

SECTION 3 – WILD BEES, NESTS AND TRADITIONAL HIVES

Bees have produced honey long before humans appeared on the Earth and continue to do so with or without human help or interference. The wild bee colonies that are diseased or weak tend to die out and the strong healthy ones remain by a process of natural selection.

In the wild, bees will establish themselves in any suitably-sized cavity which could be located in a hollow tree, a rock crevice or hole in the ground. Such a home will be at a favoured height, suitably sheltered, dry, well ventilated so as not to get too hot or too cold. The entrance will be small enough to be easily defended.



FIG. 27. In the wild, honey bee colonies can be found in rock crevices, trees or buildings.

The cavity will be quite dark and this encourages the bees to start making comb. However, once they have started to make comb they will continue even if the light intensity increases.

The combs are always built vertically downwards and are two-sided. They are comprised of hexagonal (six-sided) cells which will contain the stored honey at the top of the comb. This is often followed by a band of stored pollen and below this cells will be filled with brood. The distribution of stores and food always follows this plan. This is important when it comes to harvesting the honey.

A swarm of bees will start to make a honeycomb provided a queen is present and they are in a position of low light intensity. Comb construction starts from one point. The comb will develop downwards in a curve similar to that taken by a bicycle chain held at two points approximately 450 mm (18 inches) apart. Further combs will develop on each side of the first one at a space of about 32 mm (1¼ inches) from the centre of one comb to the centre of the next.

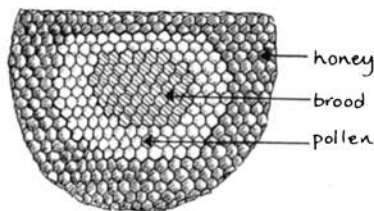


FIG. 28. Whether they live in hives or in the wild, bees build nests made of wax cells in vertical sheets (comb). In some cells brood develops into young bees and in other cells pollen and honey is stored.



FIG. 29. Comb developed by bees in a box without frames or top bars. Combs are always constructed parallel to one another but may curve. The distance between the surfaces of the comb is the 'bee space'.

Eventually, in the wild there can be five or six roughly parallel combs. The largest comb will be in the middle and will measure about 350 mm (14 inches) in width and 280 mm (11 inches) in depth. The combs each side of the central one get progressively smaller. However, this is an ideal situation and bees will make their combs fit the cavity.

Combs are always constructed parallel to one another but may curve. The distance between the surfaces of the comb is the same. This is the 'bee space'.

The bee space, or bee way, is the path or corridor bees need to move between the combs and around the nest. It is between 6–10 mm ($\frac{1}{4}$ inch and $\frac{3}{8}$ inch). If there is a space less than 6 mm ($\frac{1}{4}$ inch) bees will fill it with propolis (bee gum). If it is more than 10 mm ($\frac{3}{8}$ inch) then burr or bracing comb is constructed. These do occur in wild colonies but also in hives that have been constructed by humans, particularly if insufficient attention has been paid to construction and accurate measurement.

Anyone making a hive must make sure that the correct bee space is provided or the hive will not work efficiently. This is very important in the construction of frame hives which must be machine-made by highly skilled craft workers from well-seasoned timber. Construction of top-bar and fixed-comb hives is easier.

Colonies of honey bees reproduce by division of the adult population and the migration of a part of the colony (a swarm) to a new place. Each swarm carries the adult queen from the parent colony where she is replaced by a new queen reared there before or after the swarming.

Reproductive swarming is not the only type of swarming as bees are sometimes forced to migrate for other reasons. For example, if they are seriously disturbed, or disturbed too often, they will abscond. Similarly if there is not enough food in an area they will be forced to migrate (hunger swarming).

Wild bees are increasingly having their habitats destroyed by new farming methods

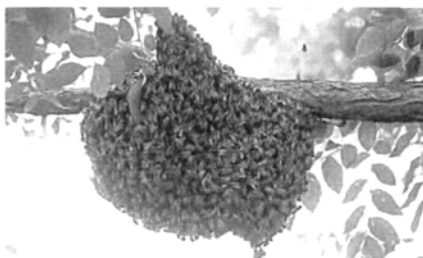


FIG. 30. A swarm that has settled in a shady tree.

and often suffer the ultimate destruction of being smoked out or killed for the short-term gain of just one honey crop. Often the larval and pupal stages are also eaten and any bees that survive are doomed. This is destructive not only to the bees but to the whole environment. If, instead of being destroyed bees are encouraged to settle into pots or bark hives, then just the honey is harvested and the brood survives. This does not require any knowledge of the biology or management of the colony but at least ensures that the bees continue to exist.

Traditional hives

This is an intermediate step between hunting, robbing and killing bees in a nest and keeping bees in a totally managed environment. The traditional hives are made from any suitable material easily available in the area.

Bees have been kept in hives for at least 4,500 years and traditional hives are simple, purpose-built containers for the bees and their combs. In many there are no fittings, such as the frames associated with modern beekeeping, and bees secure their combs to the interior of the hive. These hives are now referred to as 'fixed comb' in order to differentiate them from movable-comb hives.

In fixed-comb hives the beekeeper can remove the combs for harvesting, or any

other purpose, only by cutting them away. With movable-frame and movable-comb hives any comb can be removed, replaced or exchanged with another as a unit without any cutting or breaking.

Bark has been used for centuries to produce cylindrical hives. It is stripped from the tree and fastened together to form a pipe. However, this process is very destructive. The debarking kills trees which have already been much reduced in numbers and so alternatives should be found which do not further degrade the environment.

Hollowed logs can be taken from dead or already felled trees.

Another alternative is to make a light framework of rings and to cover them with a thatching material, grass, reeds or banana fibre, which may be plastered with mud or cow dung.

Metal drums or cylinders made out of hammered corrugated-iron sheeting have been used but unless well shaded they must be covered with some insulating material in order to avoid excessive heat. Sometimes a wooden hive can be protected by being placed inside an old oil drum.

The most common type of traditional hive is a cylinder, or even a box with a square cross-

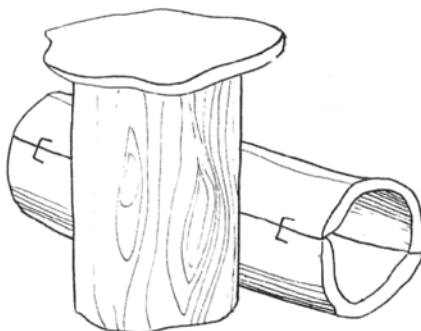


FIG. 31. Traditional fixed-comb hives made from hollow logs.



FIG. 32. Close up of a log hive suspended from a branch.



FIG. 33. Hive made out of woven materials which can be plastered in mud or dung.



FIG. 34. A box hive placed inside an old oil drum for protection.

section, laid horizontally. In its most basic form, only one end of the hive can be opened. In more developed forms, both ends can be removed to give access. A skilled beekeeper can perform a great number of management operations, even with such a basic hive.

The flight entrance for the bees is at one end of the cylinder near the edge of the closure. To harvest the honey, the beekeeper removes the back end closure and blows smoke through the opening into the hive to drive the bees towards the front. The brood is at the front of the hive and the honey is stored towards the back. The back combs of honey, once relatively free of bees, can be cut out one by one, while the brood, which is the next generation of workers, can be left almost undisturbed.

From very early in their pursuit of honey, people learned to use smoke to repel the bees and reduce their aggression. Smoke has a subduing effect and induces the bees to feed. Bees full of honey are generally easier to handle.

Skilled beekeepers open the front closure and can, after smoking, remove the brood combs and inspect them. It is then possible

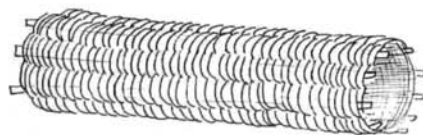


FIG. 35. Woven canes covered with mud or dung.

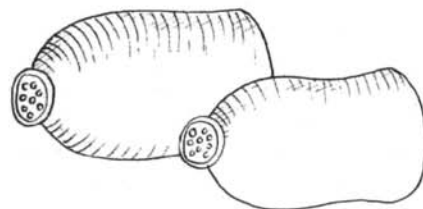


FIG. 36. Gourds, clay pots or calabashes.

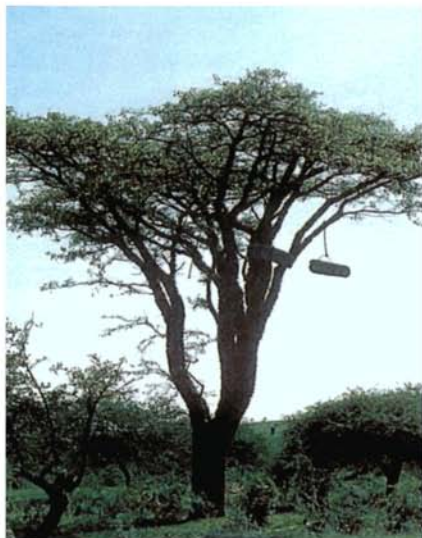


FIG. 37. Traditional log hive suspended from a tree where it is safe from most predators.

to place this young brood along with some adult bees in an empty hive and so start a new colony. Alternatively, they could be cleaned of bees and used to prime an empty hive to receive a swarm. Of course, it would be necessary to fix each comb with a stick or twig ensuring that the correct bee space is maintained.

Many beekeepers in East Africa use a horizontal hollow log for a hive suspended from a tree to protect it from enemies. Some beekeepers cut the log lengthways at or below the centre line and tie the two parts together with vines, ropes or wire. When harvesting honey, the log is forced apart, the upper part usually having the combs attached to it. The combs are cut away and the log tied together and once again returned to the tree.

When developing beekeeping as a micro-economic activity with tropical bees, the



FIG. 38. Harvesting from a traditional hive . Note the many dead and unconscious bees overcome by smoke.



FIG. 39. Hives with movable frames have many advantages over traditional fixed-comb hives. The top-bar hive is one of the simplest movable-frame hives. It is a single long box that can be constructed from locally available materials such as straw.

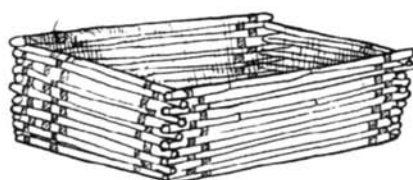


FIG. 40. Bamboo.



FIG. 41. Wood which can come from old packing boxes or crates.

introduction of modern upright hives is not the only alternative. Upright hives were developed in temperate countries where bees have to survive winters and periods of cold weather. Thus, by storing honey above the brood and bee cluster, these winter supplies provide insulation by retaining the heat of the cluster.

In tropical and sub-tropical areas, retaining heat is not a problem, indeed it is usually warm enough for bees to forage all year. Bees in the horizontal hive may help to avoid overheating by spreading out to the ends. Much progress can be made whether the hives are of the traditional kind or with top bars or frames.

Modern beekeeping with movable-frame box hives often involves operations which change and swap frames and boxes with bees between hives or even movement from one part of the country to another. There are benefits to be obtained from this but there are also dangers. Diseases and parasites, new to an area, can be brought in and spread. When they reach fixed-comb hives such pests and diseases go undetected and so go untreated with disastrous consequences.

In areas where there are only fixed-comb hives, the causes of bee ill health may not be understood but there is less chance of transmission from one colony to another.

Traditional hives give a modest amount of honey (and about 10% of the honey weight in beeswax). This is achieved at a minimal cost in materials and labour. Improvements in yield can be brought about but require a certain investment in time, labour and, to a lesser degree, materials.

Modern hives consist of a series of boxes (tiered boxes) stacked vertically. Each box is fitted with appropriate-sized, four-sided frames in which the bees build their comb.

It is possible to have movable combs without these complexities and materials. Such hives only have a top bar. The bees build down from the bar therefore the beekeeper can remove any comb from the hive just by lifting the top bar. A long single box is commonly used for such a hive. The top bars fit closely together so that the bees cannot pass between them. Often, boxes originally constructed for another purpose can be successfully adapted into this type of hive.