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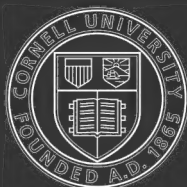
NEW YORK STATE COLLEGES
OF
AGRICULTURE AND HOME ECONOMICS

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FREEMAN HANDBOOK.

No. 1.

HONEY FOR MONEY

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PREFACE.

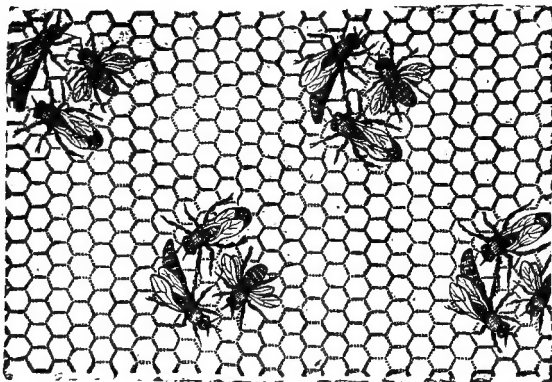
MANY years ago, when the present writer was about to take his first step in frame-hive management, he read all the available literature on the subject, without getting much practical information as to how he was to proceed in his venture. He was told to put on the super, to feed his bees, and above all to keep his stocks strong, but he was not given practical instructions for carrying out these directions. Since that time he has read and studied many works on apiculture, and he hopes he will not be considered presumptuous when he says that he thinks he has learned something as well, and as the result he ventures to express the opinion that most writers on bee-keeping err in presupposing a certain amount of knowledge of the subject on the part of their readers. This may be all very well for those who have had some little experience in working with bees, or who have a friend able to assist them, but the would-be bee-keeper who has neither is left to gather experience for himself, and this, it need hardly be said, is sometimes dearly bought.

The present work is written for those who are inexperienced in a pursuit which, when intelligently followed, is not only profitable, but which, to the business man, affords a pleasant relaxation in the early mornings and evenings.

The management of straw hives, or skeps, has not been touched on, because the quantity of honey which can be taken from them is very much smaller than from frame hives, and also because the honey is difficult to dispose of except at such prices as would scarcely pay cost of carriage to any large town in Ireland.

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B E E S .

APART from gathering and storing honey, the hive or domestic bee (*apis mellifica*) plays an important part in the economy of the farm and garden by fertilising the various flora, without which process many seeds could not be produced. Probably, very few persons are aware that the blossom of the apple, for instance, requires no less than five distinct fertilisations in order to produce a perfectly-formed fruit, the failure of one or more of which causes the apple to be formed with one or more sides, as the case may be, only partly developed. The late Charles Darwin placed the value of bees as fertilisers beyond doubt, by the following experiment.

He planted a certain number of seeds of red clover in each of two boxes, one of which was covered with wire netting fine enough to prevent the well-known humble bee from having access to the flowers. With this exception, both lots of seed were treated alike, and in the result the uncovered one produced seeds in abundance, while the other did not produce a single seed. Some years ago, the present writer took a house close to a large market garden near Dublin, and established his apiary there without attracting much attention from his neighbours. About three years after, he had a conversation with the proprietor of the garden, in the course of which the latter said that of late years he had remarked great numbers of bees working on the fruit blossoms in his garden, and as the crops of fruit were most abundant, he thought the visits of the bees must have had something to do with the increase. The seeming mystery was explained to him, and he was strongly advised to get one or two colonies of bees to render him independent of his neighbour's apiary, but the fear of stings outweighed all other considerations with him, and he elected to remain beeless.

Although the farmer should keep bees, if only for the

purpose indicated in the foregoing, he will find the production of honey by the modern system of bee-keeping sufficiently profitable to warrant his expending a small sum on hives and other appliances necessary to produce honey in the best and most saleable form, and giving a little time in order to learn how to use them to the best advantage.

Many persons suppose that to keep bees, and get a return of honey, it is necessary to have a large garden in the country; but this is a mistake. Bees will, of course, do better in a district where they are in the midst of fruit blossoms in May, and white clover in June and July, than in a city where they have to fly a long distance to reach the open fields, but bees can be kept with profit even under the unfavourable circumstances just mentioned. At one of the London bee shows some years ago, a first prize for honey was awarded to a bee-keeper whose apiary was at the rear of a house in the Strand, one of the busiest thoroughfares in London; and at the present time bees are successfully kept on a house close to Charing Cross Railway Station, almost in the centre of London. During the season of 1887, bees have been kept within a stone's throw of the Four Courts, in Dublin, and have given a very good return, all things considered. Bees do very well indeed in the suburbs of a large city, the succession of flowers in the gardens of the villas affording a constant supply of honey from early spring until autumn. Bees can be kept as profitably by the owner of ten yards of back garden as by him who owns one hundred thousand acres, so that almost every person except those who are injuriously affected by the sting of a bee, can keep bees with profit and pleasure to himself.

Of late years a very large trade has sprung up in the importation of bees from, amongst other places, Syria, Italy, Cyprus, and Carniola, in Hungary, and these, by crossing with the native black, have improved their working qualities very much, although it must be confessed that the hybrids are much more irritable than the native. This is the more curious as some of the foreign varieties, notably the Italians, or Ligurians, and Carniolans, are very gentle in a state of purity, and can be handled with almost as much impunity as flies.

Against the readiness of the bees of the present day to sting we may set the improved means of controlling and quieting them, such as were undreamt of even ten years ago. These are all the more necessary, as under the modern systems of management, bees require a good deal more manipulation than when they were kept in the old-fashioned straw-hive, in which the only variety in their somewhat uneventful existence was when at the end of the season they were placed over the brimstone pit and cruelly and wastefully smothered. Now-a-days, not only is the return of honey from a swarm of a given weight very much larger, but the price is higher, and the bees are not destroyed. Under the modern system of bee-keeping, to get the best and largest results, more time is required than formerly; but the quantity of honey produced (sometimes as much as 150lbs. from a single stock in a favourable season) is so large that the extra labour is well paid for.

Before describing the movable comb hive system, it will be well to consider the internal economy of a stock of bees, as commonly found in the common straw hive, in order to understand how the change from one to the other may be effected.



Queen.



Worker.



Drone.

FIG. 1.

A stock of bees in summer is made up of three entirely different sorts of bee, each having its own distinct duties to perform, but all working for the common weal. The first and most important is the *queen*, the only perfect female and mother of all the other bees in the hive. In appearance she is much larger than the others, and wherever she moves about the combs she is attended by about a dozen of the workers, who are constantly feeding and caressing her.

Although she is larger than the workers, her wings are much shorter than theirs, and as she carries them closed over her back she is easily distinguished from them. Next in importance come the *workers*, whose numbers may vary from 5,000 to 50,000, according to the season and the strength of the stock. The duties of the workers are to tend the hatching-brood, to gather honey and pollen, and to defend the hive against intruders. Recent investigations have shown that the worker bees are imperfectly-developed females. Last of all come the *drones*, or male bees, whose only office is to fertilise the queen. Under ordinary circumstances drones are only found in hives between the months of May and September, and their numbers vary from a few hundred to a few thousand, but the fewer of them there are, the better for the bee-keeper's pocket.

If a stock of bees in a straw hive be examined about the end of January, the bees will be seen compactly clustered between the combs, to economise heat. On the floor-board will be seen some few hundred dead bees, more or less, which have dropped out of the cluster, and it will be noticed that the hive and combs weigh much less than in the previous October, when the gross weight was probably 25lbs or thereabouts. As the days become warmer, the bees fly more frequently in search of honey and pollen, the coloured dust seen on the anthers of flowers. When honey begins to come in, the queen begins to deposit eggs in the cells of the comb which is found to be in the warmest part of the hive, the eggs being deposited in a small patch on each side of the comb, but as the weather gets warmer she enlarges the sphere of her operations until she extends them to the next comb. The bees crowd themselves on the part of the combs containing the eggs, so as to confine the heat as much as possible. On the third day after being laid, the egg hatches, and a tiny white worm or grub makes its appearance. These grubs are tended assiduously by the workers, who feed them with a mixture of honey and pollen, which they have partly digested in their own stomachs. Under this treatment the grub grows in size rapidly, until the sixth day, when it almost fills the cell, the mouth of which is then sealed or capped over by the workers with a mixture of

wax and pollen. After this, the grub gradually becomes more and more like a bee, until the twelfth day from the sealing over, and the twenty-first day from laying the egg it bites away the capping of the cell, and walks forth a perfect insect. The worker bees rapidly become worn out with the wear and tear of brood raising, and, notwithstanding the hatching of the young bees, the stock daily becomes weaker in bees until about the end of April, when the tide turns, and the population begins to increase, slowly at first, but afterwards more rapidly, and it becomes overcrowded. The bees now make preparations for emigrating, or swarming, as it is called by bee-keepers. The first step in this direction is the raising of drone brood, the eggs for this purpose being deposited by the queen in cells slightly larger than those used for worker brood. Beyond this, nothing is known of the power which enables the queen to lay drone or worker eggs at will. The drone passes through the same stages as the worker, but takes about three days longer (or twenty-four days in all) from the laying of the egg until it becomes a perfect insect. When the drones are seen taking their noisy flights, it may be taken as a proof that the bees are very well satisfied with themselves and their prospects, and that they contemplate an early departure. As the queen must go with the swarm in order to found a new colony, it becomes necessary to provide a successor, and this leads to one of the most wonderful transformations in the whole range of animated nature. The workers select a certain number of the eggs (generally those laid near the edges of the combs) laid by the queen, and enlarge the cells to about the size of the cup of an acorn. When the grub hatches, instead of being fed in the ordinary way, it is nourished with a highly concentrated food, called, for want of a better name, royal jelly. As the grub increases in size, the edges of the cup are drawn out until the eighth day, when the cell is sealed over, in which state it is not unlike the acorn of an oak in appearance. Very soon after the sealing of the queen cells, if the weather is fine, the bees make up their minds to leave the hive. On the day of their departure, a most unusual air of listlessness pervades the hive and its surroundings. The bees hang in great clusters about the hive-front

and flight-board, and very few of them are at work gathering honey, because there is no place in which to store it. Suddenly, as if by magic, the hive becomes the scene of the utmost activity, the clusters of bees melt away, the bees pour out of the entrance and fly round the hive in constantly interlacing circles, apparently in a state of the wildest excitement. By-and-by the queen comes out and takes wing, but being full of eggs, and therefore unable to fly very far, she generally alights on some tree or shrub near the hive, and the bees cluster round her, forming what bee-keepers call a swarm. When the bees are seen to cluster, they should be shaded from the sun if the weather is hot, as the close packing makes the heat intolerable and may cause them to rise again. To give the desired shade, a sheet may be thrown over the bees, or, if more convenient, an umbrella with its handle thrust between the branches will do very well. The swarm will soon be joined by all the flying bees, and, if properly shaded, may be left to itself while the altered condition of the swarmed stock is described.

CHAPTER II.

The departure of a swarm weakens a stock very much, but as the brood left by the old queen emerges at the rate of about 3,000 bees daily (the rate at which prolific queens deposit eggs), it rapidly regains its strength. About the eighth day after swarming, the most forward of the young queens is ready to leave her cell. With her powerful mandibles she bites through the cap, and as she keeps turning her body round the while, she manages to cut the cap off as cleanly as the top of an egg is cut off with a sharp knife. Having done this, she pushes her head out as if to look round her, and draws back again. This performance is repeated two or three times, after which she walks out of her cell and dips her head into the first honey cell she finds. For the first day or two, the virgin queen walks about the hive almost unnoticed by the workers. If there are other queen cells maturing, she attempts to tear them open and sting the princesses. If the season is not too far advanced, and if the bees think they can send off another swarm, a

number of them keep guard over the cells and resist the virgin queen. Finding herself foiled, she gives vent to her anger by uttering a shrill cry like "zeep, zeep," to which the princesses reply by repeating the cry in a hoarser tone. When this cry is heard, an after-swarm or cast is almost certain to issue next day, the unmated queen going with it. These after-swarms come off at all hours of the day and in all states of the weather, and generally take long flights before settling. The fact of the queen being unmated reduces their value considerably, but as the bees are all young, and have a long life of usefulness before them, they are by no means to be despised. In the case of strong stocks, other after-swarms, to the number of half-a-dozen or more, may come off during the next fortnight or so, but after that, further after-swarming is unlikely. When the bees do not wish to send off a cast, the first queen to emerge is allowed to destroy the others, which she does by tearing open the side of the cell and stinging the hapless inmate to death. About the eighth or ninth day from her leaving the cell, she plays about the hive entrance and takes short flights now and again, as if to try her wings and familiarise herself with the hive exterior so that she may know it on her return. Soon after this she takes a lofty flight to meet the drone, and remains away about twenty minutes. If she is unsuccessful she flies again and again, but if she does not mate within three weeks she makes no further attempts, and contents herself with laying eggs which produce drones only. A stock having such a queen very soon gets weak, and becomes a prey to robber bees and wasps, and finally it dies out. As a rule, the queen gets mated on her first flight, the union (which is fatal to the drone) taking place far beyond human vision. When she returns, the bees receive her with every demonstration of pleasure, and three days after she begins to lay, and never afterwards leaves the hive, except with a swarm. Occasionally queens, while on their wedding flights, get killed by birds, or other accidents happen them, in which case the stock speedily dies out, unless another queen is given to them, or they are united to another stock, having a queen.

Healthy queens live for about four years. The life of a

worker varies with the work it has to do. In summer, when brood-rearing and honey-gathering is at its height, the average duration is, probably, six weeks. Workers emerging in October generally live far into the following spring. Drones live until August or September, and about that time when honey ceases to come in they are worried out of the hive by the workers.

CHAPTER III.

The bar-frame, or movable comb hive consists of a box, measuring, inside, fourteen and a-half inches wide by nine inches deep, and from eighteen to twenty-four inches in length. The better class of hives are made with double walls, the space between being filled with wheaten chaff, cork dust, or other cheap non-conductor of heat. In the hive or box a number of frames are suspended by ears or projections at the upper corners, which rest on a ledge provided for the purpose near the upper edge of the box. These frames require to be placed accurately, so that there is a space of nearly one and a-half inches between each from centre to centre. To keep the frames at this distance apart various contrivances are used, such as metal ends, broad-shouldered top bars, and plain top bars, with a bell staple at each end at opposite sides. Each pattern has its advocates and advantages, but probably the last is the one most generally used. The top of the frames should be exactly level with the upper edge of the hive or box, and resting on the top of the frames and hive sides is the quilt, which consists of a piece of calico or ticking, and three or four thicknesses of carpet or flannel. Close to the floor of the hive is the entrance, or flight-hole, which should be about eight inches in length by about half an inch in depth. The bottom of the hive, called the floor-board, extends about six inches beyond the hive front, to form the flight-board, on which rest slides, to contract the entrance when necessary. Many hives are made so that the floor-board can be removed for cleaning by simply taking out a wedge. This arrangement is very convenient for clearing dead bees and *debris*

away at the beginning of Spring, but unless very well made and accurately fitted in its place, the disadvantages of the movable floor-board are considerable. Over the hive is the super cover and roof, which serves the twofold object of covering the surplus honey receptacles and protecting the hive from the weather. Just under the eaves of the roof there should be two holes, each of one inch in diameter, at opposite sides, so as to allow the passage of a through current of air for ventilation. Unless the place on which the hive is to stand is exceptionally dry, it should either have legs or be placed on a stand about nine inches in height. Hives placed on the ground are often destroyed by damp, which is very injurious to the bees as well. Hives should have at least three coats of light-coloured paint, made with genuine white-lead and linseed-oil, to protect them from the weather, but in many cases it will be safer to buy the hives unpainted, so as to be able to form an opinion as to the quality of the wood used in the making, but they should always be well painted before using. The price of a complete hive ranges from about twelve shillings to fifty shillings or more, according to the extras supplied with it. The difference in price between the straw and frame hives is more apparent than real, as the former are seldom used for more than a season or two, while the latter, if painted every second year or so, will last an indefinite length of time. The writer knows of a box hive in present use which was made in 1806 for the grandfather of the owner. If the bee-keeper is able to use carpenter's tools, and has spare time, it will be to his advantage to buy a good hive, with frames, and, using it as a pattern, to make others from it. In doing this, he must be very careful as to the measurements of the internal depth and breadth, as any fault in this respect may prevent the frames being interchangeable with those of other hives. A good plan is to make a board $14\frac{1}{2} \times 9 \times 1$ in. as a gauge, which should pass freely through a hive of the proper dimensions. The frames are so cheap that it will not pay to make them at home. In addition to the frames, it will be well to have two division boards for the purpose of contracting the interior of the hive, according to the requirements and size of the stock, when necessary. These boards

are sometimes called dummies, and are often made so that they can be used as feeders when desired.

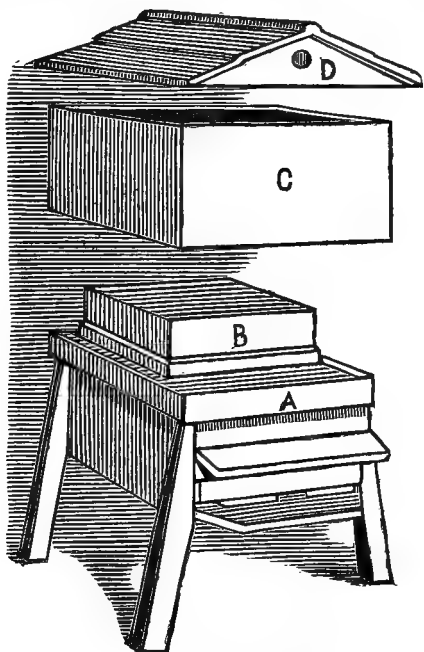


FIG. 2.—IRISH STANDARD HIVE.

A. Body of Hive. B. Crate of Sections. C. Super Cover. D. Roof.

With the view of, as far as possible, securing that hives, as sent out from the maker, shall be complete and ready for use, and also that they shall be of the correct dimensions, the Committee of the Irish Bee-keepers' Association prepared a specification of a hive, to be called the Irish Standard Hive, which they intend to have made under their inspection. Internally, its dimensions are the same as those of the hive already described, and, in addition, the specification provides that the hive shall have legs, instead of leaving the

purchaser to get a stand after he has bought the hive. A proper supply of quilting is also provided for, and the super cover is to be deep enough to take in a doubling box, with duplicate set of frames, when the hive is worked for extracted honey, or a second crate of sections when comb honey is desired. The frames are plain, or open-ended, and instead of a staple as distance-keeper, a screw-eye is screwed into the top bar, so that the distance between the frames can be regulated to the smallest fraction of an inch. The hive has an unoccupied space of about two inches at one end, into which, when manipulating, a frame can be lifted and room given to move the others as desired. This will be a great convenience to novices. Existing hives can be altered to take the Irish standard frame by placing a half-inch strip of wood along the sides, and existing frames can be made to go into the standard hive by cutting half an inch off each end of the top bar.

The general adoption of this hive will undoubtedly serve the interests of bee-keepers, as the frames of a hive in Cape Clear will be interchangeable with those of one at the Giant's Causeway. At present there is a great variety of both hives and frames, from different makers, the result of which is that the advantages of the bar-frame system are in a great measure lost.

Next in importance to the hive are the combs, which, for reasons to be given hereafter, should be straight and evenly built. It is generally believed that the wax in the combs of an ordinary-sized common hive weighs about one pound, to produce which the bees must consume between fifteen

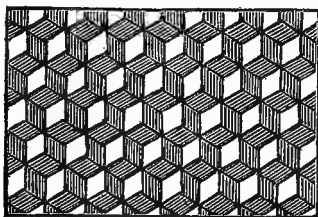


FIG. 3.—Comb Foundation, with Bases of Worker Cells, natural size

and twenty pounds of honey. As the combs are destroyed with the bees under the old system, while they last four or five years in the frame hive, the economy in the latter is apparent, more especially as a swarm of bees, having to build their own combs without assistance, will lose about three weeks of the best part of the honey-gathering season. To insure straight combs in frame hives, sheets of wax which, by being passed through suitably engraved rollers, are embossed with the bases of worker cells, are fixed in the frames by means of the saw groove made in the top bar for the purpose. Most frame hives are sent out with a strip of foundation, about one inch in depth, called a starter, fixed in the frames, but this is not sufficient for the object in view, as the bees will often build the remainder of the comb with drone cells, and this will invariably be the case when casts, or after-swarms, are hived on frames having only starters. To understand the very great loss caused by having an excess of drone comb in the hive, it is necessary to remember that a square inch of comb gives space for rearing fifty-six worker bees, while the same area will give space for rearing about forty-four drones, so that the substitution of a single square inch of drone for worker comb not only deprives the bee-keeper of the services of fifty-six workers, or producers, every three weeks during the season, but it saddles him with the loss caused by rearing forty-four drones, or consumers, every month during the same period. If, instead of a single inch of drone comb, there are several hundred square inches in the hive, the loss will, as a matter of course, be in proportion. Some drone comb is absolutely necessary in every stock of bees, but the less of it there is the better for the bee-keeper's return of honey. The price of foundation varies from 2s. per lb. for a single pound to 1s. 10d., or less, for ten to twenty pounds. About one and a-half pounds are required to fill eleven frames, the number usually required in each stock. The operation of fixing the foundation in the frames is very simple. A piece of board about eighteen inches in length has a couple of wire nails driven through it at a quarter-inch distance from each other, so that their points project about three-eighths of an inch. The wood is placed on a table, the heads of the nails

being down, and the frame is forced down on the points of the nails, so as to slightly open the saw groove in the top bar. By giving the frame a very slight twist the groove is opened sufficiently to admit the edge of the sheet of foundation, which is firmly held when the frame is lifted off. Frames of foundation should be kept in a spare hive when not required for use, as the foundation is very easily injured

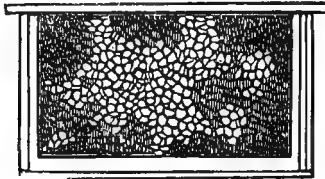


FIG. 4.—Frame, with Sheet of Comb Foundation.

About a year since, a patent was taken out for a very ingenious plan for fixing comb foundation securely in the frames. The top bar, which is half an inch thick, has two wide saw grooves along its under side, one being in the middle. Into this groove the edge of the foundation is inserted, and into the other a narrow wedge is forced with the tips of the fingers. A very slight pressure on the wedge is sufficient to hold the sheet of foundation so firmly that it cannot be drawn out without injury.

An appliance of great use to the bee-keeper is the *smoker*, which is used in quieting bees. It consists of a small bellows, worked by the hand, on which is mounted a tin tube about six inches long and two inches in diameter, over which is placed a conical tube, which acts as a chimney. The smoker is loosely filled with pieces of dry brown paper, or a small piece of clean sacking on which a lighted vesuvian is dropped. The chimney is put on and the bellows worked for a few seconds, when dense smoke will issue from the

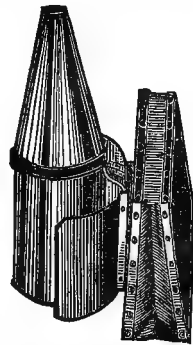


FIG. 5.—Bingham Smoker.

chimney. This simple appliance gives the bee-keeper great control over his bees. Its power will be very much increased with vicious bees if a few drops of creosote are put on the sacking or other fuel. The best smoker is the Bingham pattern, which can be bought from any hive-dealer for about four shillings. The Clark smoker is preferred by some persons, but it is liable to go out, and few things are more disconcerting to the bee-keeper when he is attacked than to find that his only defence has failed him when he most required it.

A few years ago comb honey was never seen in any grocer's shop, because the waste and consequent loss in dividing made it unprofitable. Now, there is not a first-class grocer's shop in any large town in which honey is not sold in large quantities during the season, at prices which are fairly profitable to both producer and seller. Comb honey is now

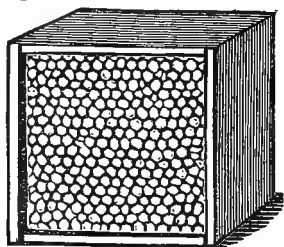


FIG. 6.—1lb. Section filled with Comb.

sold in small frames about two inches wide, called sections, each of which holds one or more pounds of honey, according

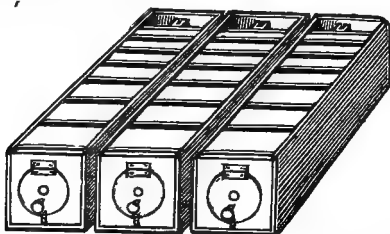


FIG. 7.—Benthall Crate, holding Twenty-one 1lb. Sections.

to size. Sections to hold one pound of honey measure $4\frac{1}{4} \times 4\frac{1}{4}$ inches; and those to hold two pounds, $6\frac{1}{4} \times 5\frac{1}{4}$ inches, both sizes being the same width, viz., two inches. A section rack or crate is something like a drawer, in which seven sections are closely packed together. The lower side of the sections is a quarter inch narrower than the sides, so as to admit the bees, and the bottom of the (supposed) drawer is cut away, so that the sections rest on a narrow strip of wood at the sides. As in the case of the frames, comb foundation, but of a special make, is required to guide the bees in filling the sections with comb. This is called "super" foundation; and the best make has flat-bottomed worker cells impressed on it. Opinions differ as to the quantity which should be fixed in each section, but a strip about four inches in length by two inches in depth will be the best for all purposes. It is sold in sheets about twelve by eight inches, about twenty of which go to the pound. It should be cut into pieces the proper size by means of a sharp-pointed knife and straight-edge. To fix it in its place the section is placed on the table, top downward, and on the inside the piece of foundation is laid flat. A smooth piece of bone or metal, such as the handle of a knife or spoon, is then dipped in very thin starch and rubbed hard on the foundation, so as to press it into the wood, to which it will adhere very firmly. It is then bent over at right angles, and the section is placed in the crate, the side on which the foundation is fixed being the top.

One-pound sections of honey sell by retail for about one shilling each, and the producer will have little difficulty in selling them in quantity for between eightpence and tenpence each in any large town, the price varying with supply.

The best sections, as the cases or boxes to hold the honey are called, are made in the United States. They are sent over as flat strips of wood, seventeen inches long, across

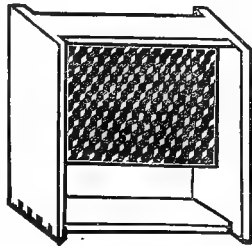


FIG. —11b. Section (folded) with Comb Foundation.

which are cut three grooves. The wood is bent or folded at these grooves, and the operation of putting them together



FIG. 9.—1lb. Section (flat).

is so simple that it is impossible to make any mistake in it. The price charged for one pound sections is twenty-two shillings a thousand, or about half-a-crown a hundred.

CHAPTER IV.

Having described the principal appliances required in modern bee-keeping, the proper way to use them must now be considered, the first step being to get the hive ready for the swarm.

The place on which the hive is to stand should be level and free from weeds. The front of the hive may face any direction, except the east, as the cold, drying winds from that quarter are not good for bees. The frames must be in their proper positions, and close up to each other. The feeder is filled with syrup, made by pouring a quart of boiling water on three pounds of sugar, and the quilt is laid evenly over the frames, care being taken not to leave any opening by which the bees could pass into the super cover. The entrance slides are opened to the fullest extent, or, if the hive has a movable floorboard, it is let down in front about an inch. On a box or large flower-pot, in front of the hive, is placed a light board, about a yard square, so that its edge comes close to the edge of the floorboard, the junction being covered by a newspaper or a piece of calico, kept in its position by means of stones. To protect the operator, a veil made in the form of a bottomless bag of a yard of black silk net (which will cost about ninepence), with a piece of elastic through a hem at one end, will be required. This goes round the crown of the hat, and the lower part is tucked under the coat collar. This arrangement will effectually

protect the face and neck from stings. A further protection will be to turn the upper parts of the socks over the ends of the trousers. If the bee-keeper is very nervous, he had better protect his hands by means of a double pair of gloves, but a much better plan will be to pour three or four drops of oil of wintergreen into the palm of one hand and rub it well over both. This substance exercises some mysterious influence on bees, and generally prevents the most vicious from attempting to sting. It can be bought in any first-class dispensing chemist's for about one shilling an ounce, and half-an-ounce will suffice for all the operations required with half-a-dozen hives in the course of the season. The next step is to take the swarm from the tree or shrub on which it is supposed to have clustered on issuing from the parent stock. The bee-keeper takes a straw hive, which he holds with one hand under the cluster, while with the other he catches hold of the branch, to which he gives a rapid shake, first down and then up, the effect of which will be to cause the greater part of the bees to fall into the hive, which is then placed on the ground and turned over, its front edge being propped up with a piece of wood or a stone. If the bees in the part of the cluster left on the branch are seen to run about uneasily and then fly off, it may be taken for granted that the queen has been shaken into the hive, where she will very soon be joined by all the flying bees. If, on the contrary, the bees are seen to leave the hive and join those left on the branch, it is a proof that the queen is there, and in this case the operation must be performed again with better hope of success. Sometimes the swarm clusters on the trunk of a tree, and when this happens the hive must be held over them while they are driven into it by means of the smoker, or the hive may be held under the bees while they are swept into it with a goosewing. If the swarm clusters near the ground, on a head of cabbage for instance, the hive can be placed over them and they will ascend to it. If the swarm has been got into the hive, the next thing, after the bees are all in, is to confine them while they are carried to the frame hive, and as the first thing they do on going into the straw hive is to cluster from the top, this is an easy matter. A piece of straining canvas, about

a yard square, is spread on the ground, and the straw hive and clustering bees (care being taken not to shake them out) are then gently lifted over it, the corners are tied over the top, a piece of cord tied round all, and the swarm is securely packed for a journey by rail, or, as in this case, for putting into a frame hive which is supposed to be waiting for its new tenants. If the straw hive has not been shaken so as to break the cluster, the easiest way will be to place it on the swarming-board as far as possible from the frame hive. The canvas is untied and pulled away, the straw hive is lifted and the swarm is thrown out with a rapid, jerk on the board, on which the bees spread out in all directions as if undecided what to do. About half-a-dozen of them are lifted with a spoon or swept with a feather into the hive entrance, into which they pass with a loud hum, which is speedily taken up by the others, and in a few seconds every head is turned towards the new abode. If the hive entrance is too small, as is very often the case, it will require clearing with a feather occasionally as the bees go in, so as to keep them from clustering on the front, but if the hive has a movable floorboard which has been lowered in front, the bees may safely be left to hive themselves after a few are seen to enter. In the evening the swarming board can be taken away, the floorboard can be raised into its place by means of the wedge, and the swarm may be said to have started housekeeping in its new home. If the weather is unfavourable for honey gathering, the feeder must be kept filled with syrup. Indeed, it is a safe rule to give food to bees whenever they will take it, which will only be when they are unable to gather it in the fields.

Two or three days after hiving, the swarm may be looked at to see how the work progresses, and, in doing this, the novice may be said to take his first step in advanced bee-keeping. The smoker must be filled and lighted as before directed, the veil must be put on, and the oil of wintergreen rubbed on the hands. The cover is taken off the hive, a corner of the quilt is raised, and one or two puffs of smoke sent in. After waiting a few seconds, part of the quilt may be turned back, so as to expose one or more of the frames to view, the division-board is moved back a little, so as to

make room for the removal of the first frame, which is then caught between the finger and thumb at each end of the top bar, and lifted out. Probably, it will be found that the foundation has not been worked out (or touched by the bees since hiving. This is an indication that the swarm was too small to cover all the frames, and it will be well to put this and other frames, if any, on which the bees are not working, outside the division-board, at the same time moving the latter up so as to contract the hive, as bees invariably work better when there is no unoccupied space in the hive. Other frames are taken out and examined, and it will be noticed that those near the middle of the hive have the foundation worked out into perfect combs. On looking closely into the cells, tiny white eggs, about the size of a comma (,) will be seen, and this is a proof that the queen is present in the hive. During the examination care must be taken not to expose the tender combs to the wind, lest it blow them out of the frames. A few weeks later they will be able to bear tolerably rough usage without injury. If the bees are inclined to be troublesome during the examination, an occasional puff of smoke will keep them in subjection. Before closing the hive care must be taken to have the frames close together; the bottom layer of the quilt must then be placed in position, and a minute or two allowed for stray bees to get from under it, after which the rest of the quilt can be replaced, and the hive closed. If the swarm has been a good one, of about four pounds of bees, and has issued a few days before the end of May, it should have the hive filled with combs and brood by the middle of June, when the white clover, the queen of honey-yielding plants, comes into full bloom, and this, subject to the special circumstances of each stock, is the proper time to place the sections on the frames. This operation, called supering, is one that should be performed at the right time to ensure success. If the sections are put on too soon, or when the weather is cold, the interior of the hive is cooled, and the stock is thrown back. If it is delayed too long, not only will part of the gathering season have passed over, but the bees, becoming overcrowded, will have made preparations for swarming by raising queen cells; and swarm they

will, in spite of anything the bee-keeper can do to prevent it. To hit on the proper time for supering, the hive should be looked at every two or three days, until the bees build little bits of white-looking comb about the edges of the top bars, and then additional room should be given on the morning of the next day, if fine. If the hive is not less than twenty inches long inside, sections may be very conveniently placed in the body of the hive, as shown in Fig. 10, which represents

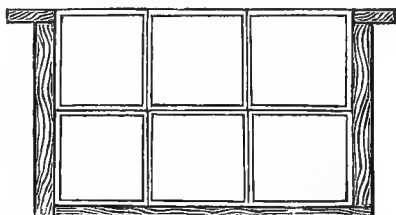


FIG. 10.—Section Frame with six 1lb. Sections.

a section frame holding six one-pound sections. Between the brood frames and the one containing the sections, a diaphragm of zinc, having perforations exactly $\frac{5}{32}$ of an inch wide, is hung. This is called a queen excluder, and its object is to keep the queen out of the sections, lest she would deposit eggs in them, and spoil them for sale. The worker bees are able to pass freely through openings of this width, but the queen, having a larger body, cannot, and hence the name of excluder. Although bees work more constantly during unsettled weather in sections placed in frames than when placed in crates over the frames, the comb is more rapidly sealed over in the latter, which is the arrangement generally adopted. To the beginner, placing supers in position seems a very difficult operation, but by attending to the following instructions, it can be performed with the greatest ease and certainty. The first thing is to remove the top layers of the quilt, and to place the section crate on the first layer, in order to find out whether it is large enough to completely cover the frames, so that neither bees nor heat can pass out. If it is, all is well; but if not, as is sometimes the case when the hive and super are not supplied by the same maker, slips

of wood must be prepared of the proper size to close all open or uncovered spaces. All being in readiness, and not forgetting the smoker, veil, or oil of wintergreen, a puff of smoke is given as before, and the operator, standing so that the frame-ends run towards him, removes the quilt, and before the bees have made up their minds what steps to take, he gently slides the super along the top bars into its position, and places the slips of wood, if any are required, close up to it, after which the quilt is placed on the super to prevent the escape of heat, and the hive is closed. If the section frame just described is used, it will be found a very good plan, when the bees have started working in the sections, to take them, with the adhering bees, and put them into the super crate, empty sections being placed in the frame as before. Supering will delay, if it does not entirely prevent, swarming; but in warm weather, and with a very prolific queen, the bees will very soon require more room, which can be given by placing another section-crate either under or over the first one. Sometimes the bees will swarm before the sections are finished off, and where this happens a little management is necessary to get them completed. A second hive is got ready, and placed where it is to remain permanently. The super is taken off the parent stock, and placed on a board, while the frames of comb and brood, with the bees, are transferred to the new hive; which is then closed as usual. A sufficient number of frames filled with comb foundation are placed in the old hive, the super is placed on the frames as before, and the swarm is hived back. By this means further swarming is prevented, and the completion of the sections is pushed forward, as, under favourable circumstances, the bees in a newly-hived swarm work with more energy than at any other time. In order to stand the rough handling incidental to a railway journey, sections should have the comb fully built out, and joined to the wood at all sides. This object can be attained by lifting the sections out of the crate just after the bees have begun capping the honey, and putting them back, top downwards. If this inverting is done too soon, the combs, not being sufficiently worked out, are apt to turn over with the heat and weight of the bees and honey. To bring top

prices, sections should have the comb on each side perfectly even and flat, and the sealing, or capping, of the cells should be quite white. To secure the first, slips of tin, called separators, are placed between the sections, and the bees are compelled to leave space for themselves to pass, and work between the face of the comb and the tin. If sections are left long on the hive after sealing, they get discoloured by the constant running of the bees over the face of the comb, but the trouble of removing single sections, almost at the moment of completion, is so great as to make it unprofitable, unless there is some special object in view. Most bee-keepers wait until all the sections in the crate are completed or sealed, when all are taken off together, and, if not too late in the season, another crate is placed on the hive. The removal of a crate of sections is thus effected: On a fine day, the cover of the hive is raised, and a dinner-knife is passed under the crate to loosen it from the frames as much as possible. The crate is then caught with both hands, and slightly twisted round, but not enough to permit the escape of bees. The quilt is then lifted off, and, by means of a few vigorous puffs of smoke sent in between the tops of the sections, nearly every bee is driven out of them down into the hive. The crate can then be lifted off, and it should be covered with a cloth to protect it from wasps or robbing bees. If it is not intended to place any more sections on the hive the quilt should be laid over the frames without delay, and the hive can be closed.

CHAPTER V.

Some bee-keepers think it more profitable to produce extracted honey—that is, honey without comb—than section honey, and some good reasons can be given in support of this view. Section honey, undoubtedly, brings a much higher price, and is much more attractive to the eye, than extracted honey. On the other hand, it is much more troublesome to produce, and is more easily injured when sending to market. Extracted honey can be forwarded from place to place in large jars with the least possible risk

of injury, while the quantity which can be taken from a hive is at least one-half greater than of section or comb honey, by reason of the bees being saved the labour of comb building, and, therefore, having nothing to do but gather honey. For the production of extracted honey to the best advantage, an appliance called a honey extractor is required, and the hive differs considerably from the one last described. The extractor consists of a strong tin cylinder, about two feet in height, and twenty inches in diameter. In the cylinder are two flat cages, each large enough to hold a frame of comb, which are attached to and revolve with a vertical spindle, the lower end of which rests on the bottom of the cylinder, while on the top there is fixed a small toothed wheel, which gears into a larger wheel, to which a handle is attached. At the bottom of the cylinder there is a treacle tap, to let the honey out. A hive intended for extracting is usually made to hold ten frames of the ordinary size, but instead of the super cover and roof, a second story, similar in every respect, except that it has no floor-board, is placed over the first. Sometimes, in very good districts, a third story is used, but for most purposes a two-storied hive will do very well. To work this hive for extracted honey, the lower story is tenanted in the ordinary way with a stock of bees, with the necessary combs. About the middle of June the quilt is removed, and the second story is placed on the first one. The combs of brood are then taken from a second stock (the bees and queen being shaken off the combs back into their own hive) and placed in the upper story, so that the hive contains twenty frames of brood. As the maturing bees emerge from the two sets of combs, the hive soon becomes very strong, and the honey, which is brought in rapidly, is stored in the upper set of combs. About a fortnight later the combs may be examined, when it will be found that some of them are clear of brood and are filled with honey, some of which is capped or sealed over. When this capping extends about two-thirds the depth of the comb, the honey may be considered ripe, and fit for extracting. In an apiary of four or five stocks, about eight or ten such combs might be selected, and extracted from every second day or so for three weeks, and the weight

of honey taken would be very great. To take out the combs, the hive is opened in the usual way, the comb is lifted out, and with one or two jerks nearly every bee is shaken back to the hive, the few remaining bees being brushed off with a feather. The combs are then brought indoors, and prepared for the extractor by shaving the cappings off both sides, by means of a thin-bladed sharp knife, after which a



FIG. 11.—Bingham Honey Knife

comb is placed in each cage, and the handle is rapidly turned for a few seconds. A little experience will enable the operator to tell, by the decreasing resistance, when the honey is all thrown out. The combs are then turned, and the other side is cleared of honey in like manner. In using the extractor, care must be taken that the cages revolve so that the lower part of the comb is first, otherwise it will be difficult to get all the honey out of the cells. A good way to dispose of the extracted combs will be by inserting one, or, perhaps, two, in a strong stock, making room for them by taking out a similar number of brood frames, which are placed in the upper story of the extracting hive. The honey is taken from the extractor by means of the treacle tap, and it will be all the better if it is kept in a deep vessel for four or five days before being put up for sale, to allow particles of wax, pollen, and other *debris*, to rise to the top, where it can easily be skimmed off. By doing this the honey becomes very much clearer, and it sells for a considerably higher price than if bottled just as it runs from the extractor. Hives worked on the extracting, or doubling, system should, in a good season, yield about 120 pounds of pure honey, and a swarm of bees, if hived on full sheets of comb foundation, or, better still, on empty combs, should give some honey over and above what they will require for winter store.

CHAPTER VI.

In no respect is the contrast between the old and new systems of bee-keeping more striking than in the relation of each to the bees'-wax, which is one of the products of the apiary. Formerly the bees were obliged to secrete all the wax in the hive, and at the end of the season a great part, if not all, of this wax was extracted ; but there was not much demand for it. Now it might almost be said that the bees have their combs ready built for them, so convenient are the sheets of comb foundation, and so little trouble is there in drawing them out into combs. Shortly stated, the case is that formerly wax was produced in considerable quantities, while there was very little demand for it, while with the movable comb system the quantity produced is very small, while the demand for wax for making foundation is very great, so that it has to be largely imported, both here and in the United States, from Africa, Mauritius, Jamaica, and many other places.

Although good combs last for several seasons, there will always be more or less odds and ends from which the wax should be extracted, not only because it is a marketable commodity, but also to avoid giving harbour to the wax moth, an insect which sometimes does a good deal of harm to combs containing pollen. One of the best means of extracting wax in a small apiary is the Gerster extractor, which costs about fifteen shillings. It consists of a box of perforated zinc (in which the combs to be operated on are placed), which fits into a casing of tin, which in turn fits into a vessel containing water. The apparatus is placed over a brisk fire, and the steam from the boiling water melts the wax, which runs through the perforated zinc, and out of a nozzle at the side. The objection to this extractor is its slowness, but it is very much cleaner to use than any other. A very good plan, where a copper is available, is to cover a hoop with straining canvas, and place it in the copper with the combs under it. The copper is filled with water, and the fire is lighted under it. As the wax melts it passes through the canvas, and floats on the surface of the water.

from whence it can be either skimmed when hot, or lifted in a solid cake when cold.

In extracting wax, care must be taken not to allow it to get into the fire, or a conflagration may be the result.

CHAPTER VII.

A spell of bad weather will often make it necessary to feed bees in order to save them from starvation, and very frequently, at the end of the season, they are stripped so closely of their honey that artificial food is necessary to tide them over the winter. The best and safest way to give food is by means of the dummy feeder already referred to, but in case it is not available, the pan feeder will do very well. In order to use the latter, a hole must be cut through the quilt about four inches from the centre so that it can be closed when desired by simply reversing one of the layers of carpet. If, owing to bad weather or any other cause, the bees are for any considerable time unable to gather honey during the spring or summer months, the queen stops laying and the production of brood is of course checked. Later on, the bees devour the food placed in the cells with the grubs or larvæ, and the maturing bees are torn from their cells and thrown out of the hive, often in sufficient numbers to form a considerable heap under the flightboard. When this is seen, food must be given at once, but, in any case, the stock will have been thrown back for weeks, if not for the entire season. For use in spring and summer, food can be prepared by pouring a quart of boiling water on three pounds of good white sugar, so as to make a thin syrup. For autumn use the food must be made very much thicker by boiling the syrup so as to evaporate as much water as possible from it. To provision a stock for the winter (supposing there is no other food in the hive) about twenty-five pounds of food are required, which can be prepared by boiling sixteen pounds of sugar in five quarts of water, adding a teaspoonful of salt while boiling. Many ~~bee-keepers~~ provision their stocks for winter with a specially-prepared sugar-barley, known in the trade as plain sugar-barley, which costs about sixpence a

pound. A good way to give it is in a frame, which can be sent to the sugar-boilers to be filled while the sugar-barley is hot. When cool, it is hung in the hive next the outside comb, and the bees will soon clear out the food and store it in the combs. To give a stock sufficient food in this way, three frames of sugar-barley will be required, and this supply should last well into the following spring. This is the safest and least troublesome way to provision a stock of bees for the winter.

All feeding should be over by the first week in October at latest, so that the bees can go into winter quarters without any delay, if rendered necessary by cold weather. The first thing is to reduce the size of the hive by lifting out an empty comb (great care must be taken to see that there is no brood in it), and placing it outside the front division-board, the latter being moved up close to the remaining combs, so as to fill the vacant space. The bees, if any, on the empty frame, will soon join those in the hive, and carry in the honey with them. Other frames can be lifted out in this way until there are only seven or eight combs, if the stock is a very strong one, and five or six if an average one, between the division-boards. The hive is contracted in this way so that there will be no space in the hive in addition to that occupied by the bees. The advantages of this are, that the bees will be warmer, and consequently will consume less honey, and also the combs will not be liable to mildew, as they are when not covered with bees. If two or three thicknesses of old flannel or blanket are now placed over the quilt, and if the roof is waterproof, the bees will safely withstand the severest winter experienced in these latitudes, and beyond clearing the hive of dead bees in February or March, they will not require much attention until the following April.

CHAPTER VIII.

Some bee-keepers are so wedded to the barbarous custom of smothering their bees that it is mere waste of time to tell them of the more profitable bar-frame system, but they may

be so far induced to fall in with modern ideas as to allow their bees to be driven, instead of smothering them. The bees of two or three straw hives, if united and placed in a frame hive, on empty combs, or full sheets of comb foundation, and given about 20 lbs. of sugar in syrup, will make a capital stock for the following season, at a very small cost. In England, it is quite common for experts to go round, about the end of August, and drive those condemned bees, as they are called, and afterwards sell them at 1s. 6d. per pound to bee-keepers who wish to build up new stocks, or to strengthen existing stocks with them. The operation of driving bees is very simple, and only requires a little care to make failure impossible. The requisites are an empty straw hive and a piece of straining canvas, with twine, for each lot of bees to be driven, an extra hive, a couple of kitchen skewers, and the indispensable smoker. On arriving at the scene of operations, the first thing is to give the stock to be driven a puff or two of smoke, and a few taps with the open hand, to alarm the bees. A stable-bucket is now placed near the wall, in a quiet corner, and the stock is lifted off its stand, and put top down in the bucket, one of the empty hives being placed on the stand to receive the flying bees. Another hive is put over the stock, so as to look like a partly-opened watch, and it is fixed in that position with the skewers, care being taken that what may be called the hinge of the watch is at one of the sides of the stock hive towards which the combs run. A gentle continuous tapping on the sides of the stock hive will now cause the bees to move, slowly at first, up to the empty hive, from the top of which they will cluster. Any bees seen hiding between the combs can be set running by the smoker, and in about ten minutes all but a few stragglers will have been driven out. The hive and clustering bees must now be placed on the old stand for a few minutes, to receive the bees from the decoy hive, after which it can be packed as already described. The treatment of driven bees after hiving is similar to that of swarms, except that they require a liberal allowance of syrup to provision them for the winter. If not taken a distance of at least a mile from the old stand, many of them will fly back, and get lost, and thus place the newly-formed stock

at a serious disadvantage. Driven bees will be materially helped by giving them a comb of brood taken from one of the other hives, but the bee-keeper must be certain that the latter is able to spare the comb without injury to its own prospects.

CHAPTER IX.

Where the bees are kept within view of the house, so as to be under something like constant supervision, it is better to allow them to swarm naturally, and limit the increase to one, or, at most, two swarms, if the season is a very good one, from each stock. It often happens, however, that a stock shows signs of an intention to swarm just at a time when all available help is wanted in the fields, and when this is the case the bee-keeper will do well to take the matter into his own hands and swarm his bees artificially, subject to certain rules to be given further on. To make an artificial swarm is a very simple operation, as the following illustrations will show. Suppose the bee-keeper has only one stock in a straw hive which he wishes to swarm, he takes it off its stand and puts a decoy hive in its place; the bees are driven from it as before described, and the driven swarm and the stock hive, with combs, are placed, one at each side of the old stand, so that they are about two feet apart. Many of the returning bees will enter the stock hive and raise a queen, and as the bees grow stronger daily by the hatching of the brood left by the old queen (now with the swarm) the hive will very soon be as strong as before. The bees forming the artificial swarm will set to work and fill the hive with comb, as would a natural one. Immediately after making the swarm, should it be found that either hive gets more than a fair share of the flying bees, that hive must be moved a few inches farther away from, and the other a few inches nearer to, the old stand, but this should be done by the second or third day after making the swarm, as after that time the bees from one hive will not be allowed to enter the other. Again, suppose the bee-keeper has two stocks in straw hives, and wishes to make one strong swarm from them, he takes up No. 1 and drives every bee from it and places the swarm on the old

stand, he then takes up No. 2, moves it to a new stand several feet away from the old one, and places No. 1 on the stand on which No. 2 stood. The flying bees from No. 2 will enter No. 1, raise a queen, and carry on the work of the hive, which will be as strong as ever in the course of a few days. In this case it will be seen that one hive supplies the bees and the other the combs to make up a stock. If the bee-keeper desires to make a swarm from a frame hive, he opens it and looks at frame after frame until he finds the queen, when he places the comb on which she is outside the division-board, to make sure that she will not wander about the hive. All the other combs are then placed in a second frame hive a few feet distant, which is then covered up and closed. The stock hive is then filled up with frames of comb foundation; the comb on which the queen is is placed in the middle, the hive is closed, and the swarm is made. To make a swarm from a frame hive and put it in a straw one, the frame hive is moved away and a board about two feet square is placed on its stand. The straw hive is placed on the board with its front edge propped up by a stone. The frame hive is opened and the combs looked over for the queen. When found, she is caught by the wings and taken to the straw hive and allowed to run in. If the swarm is required at once, several frames of comb are taken out and the bees shaken off on to the board in front of the straw hive, into which they will run and join the queen. If the swarm is for sale it should be packed in the evening and the frame hive returned to its stand. The foregoing cases will show the general principles of artificial swarming, but the proceeding can be varied in an almost endless variety of ways to suit the circumstances of particular cases.

Artificial swarms should never be made during bad weather, or at a time when natural swarming would be unseasonable, or when drones are not flying to fertilize the queen, which will be raised in the swarmed stock unless a fertile queen can be given to it.

CHAPTER X.

As a rule the queen, in a stock from which a swarm has issued, hatches out all right, and in due time, generally about a fortnight, she becomes a mother, and pursues the even tenor of her way to the end of her four or five years of life; but now and again the dull routine is broken by calamity. Sometimes there may be only one queen cell in the hive, and it fails to hatch. Sometimes it hatches, the queen sets out on her wedding flight, and gets killed and eaten by a bird, or she may enter the wrong hive, and get stung to death. In any one of these cases, the stock becomes queenless, and, unless there are eggs or larvæ not more than three days old in the hive, from which to raise another queen, the stock will certainly die out if steps are not taken to prevent it. A comb on which there are queen cells may be taken from another hive, and given to them. But, as the introduction of new blood is as advantageous with bees as it is with the higher animals, the bee-keeper will do well to order a queen from some hive-dealer living at a distance, and introduce her to the queenless stock. The price of a queen varies with the season, being highest in April, and lowest in October. Common black queens are worth about two shillings each during the whole season; Ligurian and Carniolan queens, about seven or eight shillings in May; and Cyprian and Holy Land queens, about fifteen shillings in April or May. The stock to which a foreign queen is introduced will, at the end of two or three months, be of the same race as the queen, as all the old bees will have died out by that time, and the progeny of the new queen will have taken their places. The Ligurian bees come from Italy, and are very gentle while their hive is under examination, are hardy and prolific, but are very poor honey-gatherers. Carniolans come from Hungary, and are very gentle, prolific, and fairly good at gathering honey. Both Holy Land and Cyprian bees are very handsome to look at, hardy, prolific, and industrious, but so vicious and spiteful that very few bee-keepers care to keep them. Apart, however, from the merits of any of the races or varieties when pure, the bee-keeper will do well to

have at least one purely-mated foreign queen in his apiary, as the working qualities of all the bees in the neighbourhood will be improved by the crossing which will result, even in the first season. On the Continent there are many apiaries exclusively devoted to the breeding of queens, and a large trade is done in exporting them to England and the United States of America. They are usually sent off in small boxes, about six inches square, each box containing one, and sometimes two, small frames of comb, with the queen and a few dozen bees as attendants.

The first essential to the safe introduction of a queen is the queenlessness of the stock to which she is to be introduced. One way to ensure this is to remove the reigning queen, and another is to take a swarm from the stock. If the combs of a stock do not contain brood or eggs at any time between March and September, it is almost certainly queenless, and the question can be settled beyond doubt by giving the suspected stock a comb containing eggs and brood taken from another hive. If queenless, the bees will set to work raising queen cells within twenty-four hours. One of the safest methods of queen introduction is the following, the only appliance necessary being a pipe-cover queen cage, which costs about fourpence, and a small piece of card. The box containing the queen is brought to a quiet corner of the garden, and the cover is prized off by passing the blade of a knife under it. While the bees are running and flying about, a sharp look-out must be kept for the queen. If she is seen to fly, no apprehension need be felt, as she will surely return to the box, when she must be gently caught by the wings, and put under the cage, which should be standing on the card. About a dozen of the workers are put in with her, after which the queenless hive is opened, a comb is lifted out, and the bees are shaken off. The cage, with card under it, is now placed on the comb on some unsealed honey, the card is slowly withdrawn, and the cage is screwed round until it cuts its way into the middle of the comb, which is then returned to the hive. Twenty-four hours after, the comb should be lifted out, and the behaviour of the bees round the cage noted. If they make an angry, hissing noise, and bite at the imprisoned bees as

they run about the cage, it will be unsafe to release the queen, and the comb had better be returned for another twenty-four hours, at the end of which time, if the bees still appear hostile, it may safely be inferred that the stock has a queen, in which case it will be useless to attempt to introduce another. As a rule, at the end of the first twenty-four hours, the bees are well disposed towards the new queen, and the cage may be lifted to allow her to walk out. If the bees feed her, and appear to caress her as she walks about the comb, it may be returned to the hive, and the latter closed, and an examination made a day or two later will generally show that she has begun to lay. This plan of introduction has hitherto been the favourite one with veteran bee-keepers; but quite lately a new method has been discovered by Mr. S. Simmins, which bids fair to revolutionize the operation. To ensure success with this plan, Mr. Simmins says—(1) the queen must be kept alone for not less than thirty minutes, previous to introduction; (2) she must have no food meanwhile; and (3) she must be introduced by lamplight (or in the evening). The practical details of this plan are the following:—The box is opened in the evening; the queen is caught and put by herself under a tumbler or the pipe-cover cage. At the end of thirty minutes a corner of the quilt is lifted, and the bees are driven back with a few strong puffs of smoke. The queen is now taken by the wings, put under the corner of the quilt, which is then turned down, the hive is closed, and the operation is over. This plan of introduction seems to be absolutely safe and certain in its operation, while with any of the others, even in the hands of practised bee-keepers, a certain, although small, percentage of queens is lost.

CHAPTER XI.

One of the chief things the bee-keeper has to guard against in spring and autumn is robbing of one stock by the bees of another. This is generally brought on by spilling syrup or honey when feeding. The bees set to work to carry the food into their hives, and when it is gone their baffled rage

knows no bounds, and they will sting any and every moving thing within a reasonable distance of their hives. In the search for more food they try the entrances of all the hives; the weakest is attacked, and if not protected without delay, the queen and bees are killed, and the honey is carried off. The robbing soon becomes general, and, if allowed to continue, an astounding scene of confusion ensues. The proprietor of apiary of twenty-two stocks, in Cambridgeshire, relates that recently one of his weak stocks was attacked and robbed, and the robbing continued for several days, at the end of which one stock alone survived. If signs of robbing are seen, the entrance should be contracted to about half an inch, and outside of, and leading up to it, two slips of wood a quarter-inch in thickness, should be placed, with a piece of slate over them, so as to form a sort of tunnel, through which robbers seldom care to pass, as if not knowing what resistance might be met at the other end. To make this tunnel part and parcel of the hive, some makers fit their hives with the Cheshire zig-zag entrance-slides, by means of which the entrance can in an instant be contracted to a zig-zag tunnel, which inspires the defenders with great confidence, and enables them to repel any attack, provided it has not been going on too long, in which case it may be necessary to cover the entrance with perforated zinc, which should be removed in the evening just after the bees have ceased flying; and if a further attack is feared, it can be replaced in the morning just before the bees begin to fly for the day. As a rule, robber bees cease to attack a hive almost directly they find that it is resolutely defended. The signs of robbing are—a great confusion about the flight-board, the bees on coming out of the hive, instead of taking wing at once, walk up to the hive front, as if to get a better start, and a heap, small or large, as the case may be, of dead and dying bees on the ground in front of the hive. When these are noticed, prompt action alone can save the stock.

CHAPTER XII.

In handling bees, care should be taken not to kill or injure a single bee unnecessarily, because when one is crushed it gives off an odour which the other bees can smell at a considerable distance, and which enrages them. All the bee-keeper's motions must be steady, and he should carefully avoid breathing on the bees or combs. When working at hives, the smoker should invariably be lighted and close at hand, in case of emergencies, and to give the beginner confidence he should be thoroughly protected against stings. The ends of the trousers should have the tops of the socks turned over them, the face and neck should be covered with the veil, and the hands with a pair of sting-proof gloves, consisting of a pair of knitted cotton, and over them a pair of common thread gloves. The pair complete will cost about half-a-crown. These gloves will be much pleasanter to work with in hot weather, if, after putting them on, the hands are dipped in cold water, so as to thoroughly soak them, which will make the bees less inclined to sting them. The oil of wintergreen, described in a previous chapter, will be found much more convenient than gloves for protecting the hands, but it is not improbable that the beginner will acquire confidence sooner with the latter.

When the bee-keeper is stung, the sting and poison-bag are always left in the wound, and they should be extracted with the edge of a knife, or the thumb-nail. If the poison-bag is caught between the finger and thumb, its contents are forced into the wound, which is thus made much more painful. The very best and most experienced manipulator will receive an occasional sting, but after a certain time they produce no effects beyond the slight pain caused by the wound, while the novice is often, if not always, disfigured by unsightly swellings, which, although painless, are not pleasant to have about one. There are many remedies suggested for stings, some of which act with one person and fail with another. Wet clay, moistened tobacco, onion juice, spirits of harts-horn, washing-blue, and many others, have been tried by the writer with more or less success, but having long since reached the stage when stings cause him very little incon-

venience, he has given them up as not being worth the trouble of carrying about. On one occasion it happened that part of a swarm which the writer was hiving on a cold morning crept unnoticed, for the sake of warmth, between his shirt and vest, and on his standing up a great number of them stung him through the shirt, just over the region of the heart. Fortunately, on drawing the shirt away, the stings were brought with it, and no inconvenience followed, beyond a temporary acceleration of the heart's action, but should this happen to one not so well used to being stung, he should lie down as soon as possible, a wet cloth should be placed over the part stung, and in the course of an hour he will be all right. This case is mentioned as an extraordinary one, such as might not happen once in a lifetime.

CHAPTER XIII.

In this country bees are only subject to two diseases, dysentery and foul brood, the latter being very destructive, infectious, and difficult to cure. The first is brought on by giving the bees too watery food to winter on, by dampness in the hive while wintering, and by too long confinement to the hive by bad weather.

A stock of bees stricken with dysentery gives off a peculiar odour, and on looking into the hive, the floor-board will be seen covered with dead bees, while the combs are soiled with their excretions. The cure for dysentery is very simple, and consists in taking the soiled combs away and giving clean ones instead, and one containing sealed food. The stock should be transferred to a clean, dry hive, with warm quilts. When this is done the bees speedily recover, and are, generally speaking, little the worse of the attack.

Foul brood attacks the maturing bee while in the second or larval state of growth, and an outbreak of it is beyond question the most serious calamity which can happen in an apiary. So destructive is it that when it appeared in the apiary of the great Dzierzon, out of 500 stocks he lost all but 10. If the combs of a foul broody stock are closely examined it will be noticed that many of the brood cappings, instead of slightly projecting beyond the face of the comb,

are sunken, dark in colour, and some are perforated, the holes being irregular and ragged at the edges. If one of the diseased cells is uncapped, instead of a pearly white grub, a mass of putrid dark-coloured matter is seen, which, when pulled out with a pin, comes away in strings something like partly cooled glue. A foul-broody stock dwindles away, partly by reason of the brood not hatching out, and partly because so many of the cells are filled with the decaying matter that the queen has not room in which to deposit eggs, and her health suffers in consequence. If by any chance a diseased stock swarms, the maturing queens generally die in their cells, and the stock is left queenless. As it becomes weaker in bees it is attacked by robbers, and in this way the infection is carried from hive to hive until the whole neighbourhood has it. The only remedy for the disease which has been used with anything like success is Calvert's Carbolic Crystals, No. 1, B. P., which is used as follows:—The contents of an ounce bottle are melted by placing it in hot water, when it is poured into a quart of cold water in a bottle, which is shaken occasionally until the crystals are completely dissolved. Some thin syrup (3 lbs. of sugar to a quart of boiling water) is prepared and given to the bees by filling a large tumbler, covering it with a piece of slate, and rapidly inverting it, in which position it is left standing near the hives, but not so near as to induce robbing. When the bees have been taking the syrup for a day or two a teaspoonful of the solution of carbolic crystals is added, and the dose is increased gradually until the bees show signs of refusing it, when it must be slightly reduced. If the foul brood is of the mild type this treatment, which is only practicable in spring or autumn, when honey is scarce, will soon bring the brood into a healthy condition. Spare combs should be sprayed with the solution and kept in a closed hive. Hives in which diseased stocks have been kept should have Calvert's No. 4 Carbolic applied with a brush to every part of the interior, after which a few frames of comb are put in and the quilt is placed over all. Feeders and other small articles must be sprayed or washed with the solution, and quilts should be sprayed and afterwards ironed with a very hot iron, to destroy the germs of the disease.

Sometimes it happens that queens or drones are raised in diseased stocks, and their progeny have the disease in its worst or malignant form. In a stock having one of these queens, the disease can only be kept under by constant treatment, and it reappears soon after the treatment ceases. In such a case the queen should be removed, and one from an apiary known to be healthy substituted, when the disease will give way to treatment as described.

For spraying combs a small apparatus called a spray-producer will be necessary. The best form, which costs about three shillings, has an india-rubber ball bellows connected with the nozzle by a long india-rubber tube. Any apparatus for this purpose worked by the mouth will be fatiguing to use, besides being inefficient in action.

Foul brood is not only a cause of loss to the owner of the infected stocks, but all the bees in the neighbourhood for miles round are likely to take it, and when this happens it is very difficult to rid an apiary of it permanently. So destructive has it become in parts of the United States of America that many of the Bee-keepers' Associations there talk of petitioning Congress to pass a measure under which any person who knowingly keeps foul-broody stocks without notifying the proper authority, can be severely punished by fine or imprisonment.

ADDENDUM.

The following useful information as to marketing honey is abridged from a circular issued by the Irish Bee-keepers' Association :—

RECOMMENDATIONS AND NOTICES.

QUALITY OF HONEY.

It is strongly recommended that only such sections as have the comb well sealed and firmly built to the wood be sent to the market. Inferior or badly fastened sections should be drained or sold in the producer's immediate neighbourhood, or, if sent, they should be kept separate from those of good quality, and marked separately on the invoice ; otherwise, one of them may be taken as a sample of the whole, and the parcel sold at a low price.

SAFE CARRIAGE OF HONEY.

To secure this, strict attention is necessary to the following points :—

I.—The honey must be properly packed.

Sections.—The best packing case for these is a spring travelling crate to hold one dozen sections $4\frac{1}{4} \times 4\frac{1}{4} \times 2$, with special waxed paper in which each section may be wrapped. The use of this paper will prove of great advantage, as it will prevent a leakage from one section damaging the rest, while it is sufficiently transparent to show the condition of the sections without opening the package. The use of ordinary paper, which conceals the sections, might cause the agents to give the railway company a receipt for them as in good condition, when in reality they have been injured. Honey well packed in these crates will be practically secure, but nothing can be guaranteed regarding them. They should not be fastened together, but sent separately. They must not be ordered before they are required for use, or extra hire will be charged.

Sections in ordinary packing cases.—When these crates are not used, the following directions may be found useful :—Sections must stand upright, and, if the comb is not well fastened to the bottom bar, should be turned upside down. Place them carefully edge to edge, so that the edge of one section cannot run into the comb of another. Then adopt some means of keeping them tightly together to prevent their shaking or changing their position on the journey ; a board used as a sliding partition with a wedge would answer the purpose.

Bottles.—Wrap each bottle separately in a piece of paper. Spread a layer of hay or other soft material over the bottom of the case. On this let the bottles stand, and closely press down a thick padding of the soft

material round each, so that it may not come into contact with other bottles or the sides of the case. Between two layers of bottles lay a sheet of cardboard or thin wood, and keep this, by means of the packing, from contact with either the lower or upper layer. Place packing also between the bottles and the lid, and fill up the case completely with it, so that the bottles may be kept perfectly steady and immovable.

II.—The lid must be screwed on, not nailed ; if nailed, injury may be done, when forcing it open, to the contents of the package.

THE MARKET.

Members can obtain information as to *current prices* at any time from the hon. secretary. It is sometimes necessary to delay the sale of honey for several weeks in order to obtain the best possible price for it. Members who are anxious for a quick sale, even at low prices, should state this on the invoice accompanying the consignment. The *appearance* both of sections and of bottles affects their sale. Dripping sections should be excluded from packages, as one such may spoil the look of several other sections. Bottles should be labelled and covered as attractively as possible. 1 lb. sections and 1 lb. bottles of honey sell better than larger sizes. Unbottled extracted honey should be in 28 lb. tins.

CALENDAR OF OPERATIONS IN THE APIARY.



So much depends on the season, and the circumstances of each apiary, as well as the locality, that any hints given under this heading are only to be taken in a general sense. For instance, in April, 1884, we heard of honey being stored in sections in the South of England, while for a month later in the same year bees did not come out of their winter quarters in Scotland, so that the bee-keeper must use his discretion in applying these hints to his own particular case.

JANUARY.

Keep entrance slides wide open, and occasionally clear the entrance of dead bees by means of a hooked wire. Although bees may fly, it will not be advisable to disturb them for the present. Get hives, frames of comb and section crates cleared of propolis by scraping with a piece of glass. Any appliances likely to be wanted later on should be ordered now.

FEBRUARY.

Advantage may be taken of the first fine day to examine stocks, and, where practicable, to transfer them into clean hives.

MARCH.

About the beginning of this month the queen may be stimulated by uncapping a frame of sealed honey and placing it next one of the brood combs. Later on food should be given liberally. Look out for signs of robbing. Queen wasps begin to fly now, and should be destroyed whenever seen, as a large proportion of those which escape will found colonies later on in the season.

APRIL.

Stocks are now increasing rapidly in strength, and care should be taken not to allow this to be checked by want of food. Unless under very favourable circumstances bees are unable to gather sufficient honey for the daily wants of the hive, so that the natural supply must be supplemented by sugar syrup. If the combs are not stored with either honey or its substitute, robbing is to be guarded against while feeding, as if not checked at the outset it may become general.

MAY.

This is one of the busiest months in the apiary. The fruit trees are in full bloom, and, if the weather is favourable, honey will come in well, although not in sufficient quantity to admit of any being stored in the sections. About the middle of the month drones will make their appearance, and about the last week in the month swarms may be expected to issue.

JUNE.

Early in this month the white clover comes into bloom, and everything being favourable, honey will be stored rapidly. Keep the combs clear of honey by using the extractor, and take away sections when finished. Swarms and after-swarms give a good deal of trouble now, and spare hives and frames of foundation will be in great demand. •

JULY.

Up to the middle of this month bees will continue to store honey from white clover, and a sharp look-out must be kept for the end of the honey flow. When it ceases to come in, bees are very likely to begin robbing, and on no account should honey or syrup be left where they can have access to it. All supers and combs intended for the extractor should be removed. Destroy wasps' nests by pouring paraffin oil into the entrance. As a rule, swarms will not issue after this month.

AUGUST.

Heather comes into bloom, and where bees are kept within flight-range of it, a second harvest may be expected, weather being favourable. Sometimes bees will gather and store the insect secretion known as honey dew from trees infested with the *aphis* or green fly, to the loss and annoyance of the bee-keeper. Drones are now worried out of the hives.

SEPTEMBER.

Contract entrances to prevent robbing. Examine stocks and make a note of those requiring feeding to carry them over the winter. Any hive in which drones are allowed to live may be set down as queenless, and steps should be taken to unite it to another, or, if it is strong in bees, to give it a laying queen.

OCTOBER.

By the middle of this month feeding should be finished, unless in cases of necessity. If the bees have not sufficient food by that time, bee sugar-barley, and nothing else, should be given. Contract hives by removing spare combs to suit the requirements of each stock.

NOVEMBER.

During this and next months bees should not be disturbed unnecessarily. Mistakes, however, may still be rectified. On fine days, hives in actual use may have a coat of paint. Roofs should be examined, and all cracks likely to admit rain should be stopped.

DECEMBER.

Open entrance slides to fullest extent, but with this exception—disturb bees as little as possible.

INTRODUCTION.

GENERAL success depends largely upon small enterprises and industries. A chain is only as strong as are its separate links, and those pursuits which are small in themselves, but vital to individual lives, contribute greatly to national prosperity. By "national prosperity" is not meant that of a few individuals probably those who form a connection between producer and consumer, but the community throughout. Unfortunately, so far as the poultry industry of Ireland is concerned, a large proportion of the eggs sent to the English and Scotch markets are the production of those whose condition cannot by the greatest stretch of imagination be regarded as prosperous. They know nothing of what ought to be the ordinary conditions of life. To its comforts they are entire strangers. But for the eggs laid by the few fowls kept they would have no money whatever, and miserable as is their lot now it would be worse without their poultry. To others, who are on a somewhat higher plane of life, poultry-keeping is a source of profit as vital; and were the entire egg and poultry trade of the country to cease, the condition of things would descend to an even yet greater depth than now, when the outlook for agriculturists is so bad.

The poultry-keeping section of the community may be divided into three classes. First, the cottagers and small farmers, whose only idea is to sell the eggs and chickens as soon as possible. In certain districts of Ireland it is almost entirely from this class that such multitudes of eggs are obtained. These form the industrial portion of poultry-keepers, and it is upon this class that we must depend to a great extent for the improvement of egg products especially. Unfortunately it is unable to do much for itself. It must be guided and assisted—nay, perhaps in some cases almost compelled to abandon or improve present methods.

and be encouraged to introduce fresh stock and new ways of management. In a few districts, as we shall hereafter show, something has already been done. Individuals have interested themselves in the way indicated with most satisfactory results, showing that with a guiding influence and right methods the people are ready to respond. But of themselves they can do nothing. In the proper place we shall show who are the right persons to undertake the work, how they can best do it, and the lines upon which they must act. Without their aid this first class of poultry-keepers, with their miserable, in-bred, ill-kept fowls, getting worse year by year, will go on as now. But if they will help towards improvement, we believe that the whole poultry industry in the districts specially before our mind can be rapidly and effectively revolutionised.

The second class of poultry-keepers are those whose farms are larger, and who from their means and position are enabled to help themselves, if they know how. At one time they despised poultry-keeping, aspired to touch only the larger stock, went in for corn growing, and left poultry to the women-folk. But the force of events has been too strong for them. They have been compelled to alter their ideas very materially, and now it is not too much to say that they have very open minds as to the smaller products, and are anxious to develop in directions that were ignored before. In many districts of the country the matter has been taken up, and we have been very pleased to see the strong indications, in the quality of egg and of table fowl marketed, that this class has been influenced. To them we must look at present for the best qualities of table-fowl. They can also supply fine eggs, but especially can they send forth chickens fit to compete with any other producer, whether at home or abroad. With them the object is profit also. But from their condition and position they are well able to help themselves and then assist others. They, however, need to be guided, to be stimulated somewhat, and to be shown not only the best breeds to keep for the special

end in view, but also how they can send their produce to market in the best manner and reach the consumer most directly and rapidly. We have said that this second class can "help themselves and then assist others." Both of these are equally important, and, fortunately, in helping others the farmer can help himself. A man who takes up the matter intelligently will find that his neighbours, who are not so far advanced, seeing his success, will come to him for stock, and he will be enabled to obtain in this way better prices than his competitors. We have known farmers in Britain and France who make a good income in this way. They have first educated those around them that poultry do pay if properly managed; they have stimulated them to secure better stock by the force of comparison, and, as a result, have found a constant demand for both cocks and hens for stock purposes. Therefore it is not merely a question of philanthropy, but of simple £ s. d.

Third, we come to the class who regard their poultry-keeping more for the pleasure derived from the pursuit than for the profit. Chiefly found in or near the large towns or amongst the more wealthy country residents, they are a class we hope to see largely increase both in numbers and influence. First, their existence indicates some amount of leisure which, in the working portions of our community, is itself a good sign of the times. It shows that there is an aspiration for something more than the daily toil and the mere labour of life. Recreative poultry-keeping is a valuable feature of modern life which ought to be encouraged. Frequently it commences in a desire to supply the table with a few eggs or a chicken now and again, in itself worthy of the highest commendation. Then there comes a greater attention to, and liking for, the birds. Their ways are studied, the varieties of domestic poultry are scanned, and the man or woman, by selecting one or more breeds, becomes what is not very happily termed a "fancier." For these the modern system of shows is largely conducted, and these exhibitions in turn stimulate others to follow

in their footsteps. As to the influence of shows, we shall have somewhat to remark later on. Now it is only necessary to say that their power for good is far and away beyond what is generally supposed, and that they have already done much in some districts to stimulate poultry-keeping and improve the type of fowls. There is yet another benefit which accrues to this section of poultry-keepers. Fresh eggs and good fowls on the table mean the best of food, and for invalids and children are almost essential.

Recognising the importance of poultry-keeping as an industry, as a profitable addition to farming operations, and as a pleasurable pursuit, the publishers have invited us to take up the question practically and exhaustively, so as to supply the information needed by the three classes of poultry-breeders named. This it is now our purpose to do. But, in order to understand thoroughly the conditions of the country, its opportunities, the class of fowl now kept, and the directions in which improvement can most easily and satisfactorily be secured, the writer has recently paid a prolonged visit to Ireland, travelling over the entire country, examining in all the four provinces the existing state of affairs, and interviewing those who are most closely connected with poultry breeding and keeping, and marketing the produce. The result of these observations will be given in some of the succeeding chapters, together with suggestions as to how improvement can be made most effectively. Where efforts have been already put forward the result arrived at will be shown, as a guide to others; where mistakes have been, and are being, made, it will be necessary to point these out; if there are any special hindrances in the way of development—where high freightage, merchants' charges, unfair dealing, give the foreigner an undue preference on the British markets, we shall say so, and, if possible, state the remedy; we shall have need to plainly state in what way Irish eggs and poultry have lost the place they once had in the English market; how the foreigner,

by greater attention to details, by promptitude in getting his goods before the consumer, has succeeded in establishing a trade which must now be reckoned in millions of pounds annually. The foreign systems of management, of packing, of marketing will be fully explained, so as to indicate wherein they are superior to those in vogue here; and from visits paid to these countries whence we receive our greatest supplies, we shall be able to say much that should be of value in developing this industry. The appetite of Britain for eggs and poultry seems to be omnivorous and ever-increasing. When Ireland is within three and a-half hours of English ports, and the producer closer to the great markets than is any foreign rival in point of time, it is surely a serious reflection that money goes abroad to the extent of £10,000 per diem for eggs alone, almost all of which Ireland might have secured if this question had been taken up a generation ago. It is not, however, too late even now. The prices obtained in London and the great English towns for guaranteed fresh eggs are sufficient to make the trade very remunerative, if it is organised; but if, as now, when eggs from Ireland are a week or ten days old at least, ere they are offered for sale, these high prices cannot be secured. We recently made inquiries as to some kinds of French eggs, which are exposed for sale in London on the fourth day after being laid. If that can be done from Normandy, why not from Connaught? This and other questions shall receive full consideration in due course.

It is necessary, in approaching this subject of "Irish Poultry Culture," to begin at the very commencement, for unless the fowls used are of suitable breeds success cannot possibly be attained. In this direction there is very much to be done, but unless it is rightly done the full measure of success will not be realised. The introduction of wrong breeds would be most injurious, and one most important part of our inquiry has been to learn what experiments have been made already, and their results. These will enable us to suggest varieties which will fit themselves to the conditions of

the country and the demands for its produce. Arrangements have been made with a leading artist for illustrations of the principal breeds, and we shall devote a considerable amount of space to varieties of poultry, showing their external characteristics and internal qualities. Upon this point we have gathered a vast mass of evidence at home and abroad, and the importance of a right selection is sufficient justification for devoting a large amount of attention to this part of the subject. We shall also show the characteristics of the more fancy varieties, in order to provide for those who are in the third section into which we have divided poultry-keepers. And in fact the work undertaken will be dealt with as completely as possible, and be at once a concise yet entire guide to Irish Poultry Culture.

In this work our desire is to stimulate that which might be to a vastly greater extent a National Industry than has ever been thought of. To secure this desirable result it is necessary that there should be co-operation not merely on the part of those who are directly interested in this trade, either as producer or consumer, as dealer or carrier, but on that of everyone who is wishful for individual and general prosperity. In a development of this industry all sections of the community would share the benefit, and the placing of greater means within the grasp of our people would help to raise them from the misery in which so many are sunk. In the enterprise many can share; first, by disseminating as widely as possible the knowledge imparted in these pages, and by calling the attention of all within their circle of influence to this work. It has been already proved in various districts that one poultry-breeder acting on right lines can exert an influence which cannot be measured. Examples of what has been done will be given from time to time, and it is our hope that these will be very largely followed.

IRISH POULTRY CULTURE:

INDUSTRIAL—PROFITABLE—PLEASURABLE.

THE IMPORTANCE OF POULTRY PRODUCTS.

VARIATIONS many and great have marked all food products of late years, especially those which are purely agricultural. On every hand complaints are rife as to the inability of farmers to make a living, and the tale in all parts of the United Kingdom is a very painful one. Low prices and unlimited supplies from abroad have caused an agrarian revolution in Ireland, and in Great Britain is fast bringing about a similar state of things. If it be true that in the larger island—as a farmer has just written, asking whether such things can be passed by as the gloomy accounts of goods sold by the sheriff's officer, or the still darker records of the Coroner's inquest over the hapless body who could not face the last dismal act in his downward course to the cheerless realms of want; or that thousands of acres of land, once covered with corn and peopled with labour, are now what is termed "laid down to grass," but which are in reality abandoned to the reeds, weeds, and thistles that are nature's own products without man's labour; or that the blinds of the mansion are down, the house empty, the servants discharged, the coachman, the gardener, the little tradesman sent to swell the unemployed in the larger towns—if this be true in Britain how much more so in Ireland, where the multitudes of tenants, who never knew the privileges nor had the reserves of their Saxon brethren, have been absolutely forced into a state of despair and of misery, none the less bitter because they have in the past suffered a series of periods of such misery. Into such a wide-reaching problem as is opened out by a subject like this we do not intend to enter. Our object is a different one. But it must be recorded as a fact that the attention now being directed to what may be termed Minor Farm Produce has been largely the result of outward pressure, not of inward enterprise and skill. It is to be noted that the secret of industrial progress, wherever found, has been the result of anticipating needs, of adapting products to the customer's tastes, and of even making a need by offering a supply. How far this spirit has characterised farming need not be discussed. It is generally admitted that whilst the

decline in agriculture is largely due to foreign competition, even a portion of that competition has been the result of supineness and carelessness exhibited by the home producer and, in many instances, of an insular pride which refused to be taught by others. In this respect Ireland has her share of the blame to bear. Whilst corn is now produced in America and India at prices which cannot pay at home, many of the articles in daily use show an advance in prices over twenty or thirty years ago. Butter and eggs are both striking examples. Therefore, there can be no complaint on the score of reduced and non-paying prices. Whereas a score of years ago Irish butter, eggs, and poultry were seen in almost every market of Southern and Western Britain, now they are less frequently met with, though common on the northern markets. Want of method in butter-making and of cleanliness in the marketing of both butter and eggs have given a heavy blow to the trade. Within the past few years something has been done to improve the quality of butter made, and in Munster especially there has been a marked advance in this respect. Still there is much to be done to recover lost ground. In a conversation we had the other day with one of the leading London provision merchants, he said that Irish butter and eggs have very little influence and are of small importance on that market. In the case of the latter this is due to the entire absence of provision for marketing the eggs rapidly and regularly, without which no trade can be successfully maintained, and to the want of care and of cleanliness in packing. On this point we shall have more to say in another chapter, for unless there is due attention to the marketing of the produce all other efforts will fail. So far as poultry and eggs are concerned, whilst in many districts no practical attempt has been made to improve the quality of the produce, in a few a very decided change is to be noted as having been seen within the last twenty years, with a very great benefit accruing to the producers and an important increase of the trade. What can be done in one district can be also accomplished in another, and we shall be able to show the causes which have precipitated the improvement in the portions of the country referred to, as well as on what lines other Irish breeders and merchants should work.

The value of poultry produce in the United Kingdom as a whole is very difficult to determine. In Ireland the agricultural returns include poultry, but with the exception of two years those published by the agricultural department of the English Privy Council have ignored this section of live stock. Why this is so

