SECTION 8 – HIVE PRODUCTS
BEESWAX

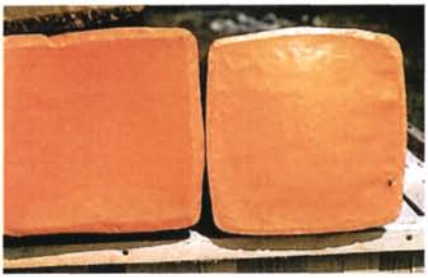

FIG. 78. Blocks of beeswax for the commercial market.

New pure beeswax is white in colour but the presence of pollen, propolis and impurities cause it to become yellow and it darkens even more with age.

It is a valuable product which can provide a worthwhile income in addition to honey and, unlike honey, beeswax does not require careful packaging; this simplifies transport and storage.

Beekeeping using movable-frame hives results in the harvesting of relatively little beeswax, as empty honeycombs are returned to the hive after the extraction of honey. Beekeeping using traditional hives or movable-comb (top-bar) hives results in greater yields of beeswax since the delicate honeycomb is broken during the extraction of honey, and cannot be returned to the hive. Beeswax can be a valuable export crop and there is strong demand on the world market. In some countries wax, rather than honey is therefore the most valued product of beekeeping.

In areas where most or all of the honey produced is consumed locally, and where there is no local use for beeswax, honeycombs are often simply discarded. The development of a wax-collecting system can, by encouraging each beekeeper in the area to save beeswax, and by organizing the sale of the combined crop, provide a source of income from an otherwise wasted resource. Both honey-hunters and beekeepers should realize that beeswax is a valuable product in addition to honey.

Beeswax is valued according to its purity and sometimes its colour (light-coloured wax is often more highly valued than dark-coloured).

Among insect waxes, beeswax has a comparatively low melting point (about 63°C, 145°F). It is an unusual material in that it remains supple and plastic at temperatures as low as 35°C (95°F) – the temperature of the brood chamber. At temperatures between 25°C and 35°C (77°F and 95°F) the comb is so strong that a few grams of comb can support several kilograms of honey.

Beeswax is secreted from four pairs of glands to be found on the underside of the worker's abdomen. These glands function when the bee is between nine and 17 days old.

On contact with air the wax hardens and forms scales, which can be seen as small flakes of wax on the underside of the bee. Bees use the stiff hairs on their hind legs to remove the scales of wax and pass them on to the middle legs and so to the mandibles (jaws) where wax is chewed before it is incorporated into honeycomb. Bees are stimulated to produce wax when there is surplus honey to be stored and a lack of honeycomb in which to store it.

The wax is an inert and largely indigestible material which can retain its shape and quality for many hundreds of years. Beeswax

does not mix with or absorb water and can form a protective layer impermeable to water.

The process by which wax from combs is converted into blocks of clean wax by melting is known as rendering.

Cappings give the best quality wax, but fresh comb recently removed from wild nests or broken from top bars is also satisfactory. Dark combs are of least use because with increasing age they contain more propolis and render little wax. Light and dark comb should not be mixed as this will reduce the value of the end product.

Wax-rendering can be a messy undertaking and so the task is only performed once or twice in a year. Specialist equipment is available but it is an expensive investment for something which receives so little use.

All methods of rendering involve melting the wax. Since beeswax is a very inflammable material care must be taken not to start a fire. It is particularly dangerous to heat beeswax over an open flame indoors.

Therefore, methods which heat the wax in water are much safer than using heat alone.

Vessels used in processing beeswax should be made of: stainless steel, aluminium, unchipped enamel or galvanized iron NOT zinc, brass, copper or iron as these discolour the wax.

To begin the rendering, make sure the comb is clean and as much honey as possible has been removed. This can be done by washing or soaking in warm water. The water must be clean. Rain-water is ideal as it is very slightly acid and this helps in the cleaning process.

The wax can be broken into small pieces and put into a pan. At this point there are two alternatives. Water can be added to the broken comb and the whole mixture heated

FIG. 79. Straining wax. Beeswax, which has been melted in water, is scooped up and put through a bag of coarse fibres that can be squeezed using two parallel sticks as well as wringing the bag with the hands.

GENTLY until the wax melts. Alternatively a small pan containing just the pieces of wax can be placed in a bigger pan containing water – a water bath. The big pan is heated, again gently, and as the water warms it melts the wax in the inner pan.

Beeswax melts at about 63°C (145°F) so never overheat the water; certainly do NOT boil it as this could ruin the wax.

The melted wax or wax and water mixture must now be strained. A number of materials can be used for this as the aim is to produce something equivalent to about a 3 mm (⅛ inch) mesh. This can be a long bag of cotton material or even closely woven vegetable fibres. Specialist and cooking sieves are also available but remember to choose a material that will not contaminate the wax and to ensure that everything used is clean.

Sometimes it is worth repeating the process with a finer mesh.

The wax or wax/water mixture is collected in another pan which may have had the sides smeared with non-scented soapy water. It is then allowed to cool in a place where it will not become recontaminated with dust or insects. The wax will harden as a layer on the water. Do not disturb it until completely set which may be in 12 or even 24 hours. Then knock the wax out of the pan or bowl and scrape off any remaining impurities which may be stuck to it. The block of wax obtained in this way will reflect the shape and size of the container in which it was collected. It is ready for sale but do not be surprised if the buyer wants to break it into small pieces. This is because people sometimes cheat and put stones or sand into the setting beeswax to increase the weight.

This is evil and reduces the value of beeswax for all good honest beekeepers.

Solar wax extractor

The solar wax extractor provides a simple and safe way of melting beeswax and costs nothing to operate because it uses the heat of the sun. Again, only clean wax should be used and then one melting will produce a satisfactory block of wax.

The solar wax extractor is a box with a glass or clear plastic lid. It has a floor or shelf of metal. The box is tilted at an angle to catch the sun. Pieces of honeycomb are placed on the metal sheet and, as they melt, wax runs down the metal slope to a container. The sheet of metal can be bent at the edges to funnel wax towards the container. A screen of wire mesh prevents pieces of comb and debris from slipping down into the container. Impurities in the wax tend to remain on the metal, and others can be scraped off the final solidified block of wax.

There are commercially made extractors but many have been produced using local materials and ingenuity. Often, two pieces of glass or perspex are used about 5 mm

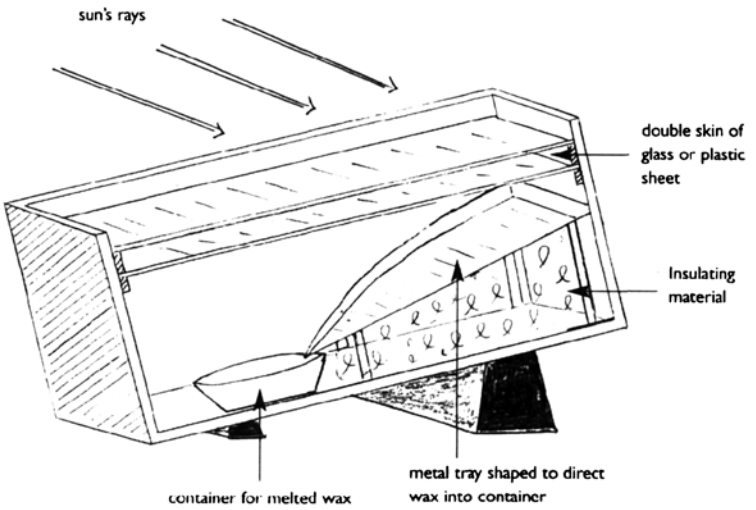

FIG. 80. Drawing of solar extractor.

(⅞ inch) apart to help retain a high temperature in the box. It is now possible to use insulated polycarbonate sheets which are produced as two skins separated by isolated channels of trapped air. Painting the walls of the box in a dark colour helps heat absorption. Insulating material underneath the metal sheet will also help to retain heat. However, most important is to gain maximum exposure to the direct rays of the sun for the maximum period. There must be no draught-creating cracks or gaps in the box, as these will encourage heat loss and, if large enough, would allow robber bees into the box. The extractor also needs to be ant-proof and set up in such a way that ants cannot gain access to it.

A simple way to melt down small scraps of comb is to place them on a piece of shiny metal foil and leave in the sun. In strong sunlight the wax will soon melt and can be poured into a container.

The residue left after beeswax has been rendered is sometimes referred to as 'Slumgum'. This is often thrown away but it has value to the beekeeper. Large amounts can be sold to commercial wax-rendering firms. But if only limited quantities are available it can be used as swarm bait if daubed inside catcher boxes.

Beeswax has a far wider range of uses than any other bee product.

If hives with movable-frames are in common usage then a major application of wax is in the production of foundation. Even with top-bar hives the use of a 'starter' strip of beeswax, or molten wax dribbled along the bar is important.

Foundation is made commercially by a continuous process in which a long sheet of beeswax is passed between two rollers which make a hexagon pattern on each side of the sheet. The pattern is offset so that the base of a cell on one side is opposite the junction of three walls on the other. These sheets are then cut into standard sizes to fit frames. When the frames are placed in the hive, the correct distance apart, the bees will set about constructing cell walls on the foundation. This process is referred to as 'drawing out foundation'. The resulting comb is said to be 'drawn out'.

Commercially-produced foundation can be sold in several thicknesses according to the number of sheets per kilogram. For example, about 13 sheets, suitable for Langstroth deep frames, weigh approximately one kilogram.

The beekeeper can make his own foundation using a mould. Such a cast has two opposite surfaces on which the hexagonal pattern is incised. These surfaces are usually hinged to ensure that when brought together the exact pattern where the base of the cells on the one side coincide with the point where three walls join on the other side is maintained. Wax, only just at the point of being molten, is poured over the lower surface. When this is covered the upper surface is closed upon it and sufficient pressure applied to emboss the hexagons.

The correct size of hexagonal brood cells varies according to the size of the bees that are to use it. Drone cells are slightly bigger than worker brood cells and so are sometimes used in supers as they hold more honey.

FIG. 81. A simple press to make wax foundation.

FIG. 82. Dipping – board method of making foundation.

Some beekeepers find it satisfactory to insert plain sheets of beeswax into their frames. Such a practice does not guarantee any regular construction of cells. Producing sheets of wax is not difficult. All that is needed is a wooden board just larger than the sheets required. It helps to have a handle of some kind on the short side, it is then wetted and dipped into molten wax and withdrawn. Practice will soon lead to sheets of the required thickness (about 1.5 mm, 1/16 inch) being deposited on each side of the board. When cool they can be peeled off and trimmed to size.

FIG. 83. Candles made by dipping wick into molten wax.

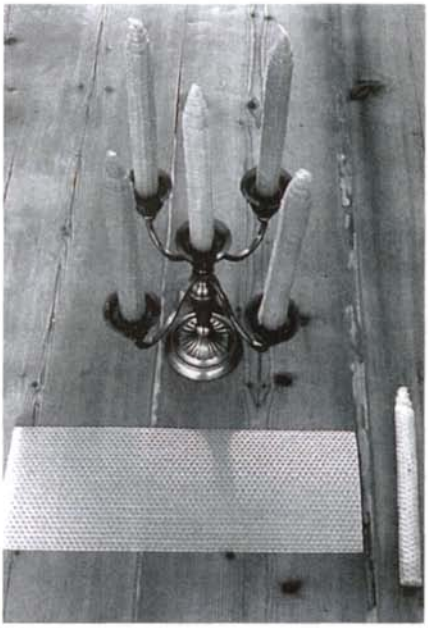

FIG. 84. Candles rolled from foundation or a sheet of beeswax.

Beeswax is still important in candle-making. It is a material that burns with a bright, steady flame and, as it has a higher melting point than cheaper waxes, the candle

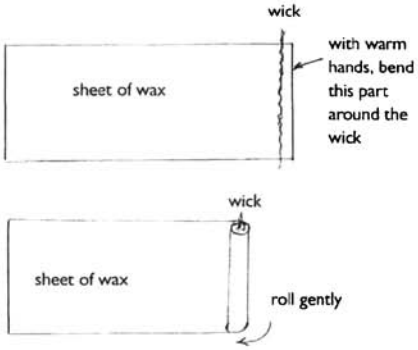

FIG. 85. How to roll a candle. Take a sheet of beeswax. Place a wick, which is longer than the wax, about 5mm from one end. Gently turn the edge to cover the wick. Then roll gently.

FIG. 86. Decorations can be made from beeswax.

remains upright in hot weather and does not smoke. Candles can be made in several ways.

Molten wax can be poured over a wick or the wick dipped into molten wax. Either way, the process is repeated until a candle of the desired thickness is acquired. Sheets of beeswax produced in the same manner as foundation can be carefully rolled around a wick until the desired diameter is achieved.

Many attractive candle moulds are available or can be made from local products like gourds or hollowed out fruits. The wicks are fixed in them before topping up with molten wax. Beeswax shrinks by about 10% when it solidifies and needs to be carefully removed from the mould when cool. Candles or small ornaments and plaques made this way have an appeal, particularly to tourists.

Beeswax can be an important ingredient in polishes and protective coatings. In its simplest form, polish can be made by dissolving wax in turpentine. The paste

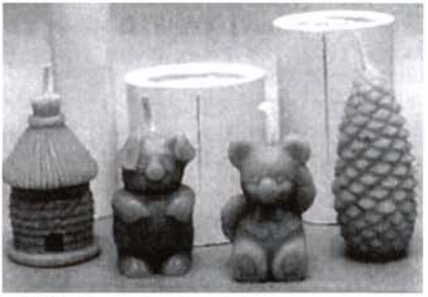

FIG. 87. Examples of moulds.

produced should spread easily and leave a very thin film when the solvent has evaporated. This film is then rubbed to give a smooth shining finish.

Between 60% and 70% of all the beeswax that is produced is used for cosmetics and pharmaceutical preparations. There is therefore a ready export market for the top quality product. This is another important reason to make sure that all operations are carried out with clean equipment and clean hands.