

# Maintaining a colony in an observation hive

Keeping an observation hive in school premises should not be taken on without considerable thought. For the school there can be both significant advantages and disadvantages:-

- In having it there all the time, it is available for class use at any time.
- It provides an opportunity to study a macro-society with very different communication mechanisms
- Respect for, rather than fear of, animals can be engendered

However against this are factors such as:-

- There are a limited number of lessons when the hive will be used
- The school will have safety problems if they do not have a member of staff who is a beekeeper
- Children are notorious at fiddling with equipment particularly if they can create a drama
- What happens during school holidays?
- The observation hive needs regular checking to ensure its continued usefulness. After a few weeks the bees often attach beeswax to the viewing glass. Although this can make it more interesting because transverse views through cells enable what goes on in cells to be seen better, it makes it impossible to see the bees on the combs.

If an observation hive is available to the school for short term observations of a few days or weeks, we would recommend the following:-

- The siting of the observation hive must be carefully considered. The exterior exit hole from the hive must be protected from vandalism and provide a clear flight path for the bees. An upstairs room will provide this. The hive must be fixed so it cannot be knocked over. The entrance tube to the hive must also be fixed. It is best positioned where both sides can easily be viewed. It is advisable to restrict children's access to times when a responsible

person is present. Children should be discouraged from tapping the glass.

- Daily observations should be made to check that the bees have enough food and water, that they do not become overcrowded, and that the exit tube does not become blocked. The observation hive should be fitted with a means of feeding the colony with concentrated sugar solution. This can be made up by mixing white table sugar with an equal quantity of tap water.
- If there is too much space for the queen to lay eggs, too many bees will build up in the hive and the hive will swarm. This does not happen overnight; there will have been several days of preparation activity leading up to this.

A queen cell will be prepared. Fewer bees will go out to collect pollen. The queen will be starved of food so she reduces in size making her more fit to fly.

In noticing this the beekeeper should be called in to close the hive entrance off at night. He will take the colony outside to remove the comb with most brood and replace it with a frame with just foundation. Alternatively a narrow strip of foundation can be used so that beeswax secretion and comb building can be observed. Care must be taken to leave the queen with the colony: this is easier if she has been marked clearly.

- If the bees prepare to swarm early in the season, the old queen could be removed enabling the making of a virgin queen to be observed.
- Bees are very clean animals. If debris is noticed building up in the bottom of the hive and no bees are leaving the exit tube outside, then a beekeeper should be contacted urgently to clean out the pipe. This is unlikely to take much time but should be carried out with no children around as bees can escape during the process.



# The Chalfont Observation Hive

## Detail and assembly instructions

The parts consist of:-

- The base A, the top B, and 2 sides C and D all cut from 18mm exterior plywood
- Items E, F, and G, which together with 2 small identical blocks H and a wire mesh screen form the feeder box into which fits a feeder jar. E, G and H are cut from 18mm plywood, F from 4mm. The screen can be cut from a piece of 3mm wire mesh.
- Two glass panels nominally 380x460x4 mm. However it may be better to take the completed hive without glass to a glazier to measure up and fit the glass, as it needs to fit well. One panel needs to be removable for loading the hive with bees and periodic maintenance.
- Two 3mm or 4mm plywood cover boards 460x378mm. Before cutting, check for squareness by measuring the diagonal which should be 595mm. Attach a piece of 20mm thickness polystyrene sheet 440x380 to one side of each cover board leaving 10mm top and bottom uncovered. This forms an insulated cover against the glass.
- Four wide plastic spacers to render the hive bee-tight when two National deep brood frames are inserted. The spacers need to be pushed fully home and have the bottom protruding lug cut off to enable the spacer to move right up to the outer vertical edge of the frame.
- Two metres of 8mm square soft wood strip for cutting to size and nailing into exact position the 2 fixed horizontal glazing strips on the base and the 4 fixed vertical glazing strips on the sides C and D.
- Two removable glazing strips to be fastened by screws through the top A. These should be from strips of 20x10 mm, 380mm long.
- Handles for sides to lift hive and for fronts of covers.
- Fastenings:- metal or plastic lip to screw to bottom front of hive to stop cover falling out, and screw toggle at top of hive to stop cover falling out at top while allowing removal of cover.

To assemble:-

1. First lay out all parts except for the glass.

2. Cut and nail the 8mm fixed glazing strips on to the base and vertical sides. They must be fixed accurately so that the spacing between the comb and glass is correct (see notes with drawing below and over leaf). The spacing between the insides of the two glass panels should be that of a wide plastic spacer used on National supers.
3. Cut and staple pieces 3mm wire mesh over all ventilation holes. Do not cover over the feeder or flight holes (bottom holes in the sides C and D).
4. Fit together parts A, D, and E so that points c and d, and w and z fit where shown. Complete the main frame by adding parts C and B. Check for squareness by using the plywood screen. These should be screwed and glued together.
5. Fix the other 2 sides of the feeder box F and G and the blocks H and K into position.
6. Take the hive to measure for the glass.
7. Fit the glass panels securing them by screws through the top into the removable glazing strips.
8. Fix the cover fastenings to the hive and fit handles as desired.

- Note 1: In the original design of the hive, vertical grooves were cut with a router (31mm in) along the length of the sides C and D into which to slot the glass. The use of vertical glazing strips is an alternative if a router is not available.
- Note 2: The sides C and D are drawn as seen from the outside. The vertical glazing strips should align with the horizontal glazing strips on the base A and are nailed in position on the inside of the sides (position shown dotted). The vertical glazing strips are of different lengths, 212 and 224mm, the shorter ones going to the top. The spacing between them must allow a frame and plastic spacer to pass between them when the frame is inserted into position. This will be so if they are fixed 7mm from the centre-line of the frame slot (14mm separating them).
- Note 3: No liability can be accepted for the accuracy of the dimensions and method of assembly described. The dimensions were taken from 2 hives that had been made up, one with glazing strips and one with routered slots. A hive has not been made directly from the plans drawn up here but permission was granted to draw them out and publish them from Alec Warden, the designer of the hive.
- Note 4: A variant of the Chalfont Observation Hive has a slot in the base of the hive. The slot is covered by queen excluder and stands on a nucleus hive with an opening in its roof to take the base of

the observation hive. The two units must be clamped securely together. The Thornes observation hive is a properly constructed development of this.

## The Thornes Travelling Observation Hive



This hive has been proved to be very effective for use by beekeepers in schools. It comes in two parts, a nucleus hive and a glazed top section which securely fixes on to the top of the nucleus hive. With such a broad base, the combined unit is very stable. It therefore sits in a car without toppling over. Similarly, when displayed on a table in school, it is very difficult to knock over.

A small colony is established in the nucleus box and left to develop at its own pace, in a garden or convenient apiary. When it is required for a display, the top glazed portion is added. The frame with the queen on it is removed from the nucleus and lowered into the glazed part which is sealed with a lid. A frame-sized feeder with sugar syrup is then placed into the nucleus to replace the removed frame. The glazed top section is clamped to the nucleus box, the entrance of which is securely screwed shut. Strong handles enable the whole unit to be carried away.

The design of the hive allows the colony to remain a fully functional entity with the queen in permanent view. A piece of queen excluder prevents the queen from walking down out of the glazed portion into the nucleus below, while worker bees can move up and down, as they wish. So, children can see the queen laying, interactions between different bees, nursing of larvae, food sharing, and many other aspects of behaviour. The bees do all

this calmly, without panic, because they have access to darkness, ventilation and liquid food. A mesh floor provides ventilation. If necessary, they can be confined without discomfort for three or four days, while maintaining their working temperature naturally.

Whilst on display, the queen will have laid eggs in most of the available cells on the frame of comb on which she has been living. After the show, when the bees are taken home, the glazed portion is removed, and the queen on her frame put back in with the nucleus, where she can move to lay eggs on other frames in cells that the colony have prepared.

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Notice to put on an observation hive at a show

# Honeybee Observation Hive

In this hive, you can see many worker honeybees moving around on the beeswax honeycomb. You will also notice the queen bee with a painted coloured mark on her thorax. She has a longer abdomen which is shaped like a carrot. There may also be drones (male bees) between May and early August. These are the larger rectangular bees with furry bottoms.

Look carefully at the cells. The cells which are capped with dark brown cappings have been sealed by worker bees to allow them to pupate when they change from larvae or white grubs into adult bees. You may see a bee hatching from one of these cells as it bites its way out.

Look into the cells near to the dark brown cappings. Can you see the white larvae or grubs? You may also see a tiny white egg in the bottom of a cell in this area, as it is where the queen will be laying eggs.

This observation hive represents a section through a full sized hive. In a full sized hive, the nest can be likened to a football. In the centre is the nursery, where the queen lays the eggs. Around the nursery, the workers store pollen mixed with a little honey. This is often called bee bread. Its colour depends on the colour of the pollen from which it is made. Around this they store pure honey, which glistens with reflected light. When they have evaporated most of the water from the honey, they cap with pure wax to protect it. These cappings are much lighter in colour.

The shape of each cell in the honeycomb is said to be hexagonal. How many sides has a hexagon? How well do they fit together? Can you see that if they fit together snugly that they support each other. Constructing with hexagons is known to produce one of the strongest engineering structures.

You may see a worker bee rushing round carrying a piece of debris or even a dead bee. Bees are very clean animals and this worker is trying to find a way out to remove the rubbish.