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TYPESCRIPT: Development of the Modern Hive

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English

DEVELOPMENT OF THE MODERN HIVE

Stuttgart, March 1975

Ladies and Gentlemen. I am delighted to be here today, at this special meeting convened in honour of the 25th Anniversary of the Bee Research Association, and especially to have as my ~~partner~~ co-speaker coming also from England, Brother Adam/Kehrle. Many years ago, in Mexico, I stayed with Mr. Wulfrath at Miel Carlota and he said that he knew only two beekeepers in England - Adam and Eve. Well, Adam and Eve have both come here to be with you today in Germany, at this BRA meeting, and we have both been involved with BRA for pretty well the whole of its existance.

I have been asked to speak to you about the development of the modern hive. And in doing this it is necessary to start a very long time ago X . In the beginning man got honey from wild nests, hunting bees as he hunted animals, and this is the earliest record we know, a rock painting from Spain about 7000 BC. Until a few years ago this was the only such painting known in beekeeping circles, but in the last decade or so an Austrian, who lives in South Africa, Harald Pager (X(H-25)), has found many paintings in rock shelters in the Ndedema Gorge X (X-14) high up in the Drakensberg Mountains in Natal. Almost overnight, the number of rock paintings showing bees increased from 1 to 81. X(X-17) I was fortunate enough to visit one of the rock shelters high up in the Gorge - they are by no means easy of access - and here I was able to see some of the actual paintings showing combs, X(X-8) X(X-10) and very realistic bees flying.

X(H-23) in Rhodesia there is a similar rock painting, which actually shows honey hunting with the use of smoke. In many parts of the world where there are not enough suitable trees, bees nest in the rocks. As soon as primitive man learned how to make clay vessels, swarms of bees made their homes in these,

and even today, the usual primitive hive in some Mediterranean areas is similar to a clay water pot. X(h 2|19) Here is a drawing and a photograph of such a clay hive from the south of England, a relic of the Roman occupation there. In the next issue of our journal Bee World there is a description of an archaeological dig near Athens in Greece, which brought to light for the first time ancient Greek clay beehives. I am sure you will all be interested to read this.

X (e 1|9) In other areas baskets of woven wicker were used. (I found these hives at the back of an Esso Station in Belgium.) I feel sure that such baskets, X(e h|6) made for general use, were occupied by swarms of bees, where they had been left upside down and thus formed a cavity. When man started to cultivate cereals X(h 2|20) the same will have happened with baskets of coiled straw. The Buch der Nature by Konrad von Megenburg contains the earliest printed illustration I know of such skeps (1475).

cutting implement, ~~and~~ the trunk X(R 9|17) , became the hive; in one phase of beekeeping it was attached to the tree trunk. Because of the possibility of carving wood, the trunk hive has in recent centuries X (R 9|20) led to the production of the most elaborate and ornamental hives, notably in Poland.

The scene is now set for the appearance of the apiary. Man was able to lead a settled existence (by growing crops), and he had hives which could be transported into one place near his home, for protection. Beekeeping proper had started, and it continued, with rather little change, right up until the 1500s. Beekeepers could see little of what went on inside the hive and therefore knew little. For instance it was not until 1586 that Luis Mendez de Torres in Spain established the real function of the queen as a female that lays eggs.

As time went on, and in many places, attempts were made to harvest

the honey without killing the colony. Extensions of various types were added to the hive in the summer, which would be filled with honey but not brood. For instance X(r-7) on the top of a straw skep, a straw cap or a glass bell-jar was set; or an eke was placed under the skep; with horizontal clay hives X(k 1|13) there might be extensions rather similar to the original hive, as here in Morocco. Other, more elaborate hives were devised which had extensions at the side. All these were in principle "honey chambers".

From the 1600s, in England - and I think also in Germany, but here I must ask you to give me the information - there were intense enquiries among educated men with an interest in bees, to devise some way of getting more control over the colony: what we would call today manipulating the colony. The enquiries and improvements were slow and halting. By about 1800 they had led to X various sorts of bar hives, X(k 2|16) hives such as Hubers with hinged frames, X(RS|15) Prokopovitch's frame hive, also those of Dzierzon and Berlepsch, and in 1851 to Langstroth movable-frame hive. We must now look in more detail at this final and important phase in the development of the modern hive.

The characteristics of the modern hive (i.e. the hive that makes possible modern beekeeping, with mechanization) are as follows. I use the word comb to mean what the bees rear brood and store honey in, and frame to mean the man-made structure that surrounds and supports the comb.

1. Each comb can be lifted out from the box containing it, freely and without difficulty.

2. These combs are interchangeable; any one comb can be put anywhere else in the same box.

3. The combs will therefore be potentially of the same shape and size.

4. Access to the combs is from the top, not the side or back, so that any one comb can be removed without moving any others in the same box.

5. (This is a requirement that arose later, as you will see.) The combs must be strong enough (alone or by use of a support) to be spun in a centrifugal honey extractor without breaking.

(1) In order to lift the comb free from the box containing it a top bar seems to be essential; I cannot think of any other way, and indeed top bars were quite an early development, in England by, or before, 1700. These top bars were, I think from the beginning, correctly spaced, copying the distance between the centres of adjacent combs X(B-11) in natural honeybee colonies.

(2,3) The interchangeability and equal size of the combs is achieved by having a hive box whose horizontal section is rectangular. This is entirely normal today, but was not a feature of primitive hives. These were more nearly cylindrical or spherical, though X(h.1|66) Exultet Rolls from Monte Cassino around AD 1000 show rectangular hives. But these were certainly not movable-comb hives.

(4) Operating the combs from above has, I know, seemed less important to German beekeepers than to many others, and hives in which combs are removed from the back have lingered longer there than anywhere. But such an operation is not suited for commercial beekeeping where time costs money.

Two important features remain to be discussed. The comb should be freely removable, i.e. not attached to the hive wall, and it should withstand centrifugal extraction. Johann Dzierzon devised a bar hive described in 1847, several years before Langstroth's book. But Dzierzon's combs had to be cut away from the side of the hive. Baron von Berlepsch provided a valuable improvement by adding a frame round the comb, which strengthened it, but his frames were removed from the back of the hive with tongs. What Langstroth did was to use a top bar with a rectangular frame beneath it (in which

which the bees built their comb) and he lifted these frames out of the hive from above. The use of these frames led to the development of foundation, and of the centrffugal honey extractor.

Langstroth allowed a bee space all around his frames. He did not invent this but refers to its use by Munn in England in 1844, who acknowledges the work of Golding, also in England.

In Langstroth's hive X(04|6) we have movable frames or framed combs; I took this photograph of an original Langstroth hive in Massachusetts where he lived. These frames were the brood chamber, to give the beekeeper control over the bees. Langstroth used bell-jars or some such for a honey chamber. The use of framed combs also for the honey chamber came after the development of the centrifugal extractor, and of wax foundation which gave stronger combs.

The frame, separated from the hive walls by a bee-space distance, provides a fixed edge to the comb. A frame is not in fact necessary to get the first four of the five advantages I listed earlier, only the fifth: strength to withstand centrifugal extraction. But in most circumstances, unless a hive is very much larger than the colony's requirements, then combs freely built, even from top-bars properly spaced, are frequently attached by the bees to the hive walls, ~~The combs are not therefore movable~~ if these are vertical. This was a trouble with Dzierzon's hive. The combs are not therefore movable combs. There was, however, a much earlier development that achieved movable combs. In 1686, Sir George Wheler published a book on his recent travels in Greece. Among the curiosities he described were wicker hives <u>used with the open end upwards</u> (like a waste-paper basket) and with bars across the top. Because the walls sloped inwards towards the bottom, the bees did not attach their combs to the sides and these hives were truly movable-comb hives.

(g1/13, g1/12)

X They are still used in Greece today. The combs were not interchangeable, because the bars were of different lengths, to fit the circular shape. If such a hive is made rectangular, while retaining the sloping walls, one has a movable-comb frameless hive in which the combs are interchangeable. Such hives are currently in use in different parts of Africa, X (E-20) Kenya, and X (J-5) South Africa on a commercial scale, X(J-6) a thousand or more by one beekeeper (Robin Guy). Such hives are cheap, and precision in making and using them is minimal. Methods of extracting the honey centrifugally have been devised, but Robin Guy uses Langstroth honey chambers on top of his brood chamber, which has the same cross section. He works with the African bee, Apis mellifera adansonii. The wild honeybee nest I showed you X (B-14) was in fact of this bee. I took the photograph X(B-21) in the children's bedroom of a hut X(B-7) in the town Nekempte in western Ethiopia. By day the shutters are drawn back from the window, to let the bees fly, at night the bees and the children are enclosed together. The bees are of the sped es that has caused such trouble since its introduction in to Brazil.

Further sophistication has been introduced in the design of modern hives, X(E10/4) with plastic comb plus frame pre-built, and with the frames plus combs fixed, in the honey chamber; all combs in a honey chamber are uncapped and extracted together as one unit.

At the other end of the scale there is a move towards simplicity and cheapness, X (J-8) as in the bar hives of Robin Guy. In the United States this has gone still further by using (for pollination) expendable cardboard cartons of bees with no frames at all. The wheel appears to have gone full circle, but this is not quite so, for these cardboard hives are distributed from aircraft by parachutes.