

## Chapter 4

# Handling bees — basic skills

### 4.1 Introduction

The foundation of the enjoyable working of bees is to work in co-operation with the bees as far as possible. Beginners are always tempted to open the hive to look in to see how the bees are doing. It is necessary to do this periodically, and it should then be done quietly, quickly and efficiently, but unnecessary disturbance is as foolish as digging up one's potatoes to see how they are growing.

In approaching a beehive, as far as possible keep out of the line of flight of the bees to and from the entrance, and stand behind the hive, or to one side. If there are trees or bushes nearby which force the bees to fly high when approaching the hive, it can help the beekeeper in this respect. Any stamping on the ground or vibration — e.g., from a lawnmower — will be felt by the bees and may trigger their alarm reaction, so avoid it if you wish to inspect the hives, and if you are prudent you will wear your veil if your work near the hives necessitates such disturbance. The scent of cut and bruised vegetation is also alarming to the bees, so lawnmowing is doubly disturbing.

Bees keep the interior of their hive very warm, and they do not enjoy having the roof removed on a cold, wet, windy or thundery day any more than you would. They show their annoyance in the only way they can. So except in dire necessity, wait for warm quiet weather before opening a hive. If you must do so on a bad day, plan carefully what must be done, and work fast.

### 4.2 Opening a hive and inspecting the combs

This is the basic skill that must be acquired, so I shall describe it in detail. I shall assume that a single-walled hive is in use. Common sense should tell you how the routine must be varied for a double-walled one.

**BEFORE YOU START, HAVE CLEARLY IN MIND — EVEN WRITE DOWN IF YOU ARE INEXPERIENCED — WHAT IT IS YOU ARE PLANNING TO FIND AND DO.**

- Before approaching the hive, put on protective clothing, and light the smoker. Probably the best fuel is a rolled up cartridge of hessian sacking, but a roll of corrugated cardboard is also a possibility, and I have often used a supply of dried grass (available free from any piece of rough ground), started off with half a sheet of newspaper. Make sure you have plenty of spare fuel in reserve and that the base of the fuel is well alight, and use the bellows until you are sure the smoker is producing plenty of cool white smoke. When the smoker starts to produce darker bluish smoke, it is a sign that the fuel is burning through. Re-fuel it before it turns into a flame-thrower!
- Before opening the hive, give one or two good puffs of smoke into the hive entrance, and leave the bees for about a minute for the smoke to take effect. No-one knows exactly why smoke pacifies

bees, but its effect is that when there is unsealed nectar in the hive, the smoked bees rush to gorge themselves and thereafter become much more placid. Smoke can also be used to drive bees from a particular area so that bees are not inadvertently crushed. Crushing bees, as well as being bad management, causes large quantities of alarm pheromone to be released and quickly puts the hive out of temper. If you have the misfortune to be stung at any time, then freeze for a moment and take stock. Scrape out the sting and then smoke the place vigorously to kill the sting scent and inhibit further attack. This routine should be followed even if the sting is received on a glove or other piece of clothing and causes you personally no inconvenience at all.

- After a quick reminder puff of smoke at the entrance, remove the roof, being careful to avoid bumping and vibration as far as possible. The roof can be laid down upside down on a level place somewhere conveniently within reach but out of the way. Honey supers above the queen excluder are not usually examined. They should be removed bodily and stacked inside the upturned roof. If there are several, take the crown board off the top one as you place it in the roof, and when the last super is on the stack, bump the bees off the crown board over the top of the brood chamber of the hive, and then cover the stack of supers with it. When the supers are restored at the end, make sure they go back the correct way round and in the correct order on to the hive. Removing a super that has been on the hive for some time is more than just a matter of lifting it off. First the seal of propolis at the junction of the boxes has to be broken by levering the boxes apart with the hive tool. As you part the boxes at one corner, puff smoke into the gap to keep bees away from the working area, so they won't be crushed as you withdraw the hive tool to move to the next corner. After all four corners have been freed, you may still find the tops of some of the frames in the lower box adhering to those in the upper box. If so *twist* the boxes apart and they should come free. This adhesion is usually worse in bottom bee-space hives, which is why they are falling out of favour. There is quite a knack in doing all this with the minimum of bumping and vibration, particularly if the super is full of honey and therefore heavy. Whenever bees are exposed during this process, give them two good puffs of the smoker. If boxes have been undisturbed for many weeks or months, the frames in the upper box are sometimes so firmly fixed to those in the lower box that the upper box is physically impossible to separate as a unit. In that case the only remedy is to obtain an empty box, and to lift out the frames from the upper box one by one, placing them in the empty box in order with the bees adhering. It is prudent to remove the propolis and brace comb from the bottom of each frame as you do so, so that when the boxes are put back together again, there is restored a proper bee space for the bees to respect. Once the upper box is lifted clear, you can also scrape the propolis and brace comb from the top bars of the frames in the box below. These are desperate measures, not needed if your hives are regularly inspected, *provided the boxes have a proper bee space between them.*
- Remove the queen excluder if there is one and examine it carefully to be sure the queen is not on it. Then lean it up in front of the hive. The bees on it will find their way home, and returning foragers will be confused by it and not bother you.
- If the queen is found at ANY time, her safe disposal must be your first thought. She should be safely escorted, by hand if necessary, on to the centre of a brood comb and replaced in the hive. Until you have found her and know where she is, assume she is on every frame you handle, and treat it with appropriate care. If you injure the queen, you have destroyed the value of your stock.  
  
A laying queen will hardly ever take wing except with a swarm. If you do ever have a queen fly off, then leave the frame tops exposed and wait ten minutes with no smoking. She will almost certainly return to the scent of the hive.
- Sometimes a hive has two boxes for the queen to lay in. In general if two boxes are to be inspected, it is best to lift off the upper one, and to start by inspecting the lower one, as then bees are not driven down as the upper combs are inspected, making a very crowded lower box when you come

to it. However if the two are badly stuck together with propolis, you will have to start with the upper one (see above).

If the upper box is lifted off first, stack it separately from the supers to avoid the risk of letting the queen get into the honey supers, preferably in another hive roof, and cover it with something else. Never leave unattended frames exposed. The bees become agitated, and in cool weather the brood may become chilled. It also tempts bees from other hives to start robbing the honey which soon leads to PANDEMONIUM.

- Smoke the tops of the frames in the box to be inspected, but do not puff too much smoke down between the frames — just enough to keep the bees down — and scrape off any brace comb built on the tops of the frames with the hive tool. There may be some drone brood among it if your inter-box space is a little too wide, but its loss is of no great importance. It is best to have with you a container for holding the scrapings, so that they can be disposed of away from the apiary, again to reduce the risk of tempting the hives to start robbing one another.

Place a cover cloth over all the frame tops and roll it back from one side to expose the first two frames.

- While actually inspecting, use as little smoke as necessary to keep the bees subdued. With the hooked end of the hive tool, free the end frame by a horizontal twisting movement (or the dummy if there is one), lift it slowly and carefully out to avoid crushing bees. Inspect it carefully to be sure the queen is not on it — she will usually be found on a central frame where egg-laying is actively going on, but you never know. If she is NOT there, then this frame (or preferably the dummy) should be propped beside the hive. If it is a frame and contains brood, remember it must not be left out long enough to become chilled.

Now free and lift the second frame, inspect it and return it to the place of the first frame or the dummy, without turning it round. In inspecting a frame, try not to hold it out horizontally, but turn it so that it is at all times supported by its wooden frame. This is especially important with new “green” combs full of honey which can sometimes drop out of the frame under their own weight. Also as far as possible hold frames over the hive in case the queen should drop off and be lost in the grass.

- At this stage bring the rolled-up second cover-cloth into use, by starting to unroll it over the frame you have replaced. Now work steadily across the box, lifting and inspecting each comb in turn and replacing it next to those you have already examined. As you work, move the slot between the cover-cloths with you by unrolling one and rolling up the other. Use only what smoke is necessary to keep the bees quiet. If you find a mass of them starting to pour out of the hive entrance and crowd up the face of the hive, you know you are over-smoking them.
- The *last* comb can be replaced in its own place. Then expose the side of the box where you began by rolling up the second cover-cloth, smoke there, and, using the hive tool as a lever, move the whole block of combs away from you back to its proper place. As the gap at the far end closes, smoke it to drive bees away before they are crushed. If metal ends are used they may buckle under the strain of this operation so that combs must be replaced one at a time. This is more disruptive to the hive and is another reason for avoiding metal ends. There will now be space to replace the first frame or the dummy in its proper place, again using smoke in the gap so that bees are not crushed. Note that if a dummy is in use, this last stage can be avoided, by simply placing the dummy at the other side of the box. No *combs* are moved by this operation and next time you simply start at the other side. Finally use the hive tool at each end of the block of combs to lever them close together into a solid block and to ensure that there is a bee space at each end of the block.
- If there is another brood box, it may now be replaced and examined in its turn — or the top one removed, stacked and covered if the inspection is top down. However if a primary objective of the

inspection is to find the queen, then the top box, if stacked initially, should be examined *where it is* if the queen was not found in the bottom box, or the queen may run down from the top box into the bottom box before she is found.

- After all the brood boxes have been inspected and replaced, cover the top box temporarily with a cover-cloth. Then bump any adhering bees off the queen excluder in front of the hive by knocking the edge of it against the palm of your hand. Clean any brace comb off the excluder with the hive tool, being careful not to bend the wires or open up the slots, or it will no longer exclude the queen.

Then quickly but gently remove the cover-cloth, give a puff or two of smoke over the frame tops to clear them of bees, replace the excluder, and on it stack the honey supers in the order they were in before they came off. Lastly bump any bees off the crown board into the top super and replace it, using a little smoke if necessary to avoid crushing bees.

I have described this in great detail. Your own working practice will almost certainly vary from this a little, but it is important to develop a well-organised systematic routine that becomes second nature, so that you can concentrate on the *objects* of your inspection. As a beginner you will want to practise this for its own sake, but remember that it is disruptive to the colony, and you should in general not look into a hive more than once a week unless it is really necessary.

### 4.3 Spring inspection

It is important to inspect hives briefly as soon as spring weather permits.

In March, even if it is cold, each colony's food supply should be checked, but this does NOT constitute an inspection. An experienced hand can usually determine by "hefting" — lifting one edge of the hive a little from below — whether there is still enough weight of honey left in it. If in doubt, put on your veil, light your smoker, briefly lift the crown board and ONLY IF NECESSARY give a little smoke to drive the bees down. If no bees are visible, then, if they are not dead already, all is well — they are down below a good "crown" of honey. Close the hive up and wait for a warm day. If bees are up, then free one *central* top frame and lift it half out. If it has NOT got at least an inch (2.5 cm) wide band of sealed honey at the top, assume the bees are running short, replace the frame, tighten up the frames, close up the hive, put on a feeder and start feeding sugar syrup, if the weather is reasonably warm. If it is very cold, this feed will have to be in solid form as candy placed directly over the cluster of bees in contact with them. See the Appendix to this chapter for a candy recipe. Do not over-feed at this stage, or you will encourage the bees into excessive early activity which is self-defeating, and more importantly you will clog up with syrup all the empty cells in the brood frames where the queen should be starting to lay, and you will make the bees feel the hive is congested very early. This is likely to encourage early swarming which you do NOT wish. A maximum of 2 to 3 kg of sugar as syrup should allow the bees to survive until the weather warms up, unless the spring is very late and cold.

The true spring inspection should take place on the first day you are free when the sun shines and you are comfortable without a jersey — temperature over 16<sup>0</sup> C (60<sup>0</sup> F) — and when there is not too much wind. There will be no honey supers on yet.

Have a clean spare floor with you. Lift off the roof after smoking at the entrance as usual. Then quickly stack ALL the brood boxes of the hive inside the roof. Carefully remove the hive floor from the stand, but do not shake off the adhering bees or the debris. Clean away quickly any rubbish from below where the floor was, and place the clean floor on the stand, and by wedging it up if necessary, make sure it does not rock, and that it is level from side to side and slopes slightly from back to front, so that any rain that blows into the entrance will drain out. Replace the bottom brood box on the clean floor, and if there is more than one, cover the other(s) with the crown board. Now begin an orthodox inspection of the brood boxes as described in the last section. You have four questions to settle, all related to one another:

1. Is the colony queen-right?
2. Is the colony healthy?
3. How far developed is the colony?
4. Is there sufficient food for the colony?

1. To answer this question, you do NOT have to find the queen, though it is always reassuring if you do. The real proof of this however is the presence of developing brood in all stages including SEALED BROOD WITH WORKER CAPPINGS, and a HEALTHY PATTERN OF EGG-LAYING, with brood spreading out in concentric ovals from the central area where egg-laying started, so that the open brood is on the outside with eggs beyond that — unless the “first round” is already emerging as young workers, and the queen is starting again from the middle.

2. Pests and diseases of bees are a large topic dealt with at length in Chapter 6. Here is only a brief description of what is to be expected in a healthy colony; of some common but not too serious problems that are often found; and a brief indication of how to look out for the few really serious problems that need to be watched for. Thankfully most of the serious diseases are rare.

Healthy **brood** will appear in the spring as concentric ovals of brood in all stages of development as described above. Look for *eggs* in particular to be sure a laying queen is present. The *open brood* should consist of pearly white larvae lying curled up in the bases of the cells with a small amount of whitish liquid bee milk. The *sealed brood* should be in even slabs of pale brown roughish cappings all of uniform appearance. At the end of its development phase there will be gaps in the pattern where bees have emerged, and you will probably see young adult bees emerging as you look at the comb, looking rather under-sized and covered with greyish downy hair. If the pattern contains too many gaps early on, it may be a sign of a failing queen.

The most common but not too serious problem with the brood is *chalk brood* where isolated uncapped cells among the sealed brood contain chalk-like mummified dead larvae. Try to avoid damp, and scrap old combs to reduce the level of this fungus infection.

The two rare but serious infections of the brood are American Foul Brood (AFB) and European Foul Brood (EFB). AFB shows as dark sunken cappings among the sealed brood covering rotting smelly remains of dead larvae that can be drawn out into a slimy “rope” with a matchstick. EFB shows as contorted “melted down” dead larvae among the mature open brood.

After winter there will inevitably be some dead bees on the floor and outside the hive, but the living **adult bees** should all be active and healthy looking. Watch out for brown fouling of the combs and frames indicating *dysentery* which may have several different causes.

Now that *Varroa* has spread widely Scotland, monitoring and dealing with this infestation has become a permanent necessity in this area and elsewhere. The details of how to do so are in Chapter 6.

If *wax moths* get into a hive (looking something like clothes moths) their larvae can quickly wreck large areas of comb which they reduce to a crumbly brown frass. They are usually more of a problem in combs (particularly brood combs) stored away from hives. Stored combs which become infested should be burned, and any wax moth pupae adhering to and concealed in crevices of woodwork destroyed. Wax moth infestation in a working colony is usually a sign of a weak colony. Get rid of the worst of the infestation, and try to clean things up as best you can.

If *mice* get into a hive, it is obvious, as they wreck the combs, eat the honey and kill the bees. Fit mouse-guards in autumn to avoid the problem in future. If any bees are still alive, they need to be fed, and urgently given clean combs (not foundation) to try to rescue them. This is not easy to achieve and usually mouse-infested stocks die.

*Slugs* often take up residence in damp hives with weak stocks. Kill them, don't just throw them out, or they will return. Try to keep hives dry and strong.

If you find suspect brood comb, unhealthy looking bees or strange creatures in the floor debris, then send a 5 cm square of comb, or a sample of 20 to 30 adult bees (killed by an hour in the deep freeze) or as much floor debris as you can collect in a *cardboard* box or *paper* envelope (NB NOT plastic which rots the sample) to the Scottish Agricultural Science Agency. Their full contact details are given in Chapter 6 later. Remember to enclose a covering letter giving your name and address, explaining what the sample is, what problem you suspect and saying where the bees are kept. You will be sent a FREE EXPERT DIAGNOSIS. This is a valuable service, so use it sensibly.

The two serious conditions AFB and EFB, and two other infestations which have thankfully not yet appeared in this country are legally notifiable diseases. If you find you have any of them, you are legally obliged to notify your local office of the Scottish Government Rural Payments and Inspections Directorate (SGRPID). Infestation by *Varroa* is now endemic in virtually the whole of Scotland apart from some of the outlying islands and the extreme north and north-west. Because it had become so widespread, it was in 2007 removed from the notifiable list by the Scottish Government.

3. The development of the colony can be assessed by noting how many combs are occupied by the brood nest as it spreads out from its winter centre. I sometimes liken its development to the spread of a fire through the kindling and fuel laid out in a grate. Once it occupies all but the two outside combs on each side, the time has come, if the weather is fair, to put on the first honey super over a queen excluder. Do this too early rather than too late, or your hive may swarm before the end of May. Always ensure throughout the summer that you give ample room for the storage of honey.
4. A *full* brood comb of honey holds about 2.5 kg (5 lb). A *full* shallow comb holds about 1.5 kg (3 lb). Total colony reserves should never be allowed to fall below 5 kg (10 lb), and if they are falling to near this level, the beekeeper must be prepared to feed if the weather turns cold or wet, especially if this happens in the middle of summer when colonies are large and active and can soon use up a small reserve.

On the other hand if excessive reserve slabs of sealed honey or sugar syrup in the brood combs are restricting the queen's laying space, an excellent way of stimulating rapid development is to break with the hive tool the cappings over these slabs in two combs adjacent to the brood nest. The bees will then clean out these cells and prepare them for the queen, re-storing the honey elsewhere, provided you have given them room to do so, which you should have done. The extra feeding also stimulates the workers to greater activity.

After completing your spring inspection and closing up the hive, carefully examine the debris on the old floor you removed and laid aside. Quite a lot can be learned from the pattern of winter debris on it. If it is wet, almost certainly the hive roof is leaking, or the slope of the hive is failing to drain out rainwater which blows in. The cause should be determined and remedied immediately. Then clean this hive floor thoroughly by scraping it with the hive tool, and if possible scorching it with a blow-lamp to disinfect it. It can then be used to replace the hive floor from the next hive that will be inspected.

One of the measures now adopted by many beekeepers to help in the control of *Varroa* infestation is the use of *open mesh floors*, through the mesh of which any dislodged *Varroa* mites will fall to become chilled and die. When these are in use the necessity to supply a clean floor for each hive at spring inspection is less urgent, but the floor should nevertheless be inspected, and any accumulation of debris on the floor removed. Also no tray should be left below such a floor except for a short period, since the accumulation of debris on the tray provides an ideal breeding-ground for wax moths.