Ian Rumsey

Beekeeping - Pure and Simple

Chapter 1

We See

My friend the bee, what do you see,
Beyond your own domain?

We see the dark clouds in the West,
Around about Bude Bay,
Resistant mites, with appetites,
Are coming up our way.

We see our Keepers almost slain,
Upon their knees in utmost pain,
They cannot help us any more,
We must return to nature's law.

We see with eyes you cannot see,
Our feral sisters hold the key,
The secrets lay within our home,
Designed by us in natural comb.

The Hive

The hive consists of an inner and an outer body. The inner body is constructed with 1/4 inch thick material and comprises of square boxes 6 inches deep, without top or bottom, with an internal dimension of 9 inches. One side of each box is made of a transparent material. (Fig 1 refers).

The outer body is made of 1 inch thick material but in this case the boxes have an external dimension of 14 inches. (Fig 2 refers). The base section of the outer hive is modified to include 2 cross pieces to support the inner hive, and one side of the base is removable to allow the floor to be inspected. (Fig 3 refers).

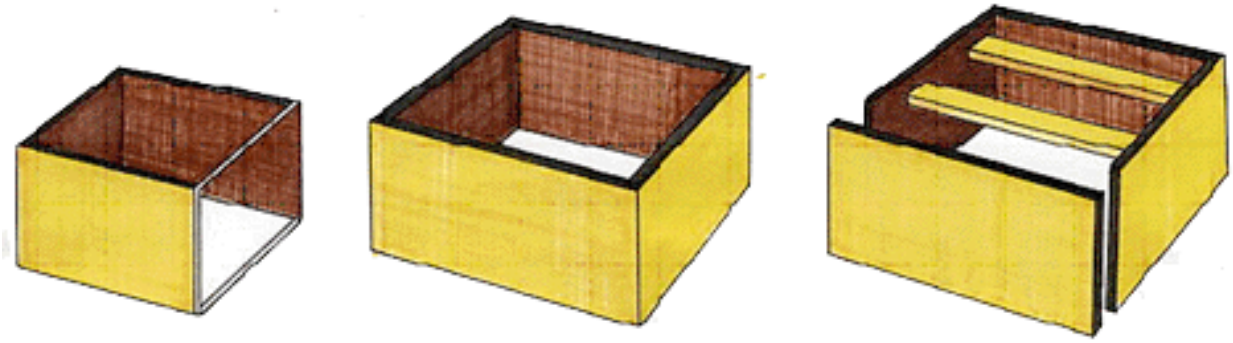
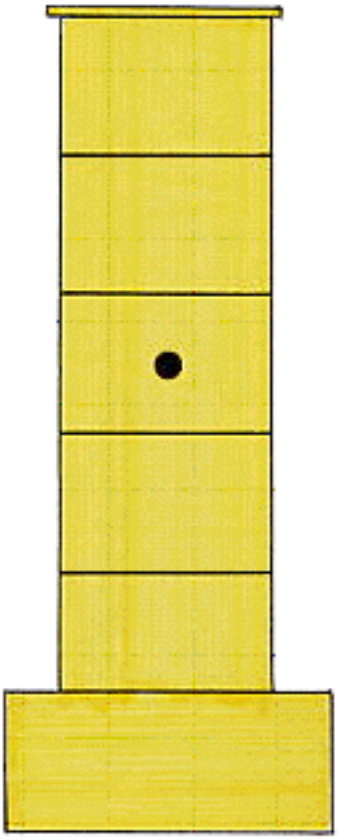


Fig. 1
Fig. 2
Fig. 3

The inner hive is mounted upon this base and comprises of 5 inner sections placed upon each other, one section being provided with an entrance hole. A 10 inch square board is placed on top to form the roof of the inner hive. (Fig 4 refers) .
A similar number of outer sections are now placed over the inner hive with one section also being provided with an entrance. An 18 inch square board is placed on top to form a roof. (Fig 5 refers).



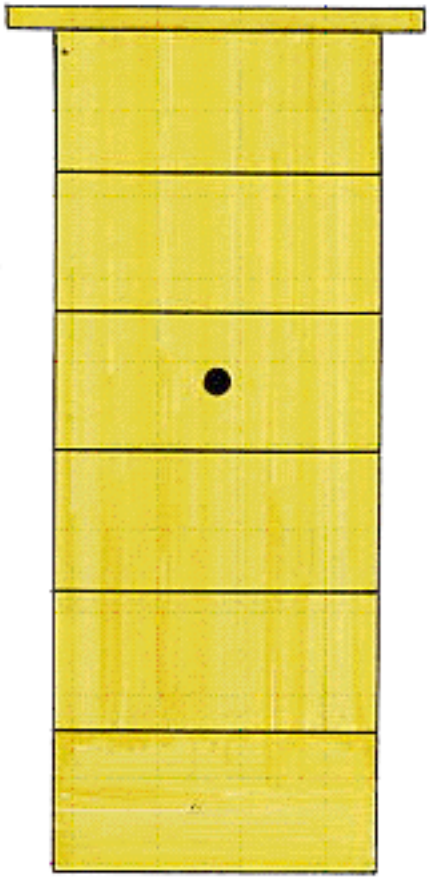


Fig. 4
Fig. 5

A swarm is placed within the inner hive and allowed to develop naturally. Observations may be made by removing upper sections of the outer hive.

Approximately 2 years are allowed to pass.

By removing the outer hive the position of the clustering bees may be observed. (Fig 6 refers).

The colony is then 'topped and tailed' with the use of a cheese wire, and the portion containing the cluster placed upon empty inner hive sections. (Figs 7 and 8 refer).

The outer hive sections are replaced and another year is allowed to elapse.

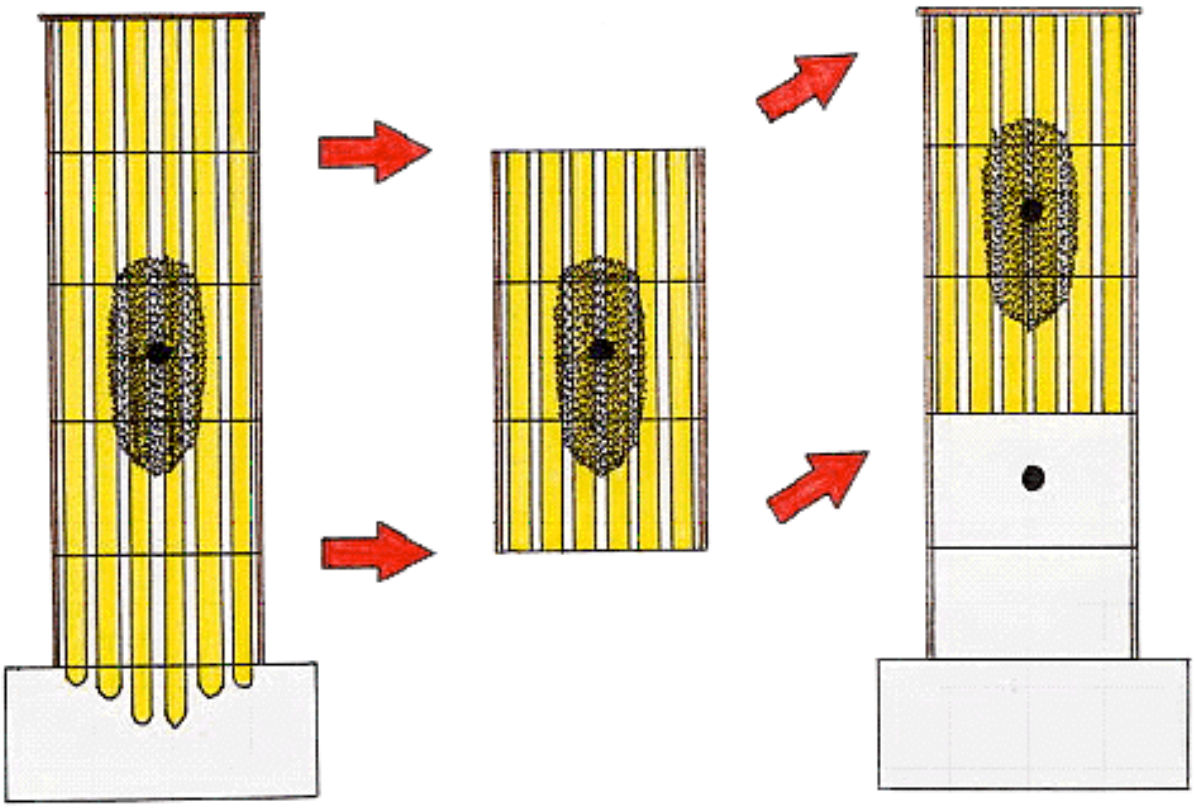


Fig. 6
Fig. 7
Fig. 8

All pathogens, pests and parasites are present but below treatment threshold levels.

The Explanation

The following factors are considered to be detrimental to varroa.

(1). Shape and position of the brood nest.

(2). Comb shape, cell size, and cell orientation.

(3). Absence of queen excluder.

(4). Absence of supplementary feeding.

(5). Position of entrance.

(6). Substantial space available beneath the comb.

The following points are considered to be of benefit to the bee.

(1). Manufacture and use of natural comb for brood each year.

(2). Absence of manipulation and inspection.

(3). Absence of any need to introduce foreign substances.

The items above are sufficient to allow bees to control the varroa population to a level where both host and parasite may live and prosper together.
We have defeated an enemy by making him our friend.
It is suggested that beekeepers should provide these conditions which permit bees to exercise their instincts or innate knowledge to the fullest extent without constraint or hindrance.

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http://www.pcela.co.yu/ian_pure_simple1.htm

From ApisUK, May 2005, Editor David Cramp

http://www.beedata.com/apis-uk/newsletters05/apis-uk0705.htm

Author's note: "Beekeeping Pure and Simple" is just an idea, and it is up to the individual
to modify it to their own conditions as they think fit.

Ian Rumsey

Beekeeping - Pure and Simple

Chapter 2

Feral Sisters We

As all our secrets are pure gold,
In verse and rhyme they must be told,
Each one a gem, and plain to see,
When told by us, the Sisters We.

The breeding cycle of our friends,
Goes on and on and never ends,
Another fact that is well known,
They love the large cells of the drone.

The shape of comb where we abide,
Is much more deeper than its wide,
With drone cells strung along its base,
A longer journey they now face.

A greater number are now doomed,
By falling off whilst being groomed,
Mathematics prove its time well spent,
As grooming goes up X percent.

1) Natural Ways of Varroa Containment. The Importance of the Shape and the Position of the Brood-Nest

The brood-nest of a colony, when contained by queen excluder, and housed in a conventional hive, will be oval in shape with the major axis horizontal.

Feral colonies however build natural comb to the limits of the cavity they have chosen for their home. The comb shape, and in consequence the brood-nest shape, will vary considerably from that imposed upon them by beekeepers, and in some cases, in a feral colony, the brood-nest may be found to be oval, but with the major axis vertical.

This at first glance would not suggest a situation that was detrimental to the reproduction of varroa, but let us consider the matter further.

It is an accepted fact that bees will groom varroa to some degree, although the apparent effectiveness of this ability is dependent upon the position of the entrance relative to the floor, the type of floor in use, and the space available beneath the underside of the comb.

The degree of grooming experienced by varroa is proportional to the distance they travel away from future suitable nest sites before their desire to recommence reproduction occurs.

Any increase therefore in this distance would be of benefit to the bee and of detriment to the varroa.

Such increase may be accomplished in three ways -

(1). By the change of brood-nest shape from circular to oval.

(2). By the orientation of the oval brood-nest from major axis horizontal to major axis vertical.

(3). By positioning of the vertical oval brood-nest in such a way as to maximize the distance between storage comb and the brood comb.

The Shape of the Brood-Nest.

Let us first consider a fish in a square pond 2ft by 2ft providing a surface area of 4 square ft.

Our fish likes eating flies and to satisfy this natural demand we will allow one fly to land randomly somewhere on the surface. The furthest distance the fish and fly can be apart is when they are in diagonally opposite corners.

The fish understands this and positions itself in the centre of the pond, so the most it must now travel is 1.414 ft.

We will now place our fish into a pond 4 ft by 1 ft thus retaining the same surface area.

The distances now travelled by the fish to catch his fly have increased. Even when he stations himself in the middle of the pond he may be as much as 2.06 ft away from the unsuspecting fly, an increase of 46 percent.

A pond 8 ft long and only 6 inches wide increases this distance by 283 percent which is quite an advantage to the fly.

Clearly the longer and narrower the pond becomes the greater the distances the fish may have to swim to obtain his fly.

(2)

Returning to beekeeping, we will now consider a circular brood-nest with one worker cell waiting to be capped. One varroa is introduced, placed randomly within this area.

The distance between the cell and the varroa may be as great as the diameter of the circle, or much less.

Let us now compare this with an oval brood nest of the same area but 4 times longer than it is wide. Like the fish in a retangular pond, the varroa will find that the maximum travelling distance has increased together with the possibility of being groomed.

It is therefore illustrated that varroa may more readily infest a worker brood cell situated in a brood nest that is circular, rather than one which is of oval construction.

Brood-Nest Orientation.

Let us now consider the orientation of the oval brood-nest. We will assume that the eight squares in Fig 1 represent a frame of comb in the brood- nest and Fig 2 is the same frame rotated through 90 degrees. In Fig 1 the distances from the centre of each square to point A are measured and compared with similar measurements taken to point B in Fig 2 . It will be found that the distances to point B are 40 percent greater than those measured to point A.

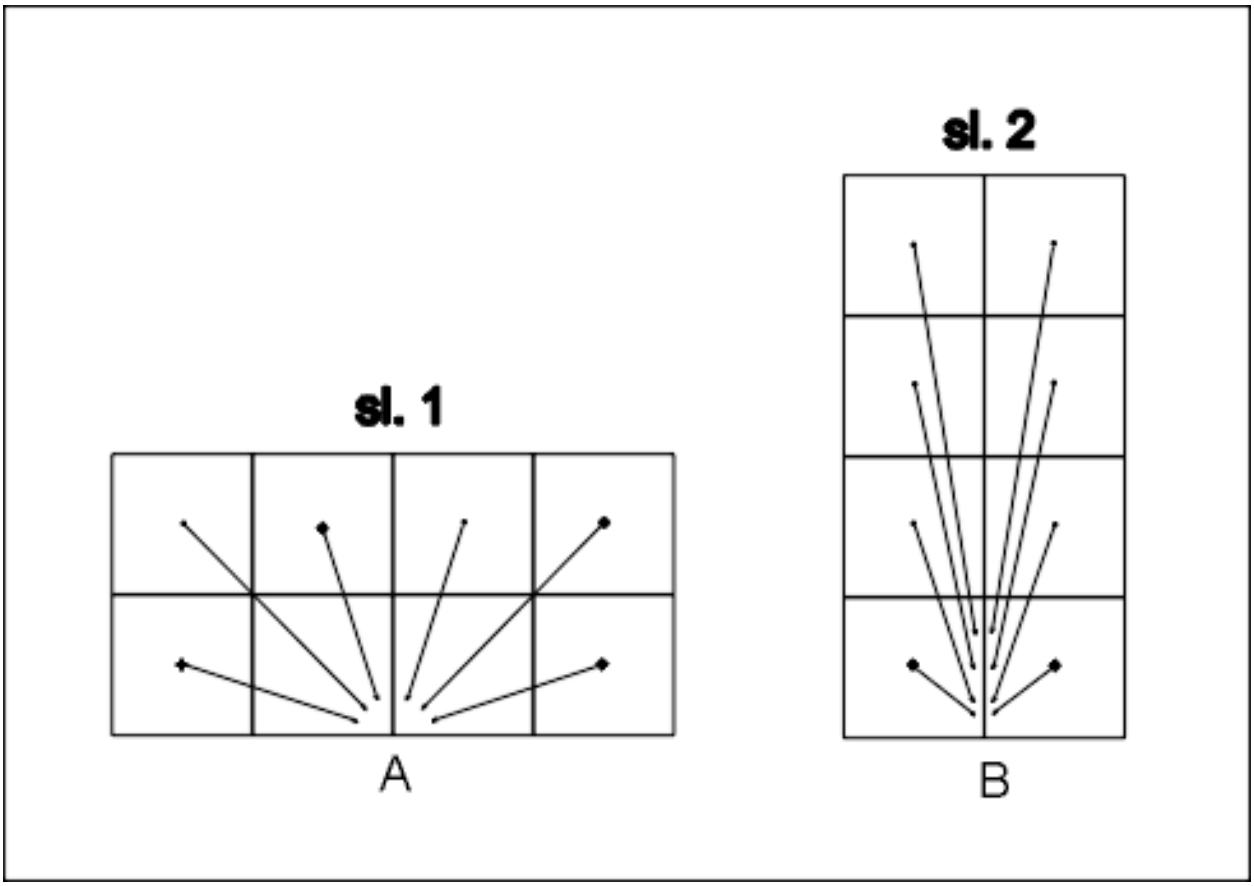

Fig 1
Fig 2

This 40 percent figure applies when the rectangle is twice as long as it is deep. When the rectangle is three times longer than it is deep and similar measurements are taken this percentage increases to 60.

Where the bees are evenly distributed throughout the brood area and the varroa are evenly distributed amongst the bees, it would be reasonable to suggest that a brood frame which is twice as long than it is deep, when rotated through 90 degrees, would enhance the distances varroa require to travel to reach drone brood when they are located at the bottom of the frame.

The increased distance of 40 percent lengthens the time the varroa is liable to be groomed which would increase the varroa drop accordingly.

This benefit may be further enhanced to 60 percent by increasing the depth/length ratio from 2-1 to 3-1.

An oval brood-nest therefore when orientated with the major axis vertical would again be of advantage to the bee.

(3)

The Shape of the Hive.

Finally let us consider the shape of an actual hive which consists of a brood box 2ft x 2ft and 1ft deep, a super also 2ft x 2ft and 1ft deep, with queen excluder in between.

We will assume that the bees are evenly distributed throughout the hive and that the phoretic mites are evenly distributed amongst the bees. Under these circumstances the centre of the brood-nest may be taken to be half-way up the brood box, 6 inches above the floor level. The centre of the mass of bees may be taken as 1ft above floor level. The distance between these two masses is 6 inches and is indicative of the average distance between the phoretic mites and the brood-nest.

Keeping the hive capacity the same, let us now envisage a brood box 1ft x 1ft and 4ft deep with a super also 1ft x 1ft and 4ft deep, positioned on top, again with queen excluder in between.

The distance between the centre of the brood-nest and the centre of the mass of bees has now increased from 6 inches to 2ft. The travelling distance of the mites to possible nest sites has increased by 400 percent, again to the detriment of the varroa.

A tall thin hive is therefore better than a short fat hive.

So to summarize.

The shape of the hive increases varroa travelling distances and in consequence increases grooming opportunities in three ways-

(1). Provision of an oval brood-nest instead of circular.

(2). Orientation of the oval brood-nest so that the major axis is vertical.

(3). Provision of a tall narrow volume for colony occupation.

There may be in fact a fourth and even a fifth advantage.

If varroa have a sense of awareness which is able to pinpoint the location of suitable nest sites, this awareness must have some limiting range and a falling off of accuracy at its upper limit.

The distance between host and parasite will therefore be of utmost importance.

Also viewing suitable nest sites ‘end on’ to the oval brood-nest would result in a smaller surface area being scanned which would reduce the attraction and increase multiple mite cell infestation as it would appear, to the mites, that fewer cells were available for occupation.

Foreign matter introduced into the hive may well effect this sensory perception, if in fact it exists, and cause disorientation as the subject of the treatment would become blind.

However even when the substance is of a benign nature, with no apparent side effects, distress is caused to the bees upon administration.

Although such action brings relief it is not a long term solution whereas stretching the mites beyond their natural limitations may well guarantee ultimate success.

Pure and Simple (or: About Author's experiments)

Having reached retirement, being sound in wind and limb, and mentally ready to enter an early second childhood, it seemed quite natural to reduce beekeeping activities to their simplest possible form, and as an amusement, undertake schoolboy type experiments hoping to achieve a better understanding of bee behaviour.

For example, the alignment of natural comb, when a swarm is introduced into an empty box 9 inches x 9 inches square and 12 inches deep has puzzled me for the last three years and will no doubt continue for some time to come.

It would appear that each year some form of experiment needs to be undertaken. During the winter the experiment is decided upon and the equipment built. In the summer the experiment is carried out and the results evaluated.

For example next years experiment will be as follows-
I am told that moving a hive about 3 feet will cause the bees to hover around the original site until they are exhausted and that they do not have the common sense to recognize their own home just 3 feet away.

I would like to observe this phenomenon first hand and investigate the reason for such behaviour. To this end I have built a small tram line 6 feet long upon which we have a wheeled trolley carrying a hive which may now be moved up and down the track with ease, and at our own convenience.

Details of the actual experiment are still under consideration.
The photograph of my apiary shows a yellow hive 6-4 which is situated on the tram lines. A wheel has yet to turn.
Hives 9-5;10-5;11-5;12-5 and 13-5 are part of a vertical magnetic field experiment and hives 7-5 and 8-5, in the far right hand corner, have a rotating inner hive to add confusion to the bees and also myself.

The chap in the blue shirt is me(Ian Rumsey), enjoying the Essex countryside.