes to be continually watched. The result was, that the bees were dismissed without a stain on their character.

Even if they were guilty, their guilt is more than

compensated by the great aid which the bees afford the fruit-grower in the great work of cross-fertilization, which is imperatively necessary to his success. It is true that cross-fertilization of the flowers, which can only be accomplished by insects, and early in the season by the honey-bee, is often, if not always, necessary to a full yield of fruit and vegetables. In diœcious plants, like the willows and most nut-bearing trees, the stamens that bear the pollen, or male element, are on one plant or flower, and the pistils that grow the ovules—the female element—on another. Here, then, as Cook says, the insects must act as “marriage priests,” that fructification may be accomplished at all. In other plants, where the organs are all in the same flower, fertilization is wholly dependent on insects, of which bees are chief and foremost. The pollen grains must reach the stigma. Often this is, from the very structure of the flower, entirely dependent upon insects. In some flowers the pollen and stigma are not ripe simultaneously, and so pollen must be brought from one flower to the stigma of another, and this can only be done by insects. People who are not afraid of bees have often placed hives here and there amongst currant and gooseberry bushes, and it has invariably been found that the bushes nearest to the hives have borne the finest fruit as well as the greatest quantity. I do not practise this myself, as I think that bees should be kept together in a part of the garden not generally

used, as a stranger going among the bushes might be stung. Fruit is invariably better and more plentiful in the neighbourhood of bees. Many gardeners, recognizing this fact, have taken a hive of bees into a greenhouse and let it stop there for some time so that fertilization can be carried out under Nature's laws, which are more perfect than any artificial fertilization carried on by man.

It has been said that bees may be kept anywhere, but this requires a little qualification. A great many years ago there lived a famous bee-keeper in Holborn, who kept his bees there. He said he could put a hive on the top of the cross of St. Paul's Cathedral, and would guarantee that they would get honey. He tried experiments to see how far his bees would go for honey. This is what he did. As the bees flew out one morning to their daily work, he used a flour dredger and sprinkled them all with flour. Then he hastened off to Hampstead Heath, and found a lot of bees in the flowers there all covered with flour. Doubtless they were his. Holborn would be a very bad place for a bee-keeper now, as would also the neighbourhood of large and smoky towns. Apple, pear and cherry trees are perfectly surrounded by bees when they are in bloom, and cannot be surpassed for honey. The most important general source of honey in England is white clover, and the honey is very superior, being pure white. The following passage from *The British*

*Bee-keeper's Guide Book*, by Thomas William Cowan, Esq., is quite to the point :—"Many other honey-producing plants could be named, blooming at different seasons, as nearly all single blossoms, with few exceptions, produce either honey or pollen. Some of the principal are—sainfoin, lime trees, alsike clover, buckwheat, mustard or rape, catmint, figwort, phacelia, borage, etc. Near the hives may be planted crocuses, *Limnanthes Douglasii*, arabis, wallflowers, and other spring flowering plants, as these all afford the bees early pasturage." The above remarks from Mr. Cowan's valuable book will be a guide to the best districts for bees. But lucky is the bee-keeper whose apiary is also near heather, for he will get honey of a very superior kind long after other bee-keepers have finished their harvest.

## CHAPTER II.

LIFE HISTORY AND STRUCTURE OF THE BEE.—THE EGG, LARVA, PUPA, QUEEN, WORKER, DRONE.—VARIETIES OF THE HONEY-BEE.—CONSTRUCTION OF THE COMB.

PROFESSOR COOK, whom we have before mentioned, says : “ What in all the realm of Nature is so worthy to awaken delight and admiration as the astonishing changes which insects undergo ? ” Just think of the sluggish, repulsive caterpillar, dragging its heavy form over clod or bush, or mining in dirt and filth, changed, by the wand of Nature’s great magician, first into the motionless chrysalis, decked with green and gold and beautiful as the gem that glitters on the finger of beauty, then bursting forth as the graceful, gorgeous butterfly which, by its brilliant tints and elegant poise, outrivals even the birds among the life-jewels of Nature, and is made fit to revel in all her decorative wealth. The little fly, too, with wings dyed in rainbow hues, flitting like a fairy from leaf to flower, was but yesterday the repulsive maggot, revelling in the veriest filth of decaying nature. The grub to-day drags its slimy shape through the slums of earth on which it

fattens ; to-morrow it will glitter as the brilliant setting in the bracelet and eardrops of the gay and thoughtless belle.

There are four separate stages in the development of insects : The egg, the larva, the pupa, and the imago. The eggs of bees are of two kinds, and under ordinary circumstances and treatment produce two different kinds of bees. One sort produces drones, and the other sort produces workers. Workers are really undeveloped queens, but the eggs of workers if treated in a different manner will produce perfect queens. From the egg comes the larva, also called the grub or maggot. These are worm-shaped usually, have strong jaws, simple eyes, and the body plainly marked in ring divisions. In some insects there are fourteen of these rings or segments, or ten beside the head and three rings of the thorax. In bees and nearly all other insects there is one less abdominal ring. The larvæ of bees, as of other insects, are voracious eaters. The next stage is the pupa stage, during which the bee is in profound repose, as if resting after its enormous meal. The last form of all is the winged form, sometimes called the imago stage.

If a hive of bees was examined in May or June it would be found to contain three kinds of bees, viz., one queen, a few hundred drones, and many thousands of workers. By looking at fig. 1 it will be seen that the queen bee is smaller than the drone, but larger

than the worker bee. In shape she is something like the worker, but is more beautiful and genteel than either. Her abdomen is long and gradually tapers to a point, and she is so different in appearance to the other bees that she can readily be distinguished in a hive. She is the mother of all in the hive, and on her existence depends the prosperity of the hive. If from any cause a hive loses its queen, and there is no chance of procuring another, all industry departs, and the bees become discontented and miserable, and



Queen.



Worker.



Drone.

FIG. 1.

soon die out. A queen bee may live four to five years, but it is better that it should be superseded quite by the end of the third year, as their laying powers decrease after that time. They are generally supposed to be at their best during their second year of life. Queens are fourteen days in being hatched; that is to say, perfect queens are produced on the fourteenth day after eggs have been put into royal cells. Only fourteen days are required to develop a princess of the blood royal, while it takes twenty-one

days for the completion of a worker, and twenty-four for a drone. This great mystery alone proves the value of the queen bee. "When a queen is accidentally killed, or dies unexpectedly, or is removed from a hive, the bees have the power to make another. They take an egg meant for a worker from a common cell, where, if undisturbed, it would be developed into a worker in twenty-one days, and place it in a royal cell, and there convert it into a queen in fourteen days." Formerly this fact was disputed, but it has long been an established fact, and cannot now be denied. The power seems to rest in the treatment and the food, the latter being sometimes called "royal jelly." The fertilization of the queens is an important matter, and ought to be understood. A day or two after the queen leaves her cell she has a strong desire to get married, and her method of carrying this out is, like all the rest about her, extremely wonderful. In the middle of a fine warm day she flies out of the hive and high up into the air. She is attracted by the sound of drones (the males) flying about in front of the hive. As soon as the drones catch sight of the queen they fly up after her and surround her. She selects one, and copulation takes place in the air. During this act the queen and drone twist round and round in mad excitement and pleasure, the buzz of the other drones probably adding to the happiness of the principal actors. At last the queen and drone give a kind of wrench to each other, which causes the

male organ to be torn off, and this remains with the queen. The poor drone falls to the ground dead, while the happy queen flies home to her hive, never again to leave it except with a swarm. Copulation only takes place once. It sometimes happens that from one cause or another the queen does not arrive safely home, or goes into the wrong hive and is killed. To prevent the latter, hives should not be placed too closely together, or, if they are, should be painted different colours. It is well known that bees can distinguish colours, and it is certain they are fond of blue flowers, as they will often go into them when there is not a particle of nectar there. In the height of summer a queen bee will lay as many as 2000 eggs a day. A queen bee can lay drone eggs or worker eggs at will. If a queen is not mated, it can lay eggs, but these only produce drones.

The ordinary working bees are twenty-one days hatching out, and their span of life is from six to nine months. Probably most of them die long before the end of nine months from one cause or another. The limit of their existence has been ascertained by introducing foreign (mostly Italian) queens after their own queen has been withdrawn. In such cases not one of the old bees has been left nine months after the introduction of the new queen. The working bees are smaller than either the queens or the drones, and, as their name denotes, they do all the work of the hive, and they do it with a zeal that baffles all description.

They make the wax, build the comb, gather all the honey and the pollen by day, and store it by night. They never seem to sleep, though they have been watched at all hours in observatory hives.

Working bees are undeveloped females, as it has been proved beyond doubt that workers and queens are produced from the same eggs treated in different ways. This is one of the mysteries of Nature, at present wholly unknown. Besides doing all the work, they defend their stores when collected by means of their stings. The ingenuity of man has, however, caused bees to be harmless in this respect, and they can be so completely subdued by means of a little smoke or carbolic acid, that they can be treated as flies.

The drones seem to be the most unfortunate creatures in the hive. They are called into existence in the spring for certain purposes, the principal of which is the fertilization of the queens. Those that are chosen by the queens lose their life on their wedding tour, as intimated before, while those that are not required for that purpose are suffered by the workers to exist till August or September, and when it is certain that the queens do not require their services any longer, they are turned out of the hives and miserably destroyed by the bees themselves. Though the drones are so much larger than the workers, they are no match for them in a fight. They are not only few in numbers, but they have no sting,

and are defenceless. The writer has often watched drones being turned out. A wet day is generally selected for the sport. Some of the drones have their wings bitten off, and are then rolled out ; others are stung by the workers, and die in agony. Those that are wounded and rolled out, crawl in again, only to meet with more merciless treatment. As far as the bee-keeper is concerned, he may rest assured that when drones are turned out, the queen bee is all right. If drones are permitted to live all the winter it is a sure proof that the hive is queenless. It might be asked why so many drones are born if so few are required ? The answer is, the whole existence of the bees depends on the fertilization of the queen, and she had better be accompanied by a thousand drones in her flight than fail to meet one. There *may* be some other useful purpose in their creation, and it has been thought by some that they help to keep up the warmth of the hive while wax is being made. The great characteristic of the drone in all ages has been his laziness. He will not work, and would die of want rather than do any. His character is the opposite to the worker, which works itself to death even as the nightingale is said to sing itself to death.

There are many different kinds of bees. The principal bees introduced into England are the Italian bees, Cyprian and Syrian bees, and the Carniolan bees. Speaking generally, it is supposed that our English bees have been improved by the introduction

of foreign bees, though that opinion is not universal. The Italian or Ligurian bee was first introduced into England in 1859. It is about the same size as our native black bee, but is lighter in colour and looks more like a wasp than a bee. Its good qualities are that it is more prolific than ours, works earlier and later, and having a longer tongue, it can get nectar from flowers where ours cannot. In its pure state, the Ligurian is an amiable creature, but when crossed with the English bee, the temper is not always improved. The way to change a hive of English bees into Italians is to remove the English queen, and substitute the Italian. The queen being the mother of all the bees in the hive, the old bees quickly die off from overwork, or are killed, and after a few months the whole hive would consist of Italian bees. The Cyprian and Syrian bees have many of the good qualities of the Italians, but when they are crossed with ours, they are frequently very vicious. As far as *their* introduction is concerned, *my* advice is that of *Punch* to those about to get married, "Don't."

The Carniolan is a totally different bee to the others. It comes from Carniola in Austria, hence its name. It is hardy, good-tempered, and makes beautifully white combs. When crossed with ours, the temper is on the whole improved, certainly not the opposite. Its bad qualities are its propensity for excessive swarming, whether in its pure state or crossed with others. There are methods of checking

this desire to swarm, the chief of which is giving the bees plenty of room in *advance* of their requirements and giving them ventilation.

There are several other kinds of bees, and a remarkable one in Mexico, which is stingless ; but taking everything into consideration, the writer is strongly of the opinion that a good strong stock of English bees is the best kind of bee for an Englishman.

The construction of the comb is very wonderful. Comb is made of wax, and the latter oozes from

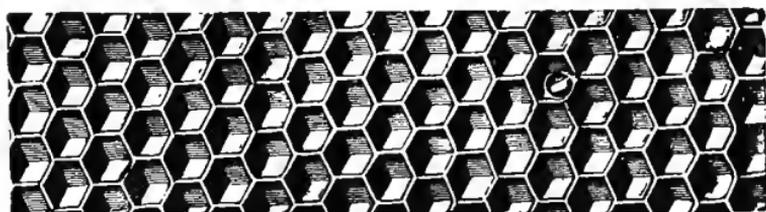


FIG. 2.

the body of the bee. If a swarm of bees was put into a skep or empty box and the bees could be seen, they would be found to be hanging in festoons very close together. This produces a great deal of heat in the hive, and causes the wax, which is the fat of the bee, to ooze from the body of the bee in very small scales. The bees—the workers, of course—take these little pieces and form them into what we call comb, with hexagonal cells (fig. 2). This shows the wonderful instinct of the bee. If the cells were circular, much room would be wasted ; but being

hexagonal, every particle of room is used up by the cells, and the greatest number of eggs could be laid in a given space, and also the greatest quantity of honey contained. *All* the cells for the drones and workers are of the same shape, but the drone cells are made larger. At swarming time bees have a great desire to build comb, and this is done very quickly ; sometimes, in the case of a skep, the hive is filled with comb in a week or ten days. But modern bee-keepers assist the bees by giving them full sheets of foundation. This is made of wax, with the cells impressed on it. The bees have only to draw out the cells, and then fill them, a lot of valuable time being thus saved. It is always a saving to use a good deal of foundation in the spring of the year, and the amount of money spent on it is sure to be repaid with compound interest.

## CHAPTER III.

BEE-KEEPING APPLIANCES.—STRAW SKEPS.—MODERN APPLIANCES :  
BAR-FRAME HIVE (DIFFERENT FORMS OF IT), INCLUDING  
DESCRIPTION OF THE VARIOUS PARTS OF A HIVE : OUTSIDE  
CASE, BROOD-CHAMBER, SECTION-CRATES, ETC.

THERE is very little doubt that, inconvenient as the straw skep is in a great many respects, no more comfortable home has ever been found as far as the bees are concerned. A very great authority on this subject was the late Mr. Pettigrew. He was a thoroughly successful bee-keeper, and made a great deal of money by bees. He says : "Straw hives, well sewed with split canes or bramble-briers, are incomparably better for bees than any other kind of hive yet introduced. Nothing better is needed, and we believe nothing better will ever be found out. On the score of cheapness and neatness, lightness and convenience, suitability and surpassing worth, we advise all bee-keepers seeking large returns in honey to use nothing but straw hives as domiciles for bees." This is strong language, but there is a great deal of truth in it. One of the chief causes of Mr. Pettigrew's

success lay in the fact that he used *very large hives*. Bee-keepers formerly used small straw hives with dome-shaped tops, with no opening at the top. These hives could not therefore be enlarged except by putting an eke *under* the hive. If straw hives are made with flat tops (fig. 3) and a round hole for feeding and supering, a great deal of honey can be secured by intelligent treatment. Sections or shallow

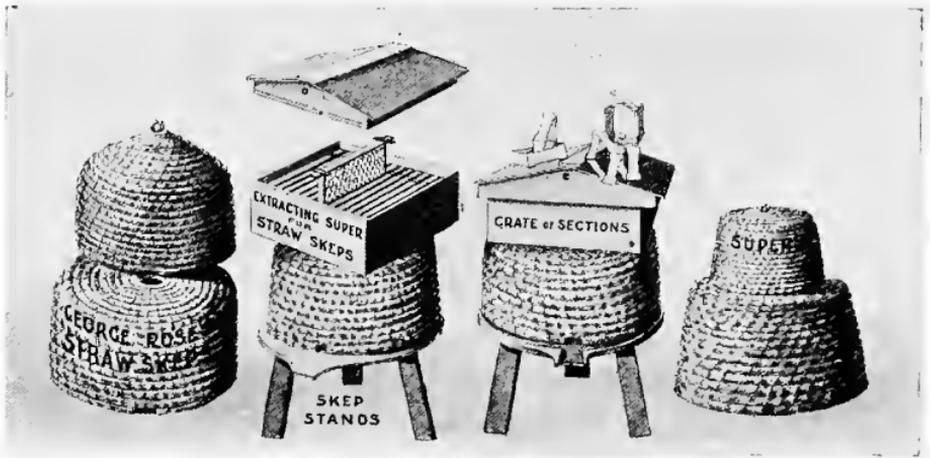


FIG. 3.

frames can be placed over a skep of this sort and some of the advantages of a bar-frame hive secured. The principal disadvantages of the skep consist in the fact that the doings of the bees cannot be discovered because the combs are fixed. Even if the skep is turned up, very little can be seen, and the queen never. Nevertheless, bees always look

and are comfortable in them, and many of our most advanced bee-keepers keep at least one or two of them in remembrance of the past.

Some years ago, it occurred perhaps to more than

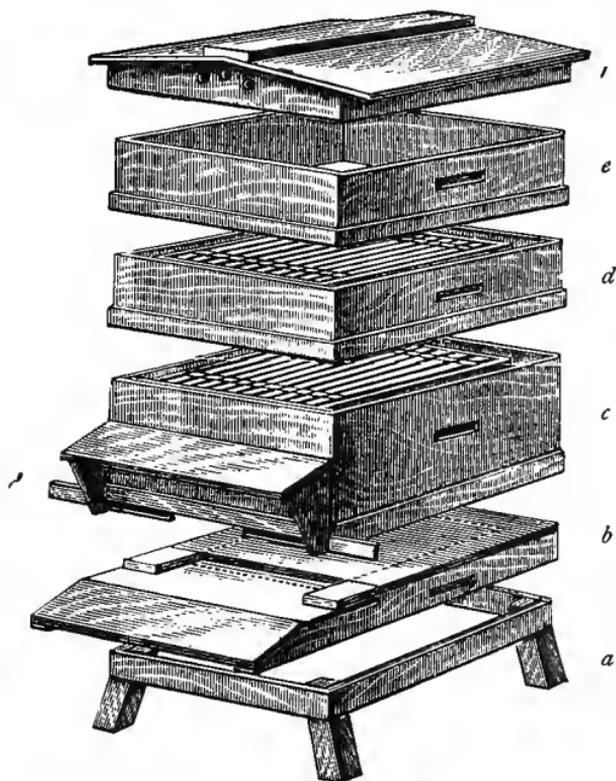


FIG. 4.—Bar-frame Hive, with each part shown separately.

one intelligent mind, that if bees could be induced to suspend their combs on bars of wood which could be lifted out of a box and examined and then put back in their places, great results might be expected. This

was the origin of the bar-frame hive, which has more than answered all expectations. By referring to fig. 4 a very fair idea of the mysteries of the bar-frame hive may be obtained. Each part is shewn separately, but when in use, all these fit down together. The four legs are shown at *a*; *b* is the floor-board; *c* is the brood chamber. This chamber is reserved for the use of the queen bee to lay her eggs and hatch the brood. There is a porch in front, which

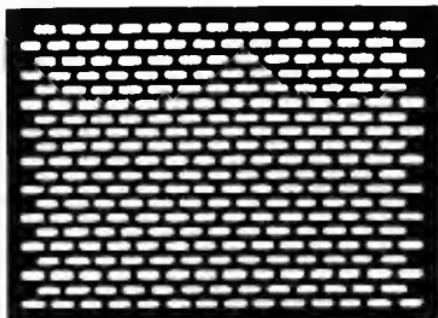


FIG. 5.—Queen Excluder.

is very useful to shade the bees and throw off the rain. Two strips of wood are shown at *c'* which serve to contract the entrance at certain seasons of the year, and to prevent robbing. The queen can be confined to the brood chamber by the use of a piece of excluder zinc (fig. 5). This is laid across the tops of the frames in the brood chamber *c*. The holes are made so exact that the queen cannot (as a rule) pass through them, but the workers can do so easily. If the queen

is abnormally small she can get through, but this is not often the case. *Sometimes* workers will not bother to get through, but will rather swarm than do so. In that case, other devices can be used to urge them to go through. *d* is a crate of shallow frames which can be placed over the excluder, and this will be filled with pure white honeycomb. *e* is another crate shewn here as empty, but it can be filled either with shallow frames or sections. The latter are little boxes which hold exactly one pound of honeycomb.

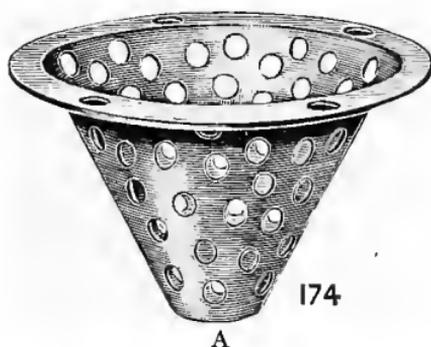


FIG. 6.—Double Cone Super Clearer.

*f* is the cover. The cover is now almost universally used as a *super clearer*. It is so in the cover shewn. In the front, three holes are shewn, and in each of those three holes a double cone super clearer is fixed as in fig. 6. There is only room for *one* bee to come out at a time of the hole A, fig. 6. The following description will show the use of the cones. Go to the hive some fine morning when the super is full of honeycomb. Lift up the super and place a piece of

unbleached calico *under* the super and over the frames of the brood nest. Gently place the super down again on the calico. The bees in the super are now cut off from the queen, and will want to get back to her. The bee-keeper will then lift the covering from the super and place the cover of the hive again in position. The bees can now only escape one at a time through the cone clearers, which they will soon do, and re-enter the hive at the proper entrance below. Sometimes a few bees will try to enter the hive by the cones, but they never find the right place. The performance thus described can be done in a few minutes, and the bee-keeper can go about his ordinary business all day. In the evening the bee-keeper could go and lift off the cover of the hive and take his super of honey indoors without a bee being in it. For the morning performance a few puffs of smoke or a carbolic rag (to be afterwards described) is quite sufficient to subdue the bees, and make them tame as flies. Fig. 4 shews a complete modern hive, but it is not necessary to have so many parts. Sometimes the parts *a*, *b*, and *c* (fig. 4) are made all in one and do just as well. It is best for a beginner to buy one hive as a pattern, after he has decided on the pattern, and then make *all the hives alike*, so that the parts may be interchangeable. There is a fixed size for frames, so that, provided the internal dimensions are the same, the outside case is not so important, and need not be the same, though it is preferable

*every* part should be alike. Fig. 7 shews a much simpler and very cheap hive which contains all the essentials for successful bee-keeping. It can be bought made up for eight and sixpence, or in the

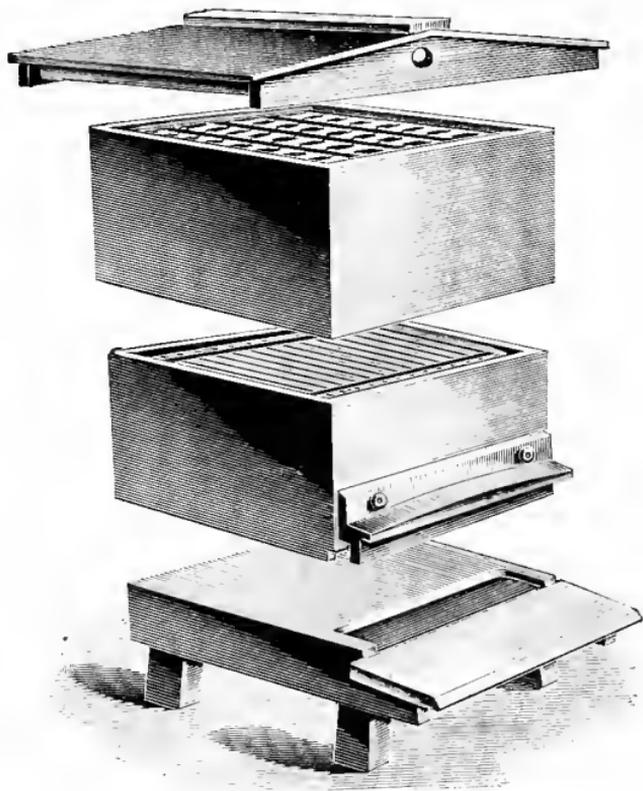


FIG. 7.—The Holborn Hive.

flat for seven shillings. There is also what is called a makeshift hive which can be bought for three and sixpence. It is very useful when swarms come out

quickly, but of course is not a complete hive by itself, as it requires a cover and more protection for winter.

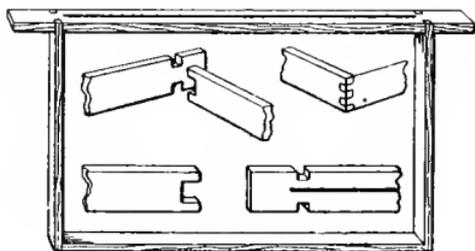


FIG. 8.—Bar-frame.

Fig. 8 shews a bar-frame of the standard kind, but of course drawn to a small scale. A crate of sections is shewn at fig. 9. The sections are made in the

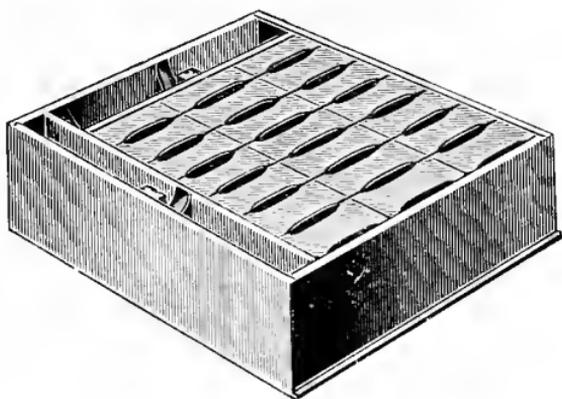


FIG. 9.—Crate of Sections.

flat by machinery, and can easily be folded (fig. 10). They hold just about a pound of honeycomb, some-

times being a fraction over sixteen ounces, and sometimes a fraction less. Openings are cut at the top

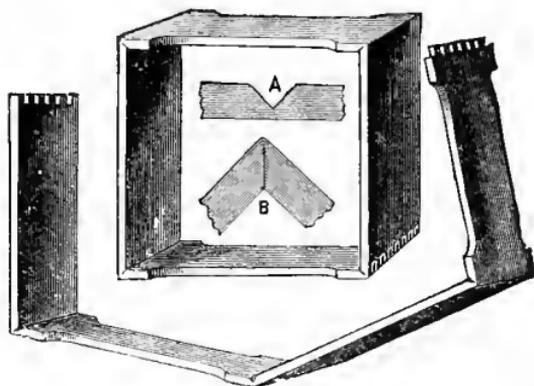


FIG. 10.

and bottom (sometimes at the sides) for the bees to enter the sections from the brood-chamber.

## CHAPTER IV.

OTHER MODERN APPLIANCES (INCLUDING A DESCRIPTION OF HOW TO FIT SOME OF THEM UP): BAR-FRAMES WITH WAX FOUNDATION.—SECTIONS, WITH WAX GUIDES.—FEEDERS.—SMOKERS.—HONEY-EXTRACTORS.—WAX-EXTRACTORS.

It is not necessary to have a vast number of appliances, and some of our very best bee-keepers



FIG. 11.

have very few, and many of them can be home-made. Some people use neither veils nor gloves. I use both. A very clever old bee-keeper used to laugh at

people who used either of them, but his bees killed him at last. It was done this way. He was getting very old, and, like *some* elderly people, he was rather addicted to keeping his mouth open. He went out unveiled and ungloved as usual to take a swarm. He shook them down into the skep, but

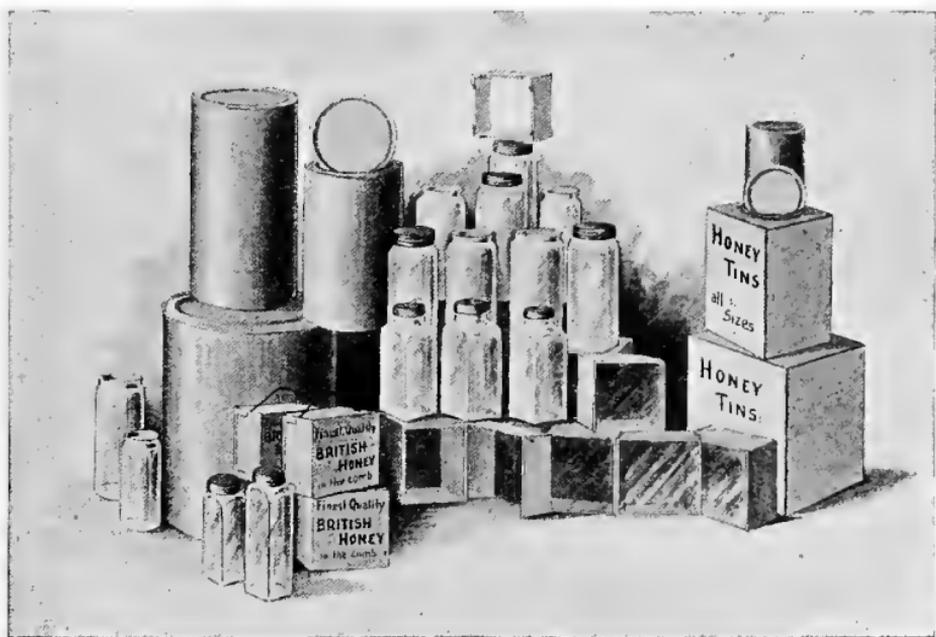


FIG. 12.

one bee entered his opened mouth, and stung him in the windpipe. He was dead in a very few minutes, and long before the arrival of a doctor. This could not possibly have happened if he had used a veil. Fig. 12 shews a number of appliances which cannot

be considered unnecessary. Here we have bottles of various shapes and sizes, sections, section cases, and honey tins. None of these can be done without. If honey is done up in a dainty fashion, there is never much trouble in disposing of it at a good profit ; at least the writer can always dispose of his in the most plentiful seasons. Last year it was all disposed of before the last day of August.

Here is a very useful article called the Rymer Honey Board (fig. 13). Mr. Rymer attributes a great deal of his success as a honey producer to this



FIG. 13.—Rymer Honey Board.

board, and says, for placing over the brood-chamber they are invaluable ; they prevent brace combs, and allow of surplus chambers being taken off clean and without any difficulty. When working several lots of wide frames, they entirely prevent one lot being worked into the other, as is nearly always the case unless there is some provision of this kind. When working, the openings cross the frames, and so provide a ready passage from one set to another ; it

should be left on for wintering, and provides the best winter passage-way known. Fig. 14 shews a honey and fruit press, and is a most useful article. It very often happens that combs are broken in the extractor, and if many hives are kept, there are sure to be odd

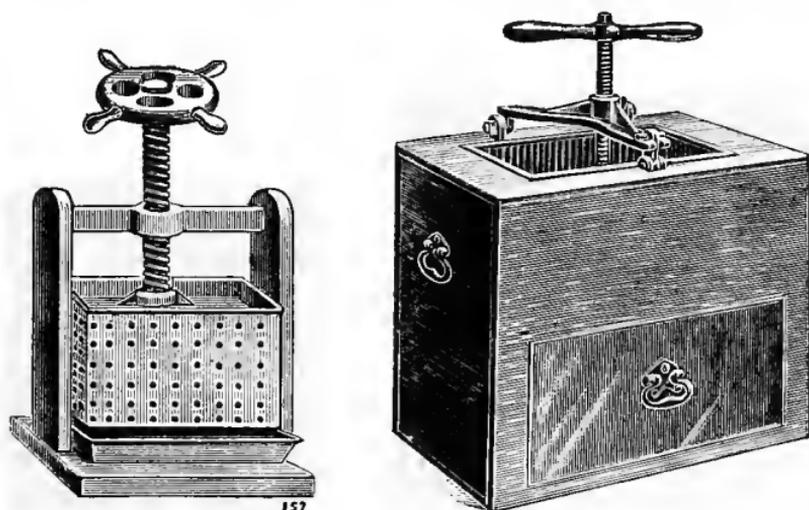


FIG. 14.

pieces of comb. If these are collected and put into the perforated box A, a few turns of the wheel will so press the honeycomb that all the honey will ooze out of the holes and run down into the tray underneath, while the wax will remain behind, and can easily be taken out in a cake. A very useful bee escape is shewn at fig. 15. It is fastened over a hole in a box, or in the cover of the hive, and a bee is shewn going towards two little springs which move very easily. Only one bee can go out at a time, and

*none* can return, as the springs close nearly close together. •This is called the Porter Bee Escape.

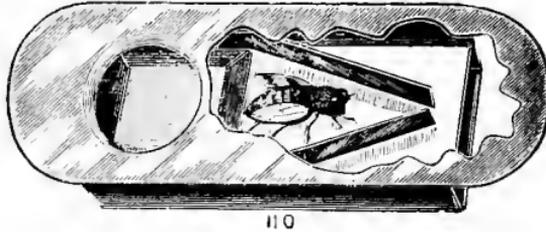


FIG. 15.--Porter escape.

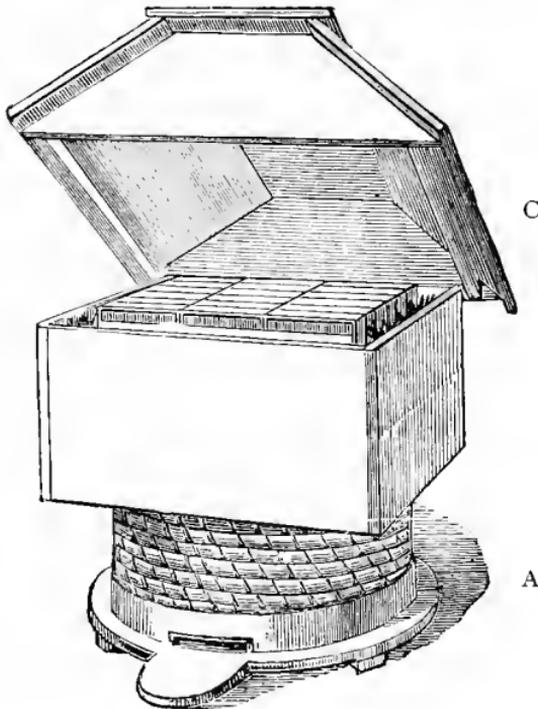


FIG. 16.

Fig. 16 shews further uses of the straw skep, and as

there are still some bee-keepers who love a straw hive, this figure shews how the best results can be obtained from its use. Moreover, there is nothing shewn in fig. 16 but what any handy man could make for himself, except, perhaps, the foundation and sections. A is a skep floor board, and the super is full of sections filled with foundation. At the bottom of this super there is a small piece of

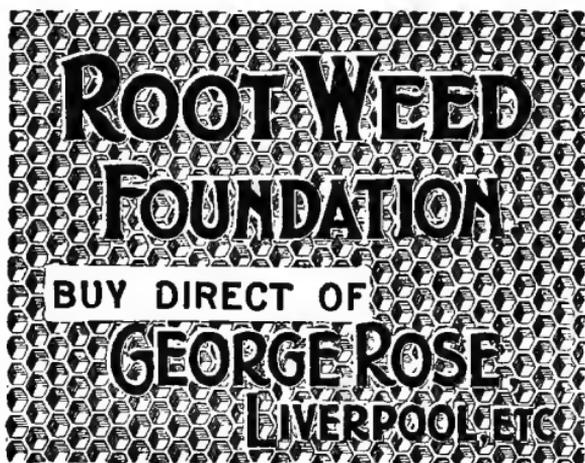


FIG. 17.

queen excluder. This cannot be seen in the figure because of the sections. The sections can be taken out and the super inverted for winter use. It fits down well over the skep and helps to keep all warm and snug. The cover C will fit on the super whichever way it is up.

Foundation (fig. 17) has been mentioned before.

The weed foundation bids fair to become the foundation of the future. It is the invention of an American, and most of it is made in America. The cells are a more perfect imitation of those made by the bee, and the foundation can be made any width and any length. The writer has now used it two years,



FIG. 18.

and found the bees take to it very quickly. The sketch (fig. 18) shews clearly the simple manner of fixing and securing foundations. The frame is placed on a block, having an inner board the half depth of frame, the sheet is placed on this, the thumb draws

open half of top bar, and it slides easily into the groove ; the bevel bit shewn between thumb and finger of right hand prevents any possibility of it splitting off when the half of frame is pulled back ; two W. B. C. ends slipped on as it remains on block, and all is tight. If necessary, all can be turned up on edge, and two nails driven in ; this makes all very firm and rigid. The awl shewn on table is for piercing holes in bottom bar for paper clips, which hold foundation perfectly straight till worked out.

Every part of frame is machine made and shouldered, cannot get out of shape, and is easily put together. Many people *wire* their frames to keep the combs from breaking when put into the extractor. The writer's experience of wired frames is that the bees do not take so readily to them, but at the same time he is bound to confess that many beekeepers use them with great success. Bees seem as though they had an opinion of their own, and one lot of bees will often do what another lot refuses to do.

The foundation used for sections is extremely thin, as no strength is required in such a small quantity. Some people only use a strip, or a triangular piece with the apex downwards. The weight of evidence seems to point to a free use of *good* foundation both in frames and sections. We say *good*, because there is foundation *and* foundation. Paraffin has sometimes

been used in its manufacture, much to the disgust of the bees. The sketch (fig. 19) shews an ordinary crate

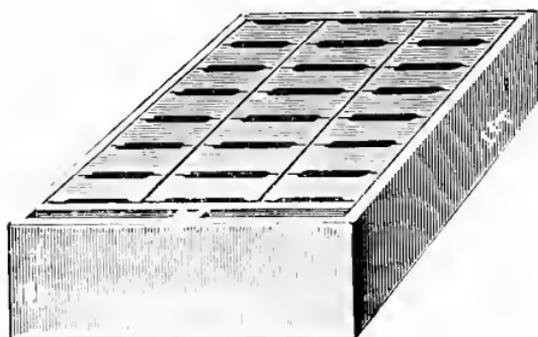


FIG. 19.

full of sections ready to put on the hive, while fig. 20 shews a crate of hanging sections. Many people

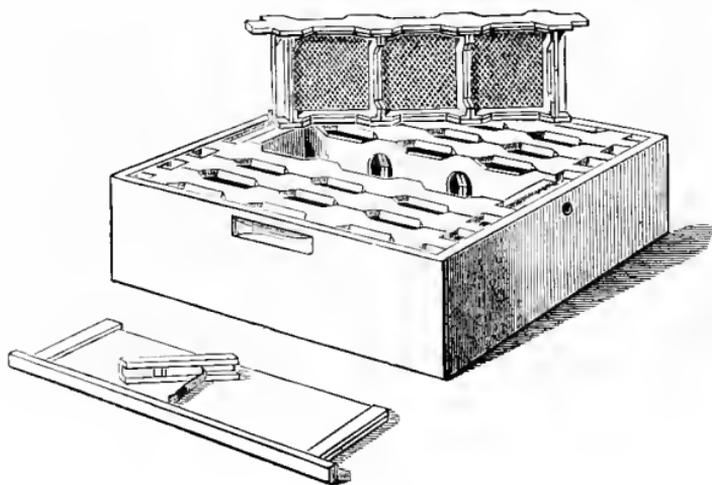


FIG. 20.

prefer the latter, as they can be more easily lifted out

of the crate and examined, or if filled, taken away for use. There is no doubt that the more tasteful the honey is prepared for market, the better it will sell ; and fig. 21 shews a tasteful little box in which the section can be placed while the comb can be seen through the glass. It will be observed that there is a lace edging, and it is necessary to warn those who intend to compete for prizes in a show, not to make

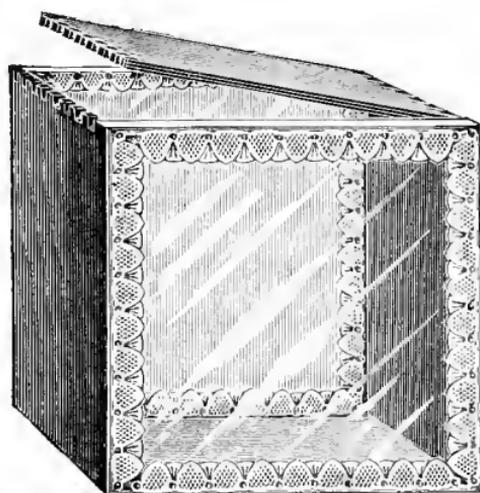


FIG. 21.

this edging too wide, or the honey will be disqualified. Wide lace hides the pop-holes which the bees often leave so that they may pass more readily from one section to another. The pop-holes must not be hidden.

We come now to feeders and feeding. If no surplus

was required, most seasons are sufficiently favourable for the bees to get all they want for *themselves*, but not always. If, on the other hand, we want our bees to provide us with a lot of honey, and yet have enough for themselves, feeding will frequently have to be resorted to. There seems to be little doubt that the best way is, leave the bees a certain weight—say 20 or 25 lbs.—of honey in the autumn, and not disturb them in the spring. If they are short of this weight feed them up to it. Even then, if the spring is cold, it is better to give them a little food so as to keep breeding going on, but not sufficient to store. The great thing is to have a hive full of bees, so that when the honey flow comes they will be able to take advantage of it. Anything given to the bees in the shape of food will be repaid with compound interest. As for the kind of food, nothing can be better than the recipes given at page 167 of *The British Bee-keeper's Guide Book*, by Thomas William Cowan, Esq. These are as follows :—

*Spring and Summer Food for Bees.*

White lump cane sugar, . . . . .	10 lbs.
Water, . . . . .	7 pints.
Vinegar, . . . . .	1 oz.
Naphthol beta solution No. 1, . . . . .	$\frac{1}{2}$ oz.
Salt, . . . . .	1 oz.

Boil for a few minutes.

*Autumn Food for Bees.*

White lump cane sugar, . . . . .	10 lbs.
Water, . . . . .	5 pints.
Vinegar, . . . . .	1 oz.
Naphthol beta solution No. 1, . . . . .	$\frac{1}{2}$ oz.
Salt, . . . . .	$\frac{1}{2}$ oz.

Boil for a few minutes.



FIG. 22.

There are various kinds of feeders. Bottle feeders (fig. 22) are very much used. A bottle is specially made with a metal cap which screws on to the bottle. The cap has several holes and an index finger. If the finger points to 1 the bees can only feed through one hole ; if it points to 2, through two holes, and so on. Sometimes these bottles leak, and without very careful usage they are more or less messy, and other kinds

are to be preferred. Perhaps a more useful kind is the Tin Float Feeder (fig. 23). These useful feeders have been very much improved by Mr. Meadows, who has invented many useful articles for bee-keepers. They are, we believe, thoroughly reliable. The bottom is raised so that bees can get under them. They can be filled without bees escaping, and the cover closes all up warm. My favourite feeder is made by Mr. E. J. Butt of Barnstaple. It is made of porcelain,



FIG. 23.

and is everlasting. The only thing that can possibly be said about it is the price. Possibly, if there was a greater sale they might be made a little cheaper, but considering the fact that one of these feeders would last *any length of time*, they are cheap. The feeder shewn at fig. 24 is what is called a Rapid Feeder, and by its use a lot of bees can be fed quickly with one dose. With one of these feeders a strong lot of bees

could be robbed of the whole of their honey, and fed up to winter strength in a day or two. Moreover, the

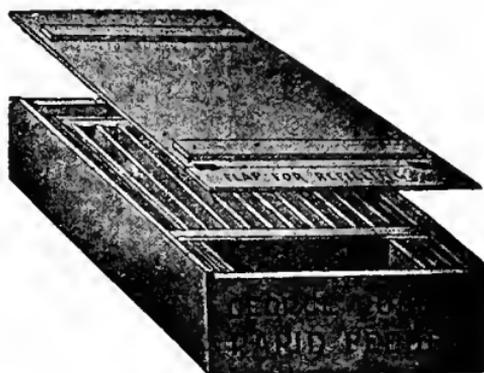


FIG. 24

syrup indicated on a previous page is as good, or better, for them than their own honey.

Anything can be done with bees if a few simple rules are understood and acted upon. I have never found

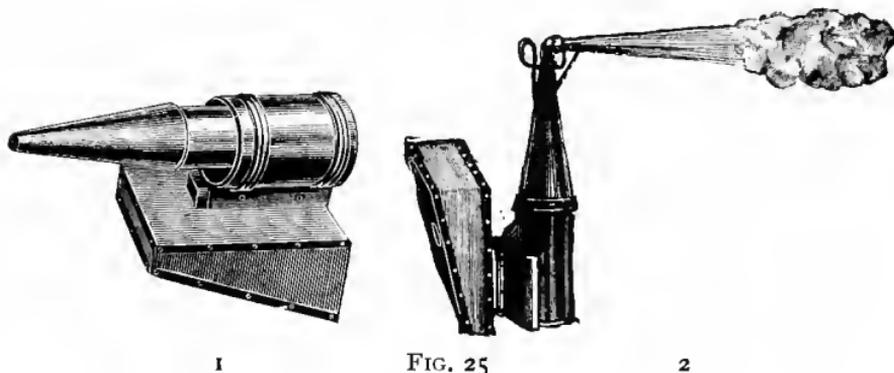


FIG. 25

anything better than a few puffs of smoke from a good smoker. Here are two (fig. 25). They are both good

in their way. Personally, I prefer No. 1. The No. 2 is a Bingham, and is said to be an excellent smoker. Mr. Meadows recommends cotton-wool as fuel, but the writer nearly always uses rotten wood. Specially prepared fuel is now mostly sold by the dealers, and is very useful. To subdue the bees it is only necessary to puff the smoke in at the entrance and wait a minute or two. The bees will gorge at once, and are then good-tempered. Should they not be so, a few more puffs over the frames will make them so. A rag soaked in carbolic acid solution is now frequently used to lay over the frames. The bees will fly from it. When this is used the rag must not be too wet, or the honey will taste of the acid.

One of the great advantages of modern bee-keeping consists in the fact that the honey can be extracted from the combs by centrifugal force, and the combs given back to the bees to be re-filled. It was said to have been discovered by an Austrian gentleman who was playing with his children on the lawn. To amuse them, he swung some honeycomb round and round. Presently he found that the honey was swung out of the comb. This led to the invention of the Honey Extractor, now brought to great perfection. Here is an excellent one by our friend Mr. Meadows, which goes as smoothly and quietly as a pneumatic bicycle. A frame of honeycomb is taken, and a long knife, which ought to be a little warm. The cappings of the honey are cut off from both

sides, and then the frame and comb are placed in the cage. Another frame is treated in a similar manner, and placed in the opposite cage, "to make the balance true." The handle is turned very carefully at first, and the honey commences to fly out and run down the sides of the extractor. When about half

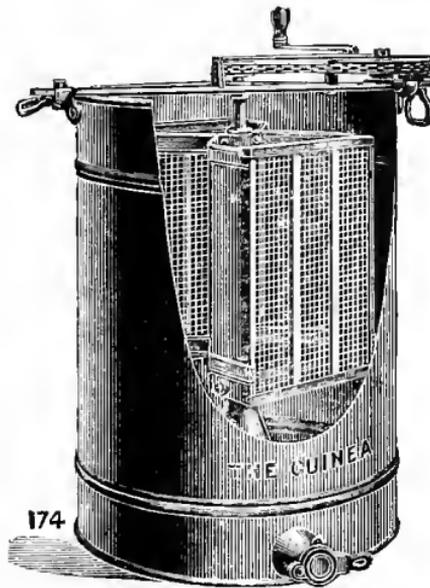


FIG. 26.

the honey has escaped, the machine can be turned faster and faster till all the honey has escaped. It can be drawn out of the faucet at leisure. There are a great many varieties of extractor, but all embrace the principle of the extractor of honey by centrifugal force. A very remarkable extractor is shewn at

fig. 27. It is the invention of T. W. Cowan, Esq., the author of the *Guide Book*. The extractor shewn will take four frames at once and the machine is *reversible* : that is, the frames, by an ingenious contrivance, are reversed without removal, when the honey is extracted on one side, and the honey will then be extracted from the other side. In the machine (fig.

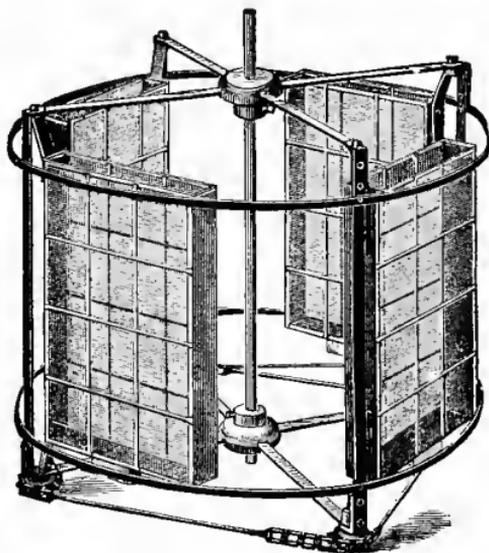


FIG. 27.

26) and most others, the frame has to be lifted out and reversed, which, however, is not a great deal of trouble.

We come now to the extracting of wax, a most useful article, and one that will always fetch a good price. The extractor shewn is the invention of the

late Mr. Cheshire (fig. 28). The directions for use are as follows :—Put the extractor on the fire in the same manner as an ordinary pot, having first filled lower tank three parts full with water, and the perforated basket above tank with broken comb, or whatever material you wish to extract wax from. The steam passes through the perforated walls of the basket, melting every particle of wax in the crude

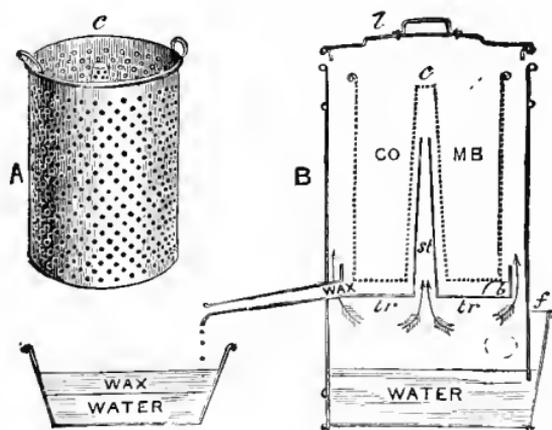


FIG. 28.—A, Perforated comb basket ; B, section of extractor ;  
*c*, central cone ; *tr*, tray ; *st*, steam tube.

material ; the wax runs out of the spout for the purpose. When not in use as an extractor, it is excellent as a capping can. The cappings drop into the basket, the honey drains off, leaving the remainder just where it is wanted to extract from. In practice I prefer something simpler, and here is one (fig. 29) well worth notice. The description is as

follows:—“No special originality of method is claimed for this little appliance, the plan in various forms having been long in use ; but we (*i.e.*, Mr. Meadows) do claim credit for a simple, economical, and original application of the known method of wax-extracting. A round pan or boiler is fitted with an inner vessel of corrugated iron having a loose top and bottom of perforated metal, together with a device for keeping it in middle of the boiler when in use. This

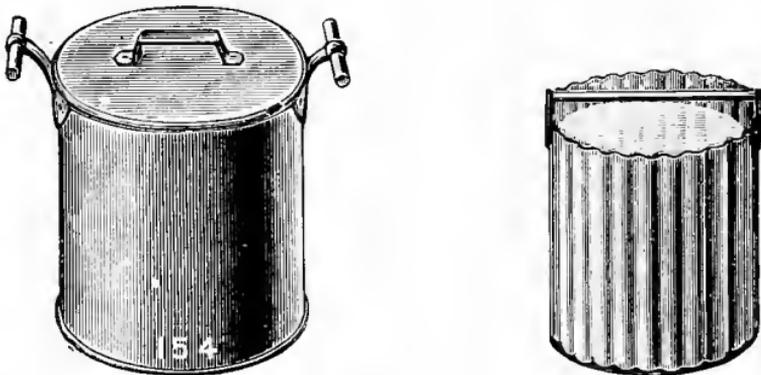


FIG. 29.

is the wax-holder. When the latter has been filled with broken combs—pressed close down and the loose lid laid over all—the boiler is filled with cold water until the wax-holder is completely submerged. As the water heats the wax melts and passes upward to the surface of water above, on which it floats till removed when cold, as a solid cake of clean wax, the débris being retained in the wax-holder The boiler

can be used for household purposes when not otherwise wanted.

Lately solar extractors have come into use. They are very successful—at least some of them—when we have plenty of King Sol, but not without. The principle is for the sun shining through glass to do the work of the steam in the ordinary extractor.

When King Sol is conspicuous by his absence the solar extractor can be stood before a fire with much the same results.

## CHAPTER V.

MANAGEMENT OF BEES.—HOW TO QUIET BEES.—TRANSFERRING BEES FROM SKEPS TO BAR-FRAME HIVES.—STOCKING HIVES FROM 'CONDEMNED BEES,' *i.e.* THOSE WHICH WOULD HAVE BEEN DESTROYED BY THEIR OWNERS IN TAKING THE HONEY.

IT has been said previously that the best way to quiet bees is to puff smoke into the hives, and put a carbolic rag over the frames. It occasionally happens that bees will not be subdued with either of these, owing to the fact that they have been roused before the smoke, etc., have been applied. The best advice we can give is this. Put on veil and gloves so as to inspire confidence, and then go to the bees in a determined but quiet manner. Don't jar the hives, or do things in a noisy manner. This will at once rouse their anger. Treat them as if you loved them. If the smoke is applied before the bees know anything about it, they will fill themselves with honey, and in that state are as harmless as flies. Sometimes substances have been used with a powerful odour. Should tobacco be used, a very few puffs would be enough. Dried puff balls have been recommended

by some, the odour of the smoke being very strong. Again, chloroform has been used. Take *Punch's* advice in another matter, "Don't." We know a case to the point. Some years ago a Wiltshire gardener was asked to go and chloroform some bees and take their honey. This gardener was very much afraid of bees. As he was gone some time, the master of the house went to look after him, and found him lying down beside the hives with the bees stinging him proper. In his nervousness, the gardener had chloroformed himself and not the bees, and he was badly stung into the bargain. Some bees are naturally vicious. When this is the case, destroy the queen, and put another in its place. Of course it would take time for this to take effect, as the vicious bees would want a little time to die off. Many bee-keepers say this is a good plan to cure vicious bees. Take a scarecrow and make it as much like a man as possible, and post it near the bees to be tamed. Smear something or other over the scarecrow to make it smell disagreeable, and the bees will go for it. Many bees will lose their stings, not being able to withdraw them. Those who lose them—which will, of course, be the worst tempered—will die. This is well worth trying.

Some years ago, at shows, bees were transferred from skeps to bar-frame hives in the following way. The operator smoked the bees, drove them from the skep into another skep, and then cut out all the

combs and fastened them with tapes into frames. The latter were put into a hive and the bees thrown on them. On the principle that bees never desert brood, they would fasten the combs to the frames, and all would probably go on well. There are, however, several objections to this method. At the best, it is a very messy job, and the combs from a skep are frequently very old, and would be better melted down. Then there is the matter of taking off the tapes. A very much more convenient method is now adopted, and this is to make the bees *transfer themselves*. This is how it is done. In the spring of the year, say *about* the month of April, take a new bar-frame hive, and fill all the frames with foundation. Full sheets are best. Then take a piece of American cloth—I always use white—large enough to cover over all the frames, and in the centre cut a hole about four or five inches square. Take a fine day for the operation, and see that there are plenty of bees and that they are working. First move the skep which is to be operated upon a little way off, and put the bar-frame hive in its place. Then lift the straw skep up carefully, and place it over the frames, with the centre of the skep just over the square hole in the American cloth. Part of the frames will not be covered by the skep. Pack all this part up with warm material so as to make all snug. The bees will soon begin to work downwards, and as they always store their honey farthest from the entrance, the queen will go

down, and the brood be in the lower hive. As the bees hatch out in the skep, the latter will be filled with honey. It is perhaps preferable to leave the skep on for some time, so as to make sure that the transfer has taken place. The skep can then easily be removed full of good honey, and the bees supered. The latter method of transfer is now adopted as *the* best. Some people drive the bees out, and then put them into the bar-framed hive, but all things considered, this is not so satisfactory as the way previously advised.

A very good way of getting good hives of bees is to get 'condemned' bees from cottagers, that is, bees which would otherwise be destroyed. It used to be the universal practice to wait till autumn, and then take some of the hives and destroy the bees by placing them over burning sulphur. Some people still do it. This is a foolish plan. When this is about to be done, it would be a good thing to go to these persons and ask them to allow you to drive their bees out of the skeps, and, of course, let them have all the honey. This is all they would get if the bees were destroyed. If a bar-frame hive is prepared with full sheets of foundation, two or three of these lots of bees could be mixed together and fed. This would in all probability become a fine stock of bees. The method of mixing is as follows :—Take the driven bees home at sunset. We will suppose you have three lots. Take up one lot and sprinkle them with a little syrup

mixed with peppermint. Throw this lot of bees quickly on a sheet in front of the bar-frame hive. Then quickly treat the second and third in the same way, throwing them on top of each other. They will all run in, queens as well, and being scented alike, they will not know friends from enemies, and will settle down as one stock. There will be a battle royal between the queens, which will be settled by the death of all save one. The fittest will survive. For feeding such an immense lot it is better to take the *large* feeder previously mentioned, and give a large quantity of syrup at once. They will quickly carry it down, store it, and seal it. Some of my best stocks of bees have been obtained this way. The labour of the bees can further be saved if frames of comb are given to them instead of sheets of foundation. After so much knocking about, it *sometimes* happens that bees will desert their new quarters, and swarm on a neighbouring bush. If they do, put them in again, and they will *probably* remain, especially if some syrup is over the frames. If they still shew a desire to desert the hive, a frame of honey and brood might be given them from another hive. On the principle that bees never desert brood, they will remain. There is, however, seldom any need for all this trouble.

## CHAPTER VI.

MANAGEMENT IN BAR-FRAME HIVES.—‘SPRING CLEANING’ OF HIVES.—ARTIFICIAL SWARMING.—PREVENTION OF SWARMING.—TAKING HONEY.—QUEEN REARING.—UNITING WEAK STOCKS.—FEEDING AND WINTERING BEES.—PACKING AND REMOVING BEES.

IF it is fine and warm towards the end of March or beginning of April, the bees should be overhauled in the middle of a fine day. The first thing to do is to see that the bees have enough stores to carry on breeding, and if not, to give them some at once. This should be given in small quantities, *not* for the purpose of storing, but to keep up the population of the hive at full working strength. *Before* putting on the feeder, the tops of the frames should be scraped with a scraper (fig. 30) to clean them of propolis, etc. The entrances should also be cleared of dead bees. But a better method of doing the ‘Spring cleaning’ is as follows :—During the winter make one or two new hives if they are required—or likely to be—and repaint and clean any empty hives. If this is done some time before they are wanted, they will be clean

and sweet, and the smell of paint gone. Then, when the time comes to examine the hives, take out a clean one, and stand it by the side of the one to be examined. Then take out all the bees and combs, one

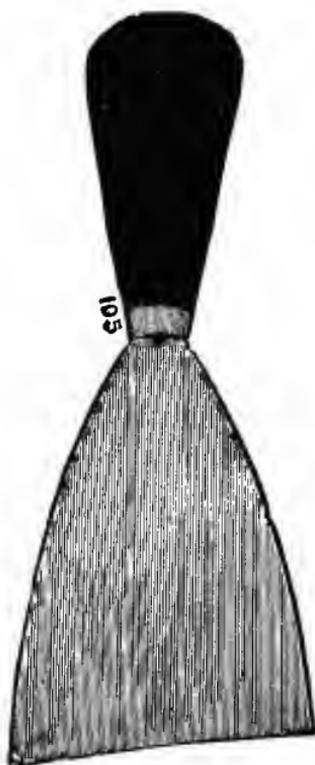


FIG. 30.—Bee scraper.

comb at a time, and place them in the same order in the clean hive. The scraping could be done before lifting the frames out. It would be quite easy to see if there is enough honey while doing this. The queen

could also be interviewed. All this work would have to be done quietly but quickly, or perhaps the brood would get chilled. *Quietness* is essential, as sometimes at this time of the year bees will 'ball' the queen if they are much disturbed. If each stock can be given either a clean or new hive, so much the better, and the hives which the bees have used during the winter can be taken away for cleaning and painting. This must never be done on a cold day, and only in the *middle* of a warm one.

It often happens that bees are ready to swarm, but the weather is not satisfactory, and perhaps this will continue for some days. In cases of this sort, the bees will be idle, and a great deal of the most valuable time will be lost. The writer prefers a natural swarm as a rule to an artificial one, but when bees will neither swarm nor work, artificial swarming must be resorted to without delay. The matter is very simple. The conditions of success are fine weather, crowded beehives, and the presence of drones. The process is then as follows:—Take an empty hive and fill it with frames of foundation, leaving room for one more frame. Then examine a strong hive, and take out the frame on which is the queen, and put it in the hive in the place where one frame was left out. Then place the new hive on the stand of the old one, moving the latter some distance off. All the old bees will flock into the new hive and make the swarm. If left alone, the old hive having young bees and brood

would soon make a fresh queen, but much valuable time would be saved if a ripe queen cell or a new queen was given twenty-four hours after the other queen had been removed. Thus two colonies would be made from one. There is another, and, we think, much better, method of artificial swarming, and that is by making three colonies from two. Go to a very strong stock, and take out five or six frames of brood, but *not* the queen, shaking the bees back into the hive. Put these frames of brood into an empty hive, filling it up with full frames of foundation. Then move another strong stock to a fresh stand, and place the hive of brood on the spot where the hive which has been removed stood. The bees will flock to the old spot, hatch out the brood and make a queen, but time will again be saved if a queen cell or a queen is given to them about a day after they discover they are without one. This is by far the best method, as one hive supplies the bees and the other the brood. Natural swarming will thus be checked, and the bees will all be at work. But the reader might say, Do not the bees always work? The answer is that bees never do anything *invariably*. Dr Watts and his "How doth the little busy bee," etc., are out of date, if they were ever in date. As a rule they will work, but we have known a hive of bees neither swarm nor do anything else all the summer, unless made to by artificial swarming. There are other methods of artificial swarming, but it is only necessary to say

that there is no better method than making three stocks out of two, as previously explained.

If it happens that the bee-keeper has stocks enough and does not wish for swarms, he may usually prevent swarming, but not always. The reason why bees swarm is because the hive gets so full of bees as to become practically unbearable. They will then swarm out. If more room is given in time—*i.e.* before they get the swarm fever—swarming is frequently prevented. Bees always like to build down to the floor of their hives. If, therefore, the hive is raised, and a box of frames with only strips of foundation put under it, the bees will probably not swarm. If supers are also added at the same time, they will be still less likely to swarm. The principle involved seems to be this. Bees will not swarm while they have *unfinished* combs nearest the entrance. Therefore, take care they never finish them. A noted Russian bee-keeper used to do this. He took a tall box, and stood it up on end. In the upper part of the box he introduced a swarm of bees. The first year they worked about a third of the way down the box, and the bee-keeper allowed them all that year's takings. At the end of the second year they had worked another third, while the top part was full of honey. He cut out the top third for himself, and left the bees the rest. At the end of the third year the bees had worked to the bottom of the hive. He then cut out the next (or middle) third, leaving the bees the bottom lot. When the bees were

ready to swarm the next year, he *turned the hive upside down*, and the process was repeated. He had 2800 of these boxes. His method of bee-keeping was simple, but he was a wise man, and, by his method, unfinished comb (*or* an empty space) was always nearest the entrance, and thus swarming was controlled. Go thou and do likewise. The whole principle seems to be to give the bees plenty of room in *advance* of their requirements. Some people advise the cutting out of queen cells. We do not. It fails sometimes. If the bees *do* swarm, and you do not want an increase, get the queen from the swarm and destroy it (*or* make some use of it) and give the bees back to the hive from which they came. Probably they will set to work and not come out again.

Taking the honey is very pleasant, and not by any means a difficult operation with good modern hives. Suppose you wish to remove a crate of sections. A good time is to go to the hive first thing in the morning. Gently raise the whole crate, after prizing with a screw-driver in various parts. A puff or two of smoke can be given if necessary. Then lift up the crate and put a cloth under it, thus separating the bees in the sections from the queen. Then uncover the sections by removing the cloth over them, and replace the cover of the hive. The bees will soon go out one at a time by the bee-escape in the roof, and not be able to return to the sections. In the evening the bee-keeper could go to the hive, take off the roof, and remove the crate

without a bee in it. A box of shallow frames could be removed in the same manner, only, in the latter case the frames of honeycomb would be uncapped, and put into the extractor, as explained in a previous chapter.

Bee escapes are also (and perhaps preferably) put between the super and the brood chambers (fig. 31). The bees then escape downwards and cannot return.

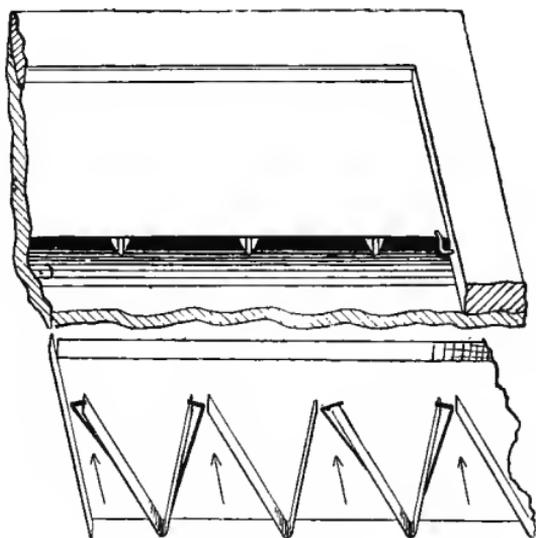


FIG. 31

As the only way to get plenty of honey is to have the colonies strong, and the only way to keep the colonies strong is always to have a good queen in each hive, it is necessary to know the way to rear queens. A queen bee will live five years, but it is not of much use

after the third year, some say after the second year. No doubt a queen bee is in its prime in its second year. Personally, I prefer queens raised under the swarming impulse, as superior to all others ; but if swarming is prevented, as it is largely done now, queens must be raised to keep up the supply. In early spring go to your strongest and best stock, and commence stimulative feeding. This is the hive in which to breed queens, and should be furnished with worker comb only, so as to prevent drones being raised. It is best to have the drones from one hive and the queens from another. Then go to the next best hive, and commence stimulative feeding, and put drone comb in this one when the hive is strong enough, after which, feed more rapidly. This will induce the early breeding of drones. As soon as the drones are found to be hatching out, go to the other hive and place the best worker comb in the centre of the brood nest. The queen will at once lay eggs in this comb. Let her do so for about three days, and then remove her elsewhere. Combs containing unsealed larvæ can also be removed to other colonies, as it is better that the queens should be raised direct from the eggs. They will thus be fed longer from the royal jelly, and will be stronger. As soon as all this is done, the bees will commence to make queen cells. You can have these cells almost where you like, but the edges of the comb will be found the most convenient. Take a piece of wood shaped like a cone and press it into a cell, making it a little larger, and

at the same time bruising the other cells round it. The bees will at once turn all the enlarged cells into queen cells. A good many cells can be obtained this way, and after nine days will be ready to cut out. This operation must be done carefully, and without any shaking of the comb. If the bees are in the way, sweep them off gently with a feather. When the cells are cut out they can be introduced to the colonies requiring them, taking care to remove the old queen first.

The conditions of success are to have only strong colonies, and weak ones must be treated with Spartan severity. If you have, say, ten colonies of strong bees in the autumn and five weak colonies, take a weak colony and mix it with a strong colony. This is done by bringing the two hives to be united closer and closer together each day. Then smoke the two hives, and mix up the bees and frames of one hive with the bees and frames of the other, and then remove the empty hive some distance away. They will generally settle down quietly if the work is carefully done. If there should be too many frames to fill one hive, they could easily be disposed of. Then treat the other weak hives in the same way. A strong lot of bees is the best to go through the winter. They can keep one another warm, and will eat less. A good Scotch bee-keeper once said that the best covering for bees in winter is bees, and he was about right.

Before winter sets in, *i.e.* in September, hives

should be examined to see if they have enough stores, and if not, they should be fed up at once. Liquid food should not be given after October, and if it is suspected that the bees are short during the winter months, candy should be given them. A cake of candy can easily be put over the frames, and the bees covered up warm. The entrances should be narrowed for winter, but now and then they should be cleared of dead bees. Some people advise turning the front of the hives to the north in winter time, so that the sun may not entice the bees out in snowy weather. Sometimes, when the sun shines brightly on the snow, the bees are tempted out only to die.

Bees may easily be moved if proper care is taken. When a swarm of bees is placed for the first time in a garden, the bees mark the spot, and if the hive is moved only a few yards away, they will fail to find it. When bees are flying every day, they must be moved two miles or more away. They will then mark the spot again, and find their way home. In winter time when the bees are at rest, they can be moved a few yards without any loss. Some care must be taken with bees when travelling. The writer has bought swarms of bees from experienced beekeepers, only to find them dead with suffocation on their arrival. Skeps should be stood in a box without a top, and *inverted*. Shavings or paper will easily make the skep stand firmly. The mouth of the skep

should have cheese-cloth firmly tied over it, and a strip of wood nailed across would make a good handle. Bees thus treated should stand a good deal of knocking about, which they would probably get. Bees are better *not* removed in hot summer weather, as the combs are then very soft. Bar-frame hives of bees are more easily removed, but it is not advisable to move them in the hottest part of the summer, except the frames are wired. The only essential of success in moving bar-frame hives is to see that the combs do not swing about. A rack could be made to prevent this. Some perforated zinc should be placed over the frames in such a manner that the bees can walk about and get some air. Perforated zinc would also have to be placed over the flight hole. A piece of rope firmly tied would make all secure, though in every case it would be best to label every stock live bees. Possibly they might then get more tender handling.

## CHAPTER VII.

SOME DIFFICULTIES, AND HOW TO OVERCOME THEM.—ROBBER-BEES.—ENEMIES OF BEES: WAX MOTH, MICE, ETC.—DISEASES OF BEES.—HOW TO DEAL WITH ACCIDENTS ARISING FROM BEES.

THERE are difficulties, and sometimes losses, connected with bee-keeping as with any live stock, but they are not insurmountable. When honey begins to get scarce, and the bees have turned out the drones, they sometimes engage in another pastime, *i.e.* robbing. And fearful robbers bees are when once they begin. Sometimes a whole apiary has been destroyed, or nearly so, in a very short space of time. The evil sometimes arises through a drop or two of syrup being spilt about when feeding. The bees will fight for their lives for this syrup, and are then like tigers who have tasted some warm blood. They want some more, and will then begin to enter each other's hives for it. Once this is fairly commenced it is most difficult to stop. The strongest hives and those which have the most honey, will go to the weakest and rob. The first considera-

tion is never to keep weak hives, but unite them with others. If, however, robbing has commenced, nearly close the entrances, so that only one bee can go in and out at a time. If a hive is being robbed, carbolic rags laid near the entrance will drive many of the robbers away. If it can be clearly seen which hive supplies the robbers and which hive is being robbed, it has been suggested to change the places of the hives for about an hour. The result would be ludicrous, because the bees that are robbing would then steal their own honey and store it in the robbed hive. Before nightfall the hives could be put on their own stands again, and the robbers would by that time have been duly punished. Sometimes hives are turned round, and this is often successful. I have frequently found that by nearly closing the entrances, robbing is soon stopped; but the best way to stop it is to avoid the cause, and see that no pieces of comb or liquid sweets are ever lying about unprotected.

The greatest enemy of the bee is the wax moth. It is difficult for the wax moth to enter a strong hive, but very easy to enter a weak one. Late on a warm summer evening the moth may be seen flying about the entrances of hives. If it can get in, it will lay an egg in a part of the comb—especially an old comb—not covered by the bees. In due time a grub will come out of the egg, and it will eat wax, pollen or honey. The usual phases are gone through, and the

grub becomes a moth, and the process is repeated. Sometimes a weak hive is completely destroyed this way. The cure seems to be : (1) To melt down old combs at once, and not let them lie about ; (2) do not let the combs get too old in the hives, but remove them and melt them ; (3) keep the hives strong, and the bees will not allow the moth to enter. As a proof that it is an essential to keep the hives strong, it is said that a snail got once into a strong hive. The bees could not get the snail out, so they stuck it down to the floor with propolis, and it died in its shell.

Mice also cause a deal of trouble, provided they can effect an entrance, as they will eat the wax and honey and return thanks for it by getting very fat. If they are already in, set a mouse trap inside the hive, and take a cat for a walk near the hives. To prevent them getting in—which is generally in winter-time—make the entrance as small as possible.

Wasps are a great nuisance to the bee-keeper. Remedy : Destroy as many queen wasps as you can in spring. Destroy wasps' nests wherever you can find them. Narrow the entrances, and hang up bottles in the trees with a little sugared beer in them. Destroy spiders' webs near the hives to prevent the following : “ ‘Come into my parlour,’ said the spider to the *bee*.” Tits are very tiresome rascals. They may be seen tapping the floor of the porch in winter, and when a bee comes out to inquire the reason of

the uproar, he does not return to give the information obtained to the other bees, but immediately passes down the bird's throat, unhonoured and unsung. Ants may occasionally be seen in large numbers in the hives, and they are arrant thieves. They object to the smell of turpentine, which can be rubbed on the stand. Lucky is the bee-man who has legs to his hives, as a saucer of water can be placed under each leg. Bees have other enemies, but the principal have been named. To cure the birds, fasten a net over the hives, and let them hear a gun occasionally.

Bees have few diseases as compared with other living creatures, but one is very serious, and that is called "Foul brood." No better description can be given than that by Mr. A. Pettigrew in his *Handy Book of Bees*. He says: "Foul brood is the great and incurable malady of bee-hives. From some cause or other, and in some seasons more than others, larvæ, or half-hatched bees (or brood), perish in their cells, and become a putrid pestilential mass in a hive. Prosperity departs from a hive whenever this happens, and sometimes the stench of it has driven the bees wholly out of their hives, and made them build fresh combs underneath their boards; and sometimes they have gone off as swarms, abandoning their hives in utter despair and detestation. An experienced bee-keeper can smell this disease outside the hive in which it exists, long before it is so fully developed

as to make the bees forsake their hive, and will not hesitate to give the bees suffering from it a clean hive as soon as he wisely can. Foul brood in a bee-hive is as dangerous and destructive of health and life as foul air or choke-damp is in a coal-pit. We are not going to waste time and space in theorising as to the cause of this distemper in bee-hives, which is not understood. Long and elaborate essays on foul brood have been printed from the pens of great and distinguished apiarians of both Europe and America during the last few years, a careful perusal of which will convince any man of ordinary intelligence that the writers themselves are not quite certain as to the correctness of their opinions. The best of them, to say the most, are but 'good guesses.' But the last, and every attempt made to clear up the mystery of foul brood, indicates that the person who makes it thinks that all who have gone before him have failed in their attempts. Though we are unable to speak with authority or certainty on this subject, we may be excused for saying that we are yet to be convinced that it is in its nature infectious or self-communicating, or that it is ever carried in honey from one hive to another. That it spreads in an infected hive of living bees, all will admit ; but a satisfactory explanation of the law or process by which it spreads we have never seen. Many single cells of foul brood, far asunder in a hive, often appear. These cells are

covered with lids, rather flat, or slightly concave or scooped, resembling in shape the lids of honey-cells. The lids of cells containing healthy brood are slightly raised or convex. The disease spreads—the cells multiply, apparently not by contact, but singly and separately, all over the brood-combs, like berries of a bunch of grapes colouring one by one.” Thus far Mr. Pettigrew. But he does not seem to say quite enough. When you are *certain* that a hive contains foul brood, it is the best policy to burn up hive, combs, and bees at once, and save nothing belonging to it. This seems a drastic cure, but we firmly believe in it. How are you to be certain that a hive contains foul brood? The answer is, that once you have smelt foul brood, you will not want to smell it ever again, but you will know it if you do, as the smell is unmistakable. There is a very effective picture of “Foul brood in an advanced stage” on page 146 of *The British Bee-keeper's Guide Book*, by Thomas William Cowan, Esq. If the smell of foul brood and the picture of it will not enable the bee-keeper to detect it, nothing will, and he had better call in an expert. Foul brood must not be confounded with chilled brood. The latter is caused by exposure to cold, through taking too long a time to examine hives in spring time. It is a much more innocent but undesirable disease. Though the writer has recommended the destruction by fire of hives affected with foul brood, this is not always done ; and

Mr. Cowan, who is a very clever scientist, recommends several 'cures.' No doubt those who wish to pursue the subject will procure his book.

Sometimes bees are afflicted with dysentery, or, as it is sometimes called, diarrhœa. Though this is usually classed as a disease, it is not one in reality, as the great American Langstroth says, but is a state or habit of body which is fairly easy to cure if taken in time, or, which is better, prevented altogether. When bees are strong and healthy they never void their excrements in the hive, but do this in the open air. In the summer this is easy, because of the warmth of the atmosphere, but in winter-time the affair becomes more difficult ; and if, through the state of the weather, the bees are confined for a long time to the hive, an attack of dysentery, more or less severe, is very likely to occur. Another cause of dysentery is improper food. Syrups made from sugar extracted from beet is very injurious to bees, and so are the juices of fruits, apples and grapes. We have read somewhere of a woman who could not afford (or thought she could not) to give sugar syrup to her bees, and she gave them very sweet cider, with the result that she lost them all from dysentery. No food is better for bees to winter on than syrup made properly from *cane* sugar, and if you have any doubt about the veracity of your grocer, get it at the office of *The British Bee Journal*. The sugar obtained there is guaranteed to be cane sugar, and the writer never gets his anywhere

else. As prevention is always said to be better than cure, it will be desirable to see how that is to be effected. Bees appear to know what kind of honey is best for themselves ; therefore keep the brood nest sufficiently large to allow the bees room to store spring honey in the brood apartment, and *don't extract it*, but leave it for the bees. It is much better for them than honey obtained late in the summer. When packing up the bees for winter, contract the brood apartment as much as possible, so that the bees may be kept warm, and see that the roofs are all water-tight. Bees can endure cold much better than they can damp. Some persons have recommended that bees should be brought into a warm room, and a kind of cage placed over the entrance. The bees would be enticed out of their hives into the cage, and would *possibly*, though not certainly, void their excrements in the cage. The writer has never adopted that plan, nor does he intend to, as it has many drawbacks. The proper treatment seems to be (1) keep the bees strong, by uniting weak lots to others ; (2) feed only with cane sugar syrup when feeding is necessary ; (3) keep the hives snug and dry, and let the coverings be porous ; (4) don't prevent them flying in winter ; better to let a few drop down from cold than miss a healthy flight. Never give the bees syrup during the four winter months, *i.e.* November, December, January and February. *If* they require food, then give them candy properly made, and not *burnt*.

It is difficult to give general advice about what to do in accidents caused by bees. But a few hints may be useful. Some time ago the following accident (?) is said to have happened, though we took it with the proverbial grain of salt. This is it. A swarm of bees flew towards a horse which was working quietly in a field. The queen bee of the swarm went down alive into the horse's stomach. All the other bees loyally followed the queen into the horse's stomach, and arriving there, and finding the hive not very comfortable, commenced giving the horse their opinion of matters by stinging him wholesale. The horse kicked about, broke its harness, and after doing a lot of damage, either died of the stings or was shot, I forget which. It was a poor man's swarm, and he had to pay for the horse. Well, the remedy for this is, *insure* your bees. This can be done for one penny a hive, and any damage up to £30 will be covered by the pennies. Sometimes a person is stung by a bee when far away from a hive, and doing nothing to provoke the bees. Sometimes a single sting has caused death. In such cases the blood is *probably* in a very unhealthy condition. Sometimes, and mostly, the inconvenience and pain is only temporary. Here is the cure from *Enquire Within upon Everything* :—

“*Method of Curing the Stings of Bees and Wasps.*—

The sting of a bee is generally more virulent than that of a wasp, and with some people attended with very

violent effects. The sting of a bee is barbed at the end, and consequently always left in the wound ; that of a wasp is pointed only, so that they can sting more than once, which a bee cannot do. When any person is stung by a bee, let the sting, in the first place, be instantly pulled out, for the longer it remains in the wound the deeper it will pierce, owing to its peculiar form, and emit more of the poison. The sting is hollow, and the poison flows through it, which is the sole cause of the pain and inflammation. The pulling out of the sting should be done carefully, and with a steady hand ; for if any part of it breaks in, all remedies then, in a great measure, will be ineffectual. When the sting is extracted, suck the wounded part, if possible, and very little inflammation, if any, will ensue. If hartshorn drops are immediately afterwards rubbed on the part, the cure will be more complete. All notions of the efficacy of sweet oil, bruised parsley, burnet, tobacco, etc., appear, on various trials, to be totally groundless. On some people the sting of bees and wasps has no effect ; it is therefore of little consequence what remedy they apply to the wound. However, the effect of stings greatly depends on the habit of body a person is of ; at one time a sting may take little or no effect, though no remedy is used, which at another time may be very virulent on the same person."

We have had occasion to test this remedy several

times, and can safely avouch its efficacy. The exposure to which persons are subjected during the hot summer months will, no doubt, render this advice useful, its very simplicity making it more acceptable.

## CHAPTER VIII.

PREPARATION OF HONEY FOR THE MARKET.—CLEANING SECTIONS  
AND GLAZING WHERE REQUIRED.—EXTRACTING HONEY.—  
EXTRACTING WAX.—SALE OF HONEY AND WAX.

If a good price is to be obtained for honey, it must be done up in a neat and tasteful manner. As soon

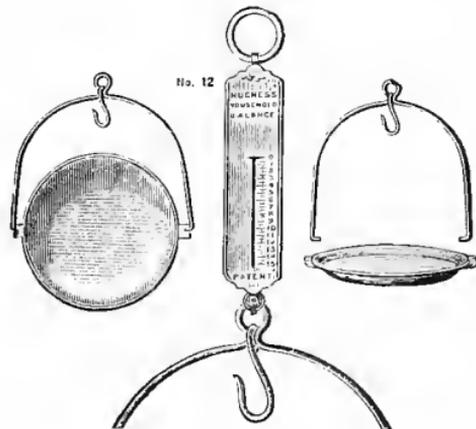


FIG. 32.—Hughes's Balance.

as the sections are taken from the hive, they should have all the propolis neatly scraped off the wood, and then sorted. The best should fetch the highest price.

It is desirable to know the exact weight, both of sections and bottles, and Hughes's Balance (fig. 32)

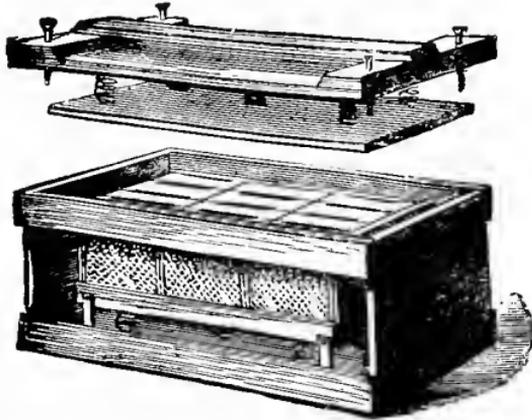


FIG. 33.—Cowan's travelling crate for sections.

would be found very useful for that purpose. The sections should then be put in a travelling crate (fig.

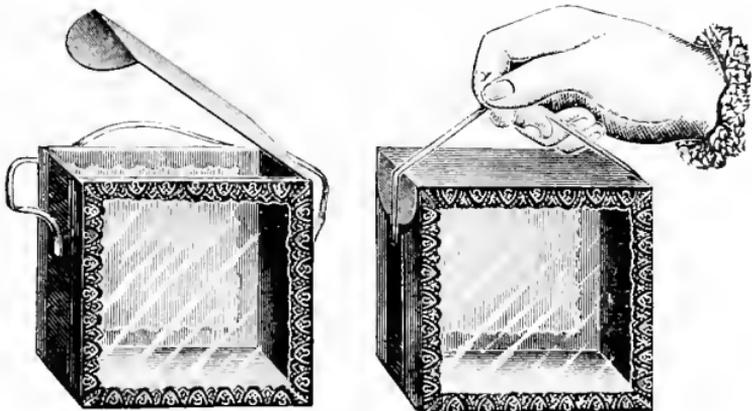


FIG. 34.—Glazed section cases.

33). That one shewn is the invention of Mr. Cowan,

and is called the "Cowan travelling crate for sections." A glance at the figure will shew that sections will travel with perfect safety in this crate. Sections can either be glazed or put in glazed section cases. The latter is the least trouble, and perhaps the most effective.



FIG. 35.—Honey label.

Here is a very good one (fig. 34) with glass on one side only. Perhaps those glazed both sides are preferable, as the customer can then see there is nothing to hide. In the case of bottles, it is best to have some kind of label. There are many varieties of these. One is shewn at fig. 35. It is printed in four colours,

and is the design of Mr. George Rose of Liverpool. It is a new one and we have not used it yet, but should think it will become very popular. There are many varieties of bottles and other packages



FIG. 36.

shewn at fig. 12. If expense is not a consideration, the fancy honey or jam jar (fig. 36) is very pretty. Mr. W. P. Meadows caters. Very pretty terra-cotta honey pots are sold by Mr. Taylor of Welwyn. If honey is daintily packed in the vessels indicated,

there is no trouble to get a fair price for it, at least the writer has never found any difficulty in disposing of his. The present year (1902) having been very unfavourable for honey gathering, the writer had about three times the quantity ordered that he could supply, and that long before he had taken out a pound. The extracting of honey and wax has been explained in a previous chapter, but latterly wax moulds have been introduced. Here is one with explanation from the catalogue of Mr. W. P. Meadows.

*First Prize,—Royal Show, York, 1900.*

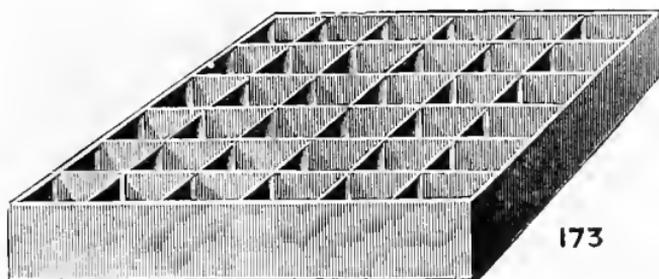


FIG. 37.

*Made in 4 Sizes.*

No.	Size.		Size.
1.	6 by 5	casts 20 cakes	1½ by 1
2.	6 „ 8	„ 32 „	1½ „ 1
3.	9 „ 8	„ 24 „	2 „ 1½
4.	12 „ 12	„ 48 „	2 „ 1½

Nos. 1 and 2 casts 1 oz. cakes.

„ 3 „ 4 „ 2 oz. „

By removing part of divisions larger squares may be obtained, e.g.

remove divisions in Nos. 1 and 2, so that cakes will be  $1\frac{1}{2}$  by 2 ; and in Nos. 3 and 4, 3 by 2 ; this will give 2 and 4 oz. cakes respectively.

The wax should be weighed before pouring into the mould, first deciding upon the size of cakes required—on the basis of 1 and 2 castings, 1 oz. ; 2 and 3, 2 oz. ; and if penny or twopenny cakes are required arrange weight of wax to suit.

---

#### INSTRUCTIONS FOR USE.

Place the mould perfectly level, raise the divisions slightly so that the wax may run under them, and as soon as all poured in, press down to the bottom. After well cleaning and straining the wax, melt in a saucepan having a little water in the bottom ; be careful not to boil. Wax melts at about 180 deg. and should not be made very much hotter or the sample will be damaged. Use a little more wax than is required, and be careful not to pour in the dirt and water that settles to the bottom ; allow this to stand till cool, when the remaining wax may be removed in a thin sheet. Allow the full moulds to be quite cold before attempting to remove.

We have now come to the end of the Government syllabus, and gone over the ground as clearly as we are able, and trust the instructions given will be found practical and useful. We therefore conclude with thirty-three hints from the Catalogue of Messrs. Brown & Sons of Bristol, and make our bow.

---

HINTS AND INSTRUCTIONS TO BEGINNERS IN BEE  
CULTURE.

1. To winter bees successfully, make sure in September or October that stores are plentiful, that the stock has a young queen, is sheltered from north winds, and, above all, see that the hive is damp-proof.

2. Twenty-five to thirty pounds are required to safely carry a colony through the winter.

3. Do not keep the bees confined to the hive on sunny winter days, but when snow lies on the ground it is safer to shade the entrance.

4. Prepare your hives, when possible, long before you expect to require them, and see that they have a good-fitting movable 'dummy,' and that all the hives have frames of uniform size.

5. Spring is the season when bees are most in danger of starvation and dwindling. Watch your colonies, and feed the destitute right on till the honey crop opens. Lessen the room by means of the dummy, and increase the space as it is required.

6. Do not feed at the entrance or out of doors, as it causes the bees to rob, but always on the top over the brood nest.

7. When you see many bees hunting around and trying to get into other hives, be sure robbing is going on somewhere, or that loose honey has been left within their reach. Close up entrances of weak hives to just

sufficient to let a bee out, and sprinkle a weak solution of carbolic acid about the front of attacked hives or where bees are crowding.

8. One bee in March is worth many in June, so do everything possible to forward breeding. Keep the hives warm—feed if necessary—supply them with water and pea flour where pollen is scarce.

9. In early spring remove the drone comb, and replace it with worker or with full sheets of comb foundation as much as in your power. You will always leave more drone comb than needed. Too many drones means a reduced crop of honey.

10. The bees require ten to fourteen pounds of honey to make *one* pound of comb, so it will always *pay* you to use full sheets of foundation, although foundation costs three times the price charged for it. In addition to saving the bees' time and honey, you can only secure straight, easily handled combs by using it freely.

11. The honey harvest lasts but a few days, or, at best, a few weeks, so you must have the hives full of bees, and always ready to take advantage of it when it does come.

12. Improved methods and foreign competition have increased the supply of honey so much that it is absolutely necessary, to ensure a ready sale, to put it up in small sections enclosed in neat and cleanly cases.

13. For home consumption, it pays to produce it in

larger sections or shallow frames, as the bees will store more honey in these.

14. By using wrought-out combs and the help of the extractor, 30 to 50 per cent. more honey can be produced than in sections. If you have three or four hives it will pay you to invest in an extractor, and a good one is cheapest in the end.

15. Honey should not be extracted when first gathered, as it is watery, unripe, and will become unfit for using. Give the bees time to ripen it, and keep them at work with sufficient room ; supply them with empty comb if possible.

16. When bees are hanging out in front of the hive it shows that they are uncomfortable in it and have no room. They should be given more air or more room according to circumstances. Shading the sun from the hive in very warm weather is beneficial.

17. If you give your bees plenty of room before the honey season, and keep them comb building, they will rarely swarm. If once they find themselves crowded and get the swarming fever, nothing will keep them from swarming.

18. Raise queens and drones only from the best colonies.

19. A queenless stock will raise queens at once if it has eggs or larvæ under three days old. These queens will hatch within a fortnight.

20. The old queen always goes with the first swarm.

21. By taking only *one* early swarm, and with good

management, you may secure a little surplus honey, but large harvests can only be taken from hives which have not swarmed at all.

22. To hive a swarm, first skep it, then place hive in position, frames being level *across*. Wedge up front of hive to form a large entrance, and place a large board or sheet, one edge resting on alighting board, the other sloping down slightly from it. Now, give the swarm a puff of smoke, and shake them out in front of the entrance, when, with very little guidance, they will quickly run under cover. If done towards evening very few bees will fly.

23. When you open a hive of bees, if you see any robber bees flying about, you may be sure that there is no honey in the fields, and you must avoid leaving the hive open, or exposing honey within their reach. A robber bee is easily recognised by its quick motions, and buzzing round the hive doors, and occasionally trying to settle on the footboard near the entrance.

24. All bees will become robbers if tempted with exposed sweets in time of scarcity.

25. Decrease the size of the entrance after the honey crop is past, but be sure and have it very large during the honey harvest.

26. In seasons of scarcity your bees should be fed, and they will probably repay you tenfold the following one.

27. If the bees have to be fed after cold weather sets in, soft candy should be given them.

28. Keep your colonies strong. That is the best safeguard against robbers and other evils.

29. A good bee smoker and veil are indispensable. They give a beginner confidence. The bees won't tolerate nervous, jerky handling. Handled gently, and with an occasional puff of smoke, you can do anything you please with them. Smoke the bees a little at the entrance before opening a hive.

30. The middle of the day is the best time to handle your bees, as the old bees are then in the fields.

31. When you get stung do not lose any time, but scrape the sting off. Do not pull it out, as you are likely to drive more poison into the wound.

32. There are about 5000 bees in a pound.

33. Before melting *old* comb into wax, it is better to keep it under rain-water for twenty-four hours. By doing so you get more and better wax.



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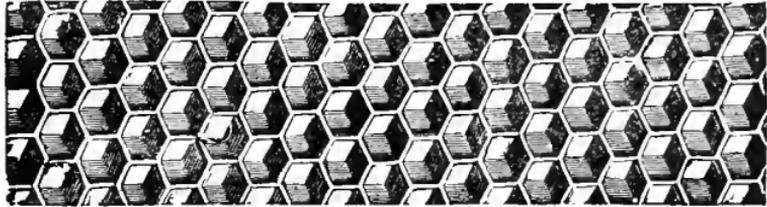
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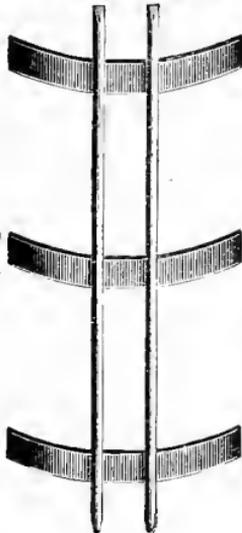


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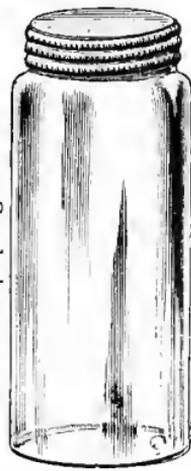
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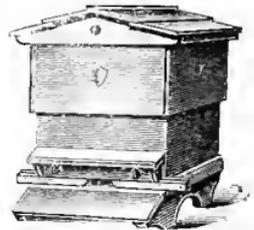
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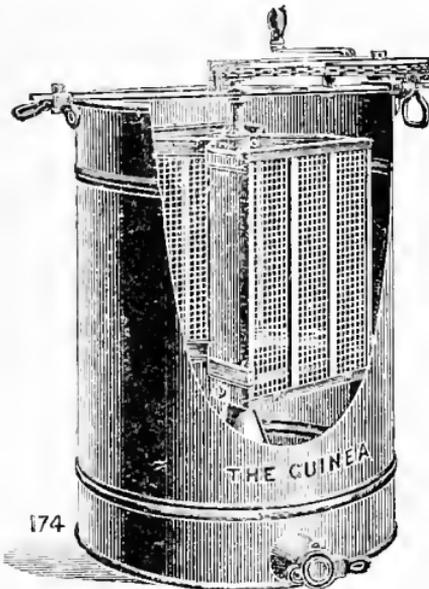


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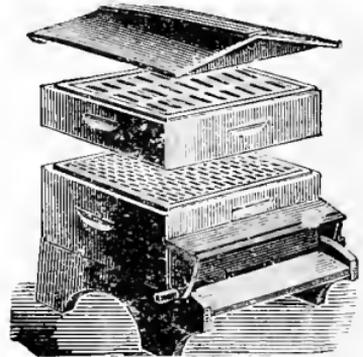
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