

# ESSENTIAL EQUIPMENT

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"THE SMOKER" !

Plan for two colonies of bees - if one dies, the other will hopefully survive. However, try to cater eventually for more, for more there will be when the 'bug bites', especially when your bees swarm! Starting in a small way enables you to assess the suitability of your area, locate sites for out-apiaries and build up experience and equipment.

If possible, decide on one type of hive so that your equipment is interchangeable - unfortunately, perhaps, there is no standard hive. There are several commercially available designs of hives in this country: the *WBC*, *Modified National*, *Smith*, *Modified Commercial*, *Langstroth* and *Modified Dadant* (it is interesting that

designs have to be "modified"), the *Langstroth* hive being the most widely used hive in the world - but not in this country! The *WBC* is a double-walled hive, whilst all the others are single-walled. There is no evidence that a double-walled hive has any advantage over a single-walled hive. Bees can be kept successfully in any type of hive that provides sufficient space and protection from the weather. The most popular hive in this country is the *Modified National*. The earlier *WBC* hive (named after the designer, William Broughton Carr), is the type often associated with beekeeping and depicted in *cottage garden* pictures. It still has its adherents, but it is more costly and cumbersome in use, especially if you want to move your hives. There is no agreed *Best Buy*. More detailed information is to be found in Len Heath's book *A Case of Hives*.

Although one type of hive is desirable, if second-hand equipment comes your way, grab it! It will be cheaper than buying new, but there is a risk that it may harbour disease. All hive parts, if not new, must be sterilized by going over the surfaces with a blowlamp. Do not buy and use old combs. Although it is possible to sterilize combs using acetic acid, it is not something a beginner should consider. It's not worth the risk of spreading disease to your bees and the low cost of new frames fitted with sheets of wax *foundation* makes it a false economy. Another drawback to buying second-hand equipment is that you can come across non-standard sizes (especially with *WBC* hives) - and some beekeepers are convinced that their hive design (or modification) is better than anything on the market! New equipment is expensive but it will last - sizes are standard and you should be able to sell more easily if you later wish to do so. It is possible, of course, if you are a DIY type to make your own hives. Plans of common hives (including the *National*) are readily available, but accuracy is essential if the bee space is to be maintained - failure in this respect will create many problems when examining bees. The hive must be soundly constructed and waterproof - an important quality, especially with single-walled hives.

In the past, old wooden food boxes were used by 'cottagers' to make hives. Plans for *cottage* or *cottager* hives from scrap timber appear in *The Beekeepers Quarterly* (No. 35 Autumn 1993). The brood box can be made compatible with *National* supers (see below).

Hives are designed to give a bee-space either above or below the frames. The *Smith*, *Langstroth* and *Dadant* hives have top bee-space. The *WBC*, *National* and the *Commercial* have bottom bee-space so that the tops of the frames are flush with the top edges of the box and the bottom bars are 9 mm (3/8") short of the lower edges. In addition, the *Smith* and *Commercial* hives are fitted with short lug frames - the others have long lug frames.

The single-walled hive consists of a floor with an entrance on which is placed the *brood box*. As the name suggests, the brood box is the part of the hive in which brood is reared and is, therefore, the area where the queen resides. The queen is restricted to the bottom brood box by placing a *queen excluder* over the top. The most commonly used type is a flexible zinc sheet with slots of a size which allow

the workers through into the boxes placed above. The queen being larger is unable to pass through. The excluder is placed on top of the brood box with the slots at right angles to the top bars of the frames underneath. This type of excluder can be used only on bottom bee-space hives. If you have a choice of *long slot* or *short slot* choose a short slot excluder - if the slots are damaged when scraping the excluder free of wax and propolis, the queen may be able to squeeze through into the boxes above. Nowadays, excluders can be obtained in a thicker more rigid form or in plastic. For top bee-space hives, the excluder is mounted in a wooden frame to give rigidity and a bee-space underneath. In summer, to provide more space for the growing number of bees and for the storage of nectar, the hive is enlarged by adding boxes above the brood box - the *supers*. In a good year, bees will accumulate more honey than they need in the supers. It is from the supers that surplus honey is harvested. These are usually less deep than the brood box to reduce the weight of each box to make lifting and carrying full supers easier. A deep frame can hold 5 lb of honey, a shallow frame can hold 3 lb. A box holding 9 or 10 shallow frames is obviously to be preferred.

One beekeeper, as he got older and less able to lift heavy boxes, used shallow boxes as brood boxes - this has the additional advantage of using the same sized frame throughout the hive. Anyone having difficulty lifting should investigate the *Long Hive* in which frames are added horizontally rather than vertically - plans have been published.

The brood box usually contains 11 deep frames each holding a sheet of wax foundation impressed with the hexagonal cell pattern of natural honeycomb. Because of the way bees produce wax and manipulate it into comb, natural comb is rounded in shape (a *catenary curve* - a fact made use of in the *Catenary* hive. See *Home Honey Production* by W B Bielby for details). Providing them with foundation encourages the bees to construct rectangular combs within the frames, enables them to build combs evenly and quickly and saves them energy. It is estimated that bees may need to consume 6 lb honey to produce 1 lb of wax. The bees draw out the foundation and add wax to build cells in which either the queen will lay her eggs or the workers will store honey and pollen.

The relatively small size of the British standard frame was fixed in 1882 by the BBKA when the non-prolific English black bee was the common bee. To accommodate more prolific queens, beekeepers resort to using two brood boxes - *double brood* - or a brood box and a shallow box - *brood and a half* - to provide a greater brood rearing area. This complicates routine inspections - either use a non-prolific bee or a larger hive.

**Comparative Brood Box Capacities:**

Hive Type	No. of Frames	Size of Frames (inches)	Comb Area (sq. ins.)	Total Comb Area (sq. ins.)	No. of Cells	Equivalent no.BS Frames
Dadant	11	17 5/8 x 11 1/4	396	4362	93,000	18
Commercial	11	16 x 10	320	3520	75,000	15
Langstroth	10	17 5/8 x 9 1/8	322	3220	68,000	14
National/Smith	11	14 x 8 1/2	238	2618	58,000	11
WBC	10	14 x 8 1/2	238	2380	53,000	10

If the frames are placed so that they are parallel to the entrance they are said to be *warm way*. When the frames are at right angles to the entrance, i.e. the frames are parallel to the hive sides, they are *cold way* - presumably *cold way* because draughts can blow straight back and through the combs, whereas when *warm way* the combs in front protect those behind. Fierce arguments have raged over this matter in the past. Most beekeepers prefer to work at the back of the open hive and this necessitates having the frames arranged *warm way*. Whichever way you choose (and the bees don't seem to care!), make sure the supers are placed with the combs aligned in the same direction as the brood box.

The supers are usually fitted with 9 or 10 shallow frames fitted with foundation. The sizes of the frames depend on the type of hive being used. *British Standard* frames (both deep and shallow) will fit *National* and *WBC* hives - and the *Smith* hive if the frame lugs are shortened. It is necessary that the frames are kept the correct distance apart to produce even combs and maintain the bee-space. There are several methods of doing this, but metal or plastic spacers which fit on the ends of the top bars are commonly used. It is also possible to buy self-spacing frames called *Hoffmans*, which are to be preferred, at least in the brood box. In these the upper part of the frame side bar is expanded to form a shoulder to hold the combs at the correct distance apart. The brood frames are fitted with 'narrow' spacing and the super frames with 'wide' spacing - the latter to enable fatter combs to be built. To facilitate the building of even combs from foundation in super frames, the frames are put on narrow spacing until the bees have drawn out the comb. This can be achieved by overlapping the wide spacers which will give narrow spacing. Alternatively, use 10 frames rather than 9 in the super on wide spacing. All foundation used in the brood box and the supers should be *worker base* (5 cells to the inch), reinforced with imbedded wires. It used to be recommended that *drone base* foundation be used in the supers (4 cells to the inch) to make extraction of honey easier, but this is not recommended for the beginner. If the queen manages to get through a damaged queen excluder into the super, you will have a lot of drones!

It is possible to make your own foundation from your own wax using a commercially available press or by making one. Details may be found in

*Backyard Beekeeping* by William Scott (Prism Press). A wiring board for imbedding wire into the foundation is also easily constructed.

A wooden board (the *crown board*, cover board or inner cover) is placed on the top box under the roof. When the super is required for extraction and the supers have to be removed, bee escapes are fitted and it becomes a *clearer board* - it is then placed under the super to be cleared. The Porter bee escape, the commonest type, allows the bees to go down, but springs prevent their return.

Instead of using a wooden board, a frame fitted with glass may be used - which enables examination of the bees without removing the cover. Strangely, it is called a glass quilt - quilts or pieces of calico or cloth were used as covers.

Wooden hive parts should be treated externally with a suitable preservative, free of insecticide, to extend their use. Creosote should not be used. *Vaseline* may be smeared on frame runners to prevent the frames being glued with propolis. Propolis may be removed from spacers by boiling them in water to which washing soda is added - *Mangers Soap* or methylated spirits may also be used. If propolised queen excluders are left out in the winter to get cold, the propolis becomes brittle and may be knocked off. Propolis screens may be purchased in order to harvest propolis - the same method may be used or they can be put in the freezer!

A smoker is a device for generating smoke. When bees detect smoke, they rush to gorge on honey from open cells in readiness to flee - presumably an instinct evolved when they were naturally tree-dwelling. However, a puff of smoke usually subdues the bees and makes them easier to handle - "usually" because some bees become more agitated when smoked! The minimum of smoke should be used to control the bees - it is often difficult to see a beginner (and some 'experienced' beekeepers) because of the clouds of smoke belching from their smoker!

Most books recommend smoking into the entrance - this drives the bees to the top to meet the beekeeper, when the roof and cover are removed! Smoke through the feed hole in the cover, wait a couple of minutes, and remove the cover giving a little smoke over the frames as you do so. As you become more experienced, you should be assessing your bees for such qualities as temper - this needs to be done with the minimum of control. It is also worth remembering that our neighbours will not have the advantage of being able to subdue your bees with smoke. And your smoker will go out - and you will forget it!! Like your hive tool, never put it down or you will tread on it - keep it between your thighs! If you have an out-piary, keep a disposable lighter (matches become damp), fuel and even a spare smoker under the roof of a hive. Do buy the largest smoker you can afford, especially if you have several colonies to examine. 'Improve' your smoker by screwing a coat hook onto the back so that you can hang it from the side of the hive, add a tobacco tin for storing matches and a cork for extinguishing the smoker - much better than stuffing the nozzle with grass and it improves visibility

when driving home! Write your name and 'phone number on the back to avoid arguments at association apiary meetings. Try to use fuel that produces pleasant smelling smoke and keeps alight. Corrugated cardboard from boxes is often treated with fire retardant and is quite useless. Wood shavings, sacking and (best of all) dry rotten wood are satisfactory fuels. If your smoker is burning too fiercely, put it down on its side.

Spring clean your smoker with oven cleaner - repair with *Plastic Padding!*

An alternative to using smoke is to wet the bees with a fine mist of water from a spray bottle - not universally popular (I have known only two beekeepers who used this method), but useful in an emergency. It is now possible to buy a sachet of *Liquid Smoke* – a black liquid that is added to the water to be sprayed on the bees. The water smells of smoke, but I am sure it is the wetting effect that is important! The use of carbolic cloths was once a recommended method, but is no longer allowed because of the risk of contaminating honey and the risk to health. Other chemical repellents have been used to subdue bees and to remove them from the super: viz propionic anhydride (more effective when mixed with propionic acid), butyric anhydride (sold under the trade name *Bee-Go*), and benzaldehyde. Although smelling pleasantly of almonds, inhalation of benzaldehyde may cause convulsions and is narcotic in high doses - contact may cause dermatitis. But why run the risk of tainting honey and, in my experience, giving oneself a bad headache - stick with smoke and the clearer board!

In my collection of beekeeping snippets I find the following recipe for *Anaesthetising Vicious Bees*:

Methylated Spirits 1 part.  
Ether 2 parts.  
Chloroform 2 parts.

Don't ever keep bees that need this sort of treatment. Killing them with petrol would be a better method of dealing with them!

A veil is worn to protect the most sensitive parts of the body - a sting in the eye or mouth would, at least, be very painful. The increased confidence complete protection gives a beginner makes it worthwhile spending a bit more and buying a combined jacket, veil and hat (or hood). However, when experience and confidence have been achieved, you should not need to prepare yourself for warfare every time you go near your bees. Too much protection can isolate you from the mood of your bees and you may continue doing things when the bees are telling you to stop and go away! It is very important to remember that you may be well protected, but your neighbours are not and are likely to be attacked by very angry bees. If your bees always require you to wear battledress, then get rid of them and replace them with a more docile strain.

Gloves give confidence in handling bees - with experience many beekeepers prefer to work with bare hands. Commercial beekeepers having to examine many hives wear gloves mainly to keep their hands free of propolis - also known as *bee glue*! It is brown and sticky and difficult to remove, especially when it gets on clothing, the car's steering wheel, etc. A hive tool is used to prise frames apart after they have been stuck together with propolis and to scrape frames clean of wax.

The first rule of beekeeping is "Never put your hive tool down". You will - and you will lose it! Paint your hive tool a bright colour - not green! Incidentally, the second rule of beekeeping is "Never do a temporary repair - it will become permanent"!

Adequate protection, judicious use of smoke, docile bees and a calm approach keep stings to a minimum.

Disposable gloves or rubber washing-up gloves are a cheap alternative to bee gloves and have the advantage that they can be replaced when soiled. An old chisel or a wide screwdriver can be used as a hive tool. However, using the right equipment will greatly aid your learning.

The parts to make a hive are usually bought 'in the flat' and need to be assembled - easier than building a wardrobe, but some knowledge is required. Seek the help of an experienced beekeeper - Thorne's catalogue gives instructions.

As your interest develops you will be tempted to buy more equipment - not all of it essential! You will eventually need to have such items as a queen cage, queen marker, etc. You will certainly need an extractor, jars & labels for the honey you will harvest.

***The following, then, is a list of essential equipment for one hive:***

- ❖ Floor and entrance block.
- ❖ Brood box.
- ❖ 11 deep frames fitted with wired foundation and narrow spacers (or use Hoffman frames).
- ❖ 9/10 shallow frames fitted with foundation (wired or unwired) and wide spacers (or use Hoffman frames or castellations).
- ❖ Queen excluder.
- ❖ Crown board/clearer board fitted with bee escapes.
- ❖ Roof.
- ❖ Varroa screen.

**In addition to the hive you will need:**

- ❖ Veil.
- ❖ Smoker.
- ❖ Gloves.
- ❖ Hive tool.
- ❖ Feeder (used to feed sugar syrup in times of shortage etc. A 1 lb. honey jar or lever-lid tin with holes made in the lid is satisfactory).