

# THE QUEST FOR THE PERFECT HIVE: ANCIENT MEDITERRANEAN ORIGINS

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## Abstract

Humans in the Mediterranean region have been interacting with bees for 8,000 years, as documented by rock wall paintings in Spain. Tantalizing evidence has suggested that large quantities of beeswax were used for lost wax casting of a variety of objects found near the Dead Sea dating to 3500 BCE. The oldest archaeological evidence of providing honey bees with artificial cavities (the first human-created bee hives) is found in Egypt's Fifth Dynasty of the Old Kingdom. These Egyptian reliefs illustrate that beekeeping at this time was already a complex process, supporting the hypothesis that beekeeping's origin was much earlier. These first documented hives were horizontally stacked tubes constructed from dried mud. Depictions and inscriptions from Egypt's Middle and New Kingdoms suggest that by this time, beekeeping was an occupation controlled by the state. As beekeeping spread throughout the region, the materials used to build beehives expanded to include wood in the form of hollowed-out logs or boxes made from cut boards, cork, earthenware, woven wicker, or fennel stalks. By the end of the Middle Ages, the necessary innovations that led to rational beekeeping were in practice in the Mediterranean region.

Humans have been interacting with honey bees long before we developed beekeeping. Chimpanzees have been observed to tear into wild colonies of bees to get to the honey and the grubs. It has also been observed that they will modify branches to aid in the robbing of the bees, and even to carry the modified sticks around with them. The chimpanzees' dense covering of fur helps to protect them from the many stings that their robbing may have elicited. It seems probable that our ancestors would have indulged in



**Fig. 1** The rock wall painting of honey hunting in Bicorp, Spain.

this behavior as well, and if this behavior developed before humans and chimpanzees diverged some 6–7 million years before present, then our association with bees would have begun even before we became *Homo sapiens*<sup>1</sup>.

The oldest direct evidence of our interactions with bees comes from a rock wall painting in eastern Spain near Bicorp. This Mesolithic painting, which dates back approximately 8,000 years, shows a honey hunter suspended from a rope and robbing a wild colony while bees swarm around him or her (**Fig. 1**). Robbing bees is not beekeeping; rather, it is an opportunistic activity carried out to take advantage of a calorie-rich food<sup>2</sup>.

True beekeeping requires us to provide the bees with an artificial cavity in which they can build comb, rear their young, and produce honey. When this was

<sup>1</sup> Boesch et al. 2009.

<sup>2</sup> Kritsky 2010, p. 11.



**Fig. 2** The beekeeping bas-relief from Newoserre Any's sun temple.

first discovered is unknown, but there is indirect evidence that large quantities of beeswax were being used around 3500 BCE in what is now Israel. In 1961, over 400 objects were found under a mat in a cave near the Dead Sea. Among these objects were copper vessels that were made using the lost wax casting process, which involves making a beeswax model of a desired object and pressing it into a mold made of moist sand or clay. The clay mold was heated to melt and burn away the wax, and molten copper would then be poured into the mold to produce a copper version of the wax model. However, the use of beeswax does not document that beekeeping was being practiced, as the wax could have been obtained by robbing wild colonies<sup>3</sup>.

The first direct evidence of beekeeping dates back to the 5<sup>th</sup> Dynasty of ancient Egypt, around 2450 BCE. About a century after the construction of the Great Pyramid, Pharaoh Newoserre Any built his sun temple, Shesepibre (the Delight of Re). In 1898, in a room adjacent to the central obelisk, Ludwig Borchardt discovered what he called "The Chamber of the Seasons" because it contained reliefs of activities that occurred at specific times of the year, and one of the reliefs he found is the oldest evidence of beekeeping (**Fig. 2**).<sup>4</sup>

The bas-relief, from left to right, shows four scenes: a beekeeper working with the hives, three men pouring honey into vessels, two men further processing honey (this scene is mostly missing), and a beekeeper sealing honey in a vessel for storage. The hives being used were horizontal tube hives that were slightly tapered at the ends. The entire relief is

<sup>3</sup> Kritsky 2015, p. 6.

<sup>4</sup> *Ibid.*, p. 8.

described in detail in Kritsky<sup>5</sup>.

The beekeeping relief in Newoserre Any's sun temple does not shed light on the origins of Egyptian beekeeping. It does show that beekeeping was well established during Egypt's Old Kingdom, and given its illustration in the temple, that beekeeping was an important occupation. There is considerable archaeological evidence that beekeeping's status remained high throughout Egypt's history. In the British Museum in London is a Middle Kingdom scarab with the title of "Chief Beekeeper" inscribed on its base<sup>6</sup>. In the New Kingdom tomb of Rekhmire, an 18<sup>th</sup> Dynasty vizier, there is a painting showing the harvesting of round honey combs from large horizontal hives, the crushing of the comb, the pouring of the honey into large vessels, and the subsequent sealing of the honey in diamond-shaped vessels (**Fig. 3**)<sup>7</sup>.

One of the most famous beekeeping reliefs in Egypt is from the 26<sup>th</sup> Dynasty tomb of Pabasa. This relief shows the beekeeper with his hands held up in praise, facing a swarm of honey bees and a series of horizontal hives (**Fig. 4**)<sup>8</sup>. These horizontal hives are more similar to the hives carved in the Old Kingdom relief from Newoserre Any's sun temple than they are to the hives from Rekhmire's tomb. They also document the continued value that the Egyptians placed on honey and honey bees, and the type of hives that were being employed at the time.

<sup>5</sup> There is considerable evidence that beekeepers  
<sup>5</sup> *Ibid.*, p. 9–13.

<sup>6</sup> Martin 1971.

<sup>7</sup> Kritsky 2015, p. 29–32.

<sup>8</sup> *Ibid.*, p. 47–53.



**Fig. 3** New Kingdom beekeeping painting in Rekhmire's tomb.



**Fig. 4** The beekeeping relief in the 26th Dynasty tomb of Pabasa. Photograph by Gene Kritsky.

were organized into an administrative structure in ancient Egypt. Several specific beekeeping titles have been documented, ranging from beekeeper through chief beekeeper, overseer of the beekeepers, and overseer of the beekeepers of all the lands, and including sealers of honey, collectors of honey, and temple beekeepers. The implied hierarchy of the titles and the existence of a scene showing beekeeping activities being supervised by the vizier (essentially the prime minister, who in turn answered to the pharaoh) document that beekeeping was a state-run enterprise that was important to Egyptian society<sup>9</sup>.

Horizontal hive beekeeping was not restricted to Egypt in the ancient world. At Tel Rehov, in present-day Israel, Amihai Mazar and his colleagues from the Hebrew University in Jerusalem discovered beehives dating to between 800–900 BCE (Mazar and Panitz-Cohen 2008). These hives were somewhat similar in proportion to the hives illustrated in Rekhmire's tomb. Whether the similarities represent an exchange of beekeeping practices between Egypt and Tel Rehov is unknown, but Tel Rehov is mentioned in Egyptian reliefs going back to the 18<sup>th</sup> Dynasty, and the town remained loyal to Egypt during the reign of Seti I in the Nineteenth Dynasty, when other towns were rebelling. It is also mentioned in the relief of Shoshenq I's campaign of victories in Palestine at Karnak Temple in Upper Egypt<sup>10</sup>.

By 400 BCE, horizontal pottery hives were widely used in Greece (**Fig. 5**). The interior of these hives was incised with patterns of grooves to aid in the attachment of the comb to the hives. The pottery lid of the hive included a small bee entrance, and was affixed to the hive body with a stick fastened to the front of the hive with rope or leather thongs tied around the lip of the hive<sup>11</sup>. Pottery extension rings

<sup>9</sup> Ibid, p. 76–77.

<sup>10</sup> Ibid, p.43–44.

<sup>11</sup> Jones et al. 1973.



**Fig. 5** 400 BCE pottery beehive from Greece. Photograph by Gene Kritsky.

would be placed between the hive and the lid if the hive needed to be enlarged. As in Egypt, the origins of beekeeping in Greece likely date to long before these hives were made. A small pottery smoker (**Fig. 6**) found in Sesklo, a Neolithic village in central Greece, dates to at least 3300 BCE. However, hives were not found at the site and the smoker (if that was its actual purpose) may have been used for robbing bees.

No hives survive from Ancient Rome, but Roman authors did record that horizontal hives were constructed of local materials. Varro<sup>12</sup>, writing in the second century CE, recorded the following:

Some build round hives of withies (wicker) for the bees to stay in, others of wood and bark, others of a hollow tree, others build of earthenware, and still others fashion them of fennel stalks, building them square, about three feet long and one foot deep, but making them narrower when there are not enough bees to fill them, so that they will not lose heart in a large empty space. All such hives are called *alvi*, 'bellies,' because of the nourishment (*alimonium*), honey, which they contain; and it seems that the reason they are made with a very narrow middle is that they may imitate the shape of the bees. Those that are made of withies are smeared, inside and out, with cow-dung, so that the bees may not be driven off by any roughness; and these hives

12 Varro 1934.



**Fig. 6** A small pottery smoker from Sesklo. Photograph by Gene Kritsky.

are so placed on brackets attached to the walls that they will not be shaken nor touch one another when they are arranged in a row. In this method, a second and a third row are placed below it at an interval, and it is said that it is better to reduce the number than to add a fourth. At the middle of the hive small openings are made on the right and left, by which the bees may enter; and on the back, covers are placed through which the keepers can remove the comb. The best hives are those made of bark, and the worst those made of earthenware, because the latter are most severely affected by cold in winter and by heat in summer.

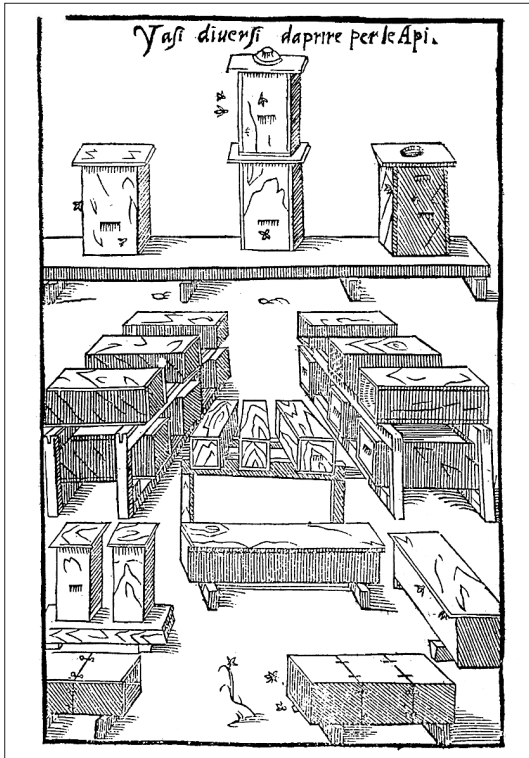
Varro's account is the possibly the earliest record of square or box hives being used, but that does not suggest that round horizontal hives had fallen out of favor. Illuminated manuscripts over the next thousand years document that beekeepers were using horizontal boxes, upright boxes, horizontal round hives, and upright hives made of cork. Wicker skeps were likely in use in more northern regions<sup>13, 14</sup>.

These various hives were not simply an end in themselves. Eva Crane argued that modern beekeeping developed in stages starting with rectangular box hives, tightly fitted upright box hives, the use of bars, the use of frames, and ending with the careful spacing of the frames in the hives<sup>15</sup>. The horizontal hives used by the ancient beekeepers of the Fertile Crescent and Greece were the precursors of the rectangular box hives described by Varro from ancient Rome. Hives made from boards were in use

13 Crane 1999.

14 Kritsky 2010.

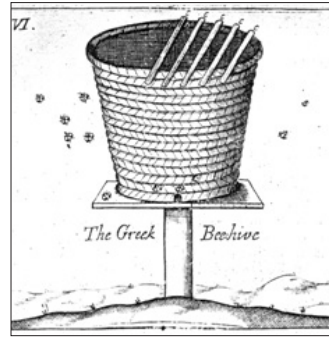
15 Crane 1999.



**Fig. 7** Upright and tightly fitted box hives as illustrated in 1596.

by the 11<sup>th</sup> century and beekeepers in Italy stacked tightly fitted boxes in the 16<sup>th</sup> century (**Fig. 7**)<sup>16</sup>, satisfying the second stage as described by Crane<sup>17</sup>.

The oldest use of bars was by the Greeks, whose hive was illustrated by Wheler in 1682 (**Fig. 8**)<sup>18</sup>. The Grecian hive was a basket hive that tapered from a wider opening at the top to a narrower base. Across the top were placed wooden slats to which the bees attached their comb. The bees treated the inward-sloping sides of the basket as the bottom of the hive and did not attach the comb to the sides of the basket, making it a simple process to lift the bar and the attached comb from the hive. This was being practiced by the 17<sup>th</sup> century, but when it began is a matter of speculation. Pots of the same shape as the basket illustrated by Wheler were known dating back to 400 BCE. However, there is no unequivocal evidence that suggests that upright pottery hives



**Fig. 8** The Greek hive as illustrated by Wheler in 1682.

date that far back<sup>19</sup>. Regardless of when the use of bars began, their use was not widely known outside of the Mediterranean region until the 17<sup>th</sup> century. A frame for use inside a hive was described by a beekeeper known as J.A. in 1683, but they were not in common use until the 19<sup>th</sup> century. Innovative beekeepers in the Ukraine, Germany, France, England, and the United States incorporated frames in a variety of hives, before L. Langstroth incorporated the critical spacing in 1851 that resulted in the moveable frame hive<sup>20, 21</sup>.

The first three innovations that were required for the development of modern beekeeping -rectangular box hives, tightly fitted upright box hives, and the use of bars- were developed by Mediterranean beekeepers whose knowledge of bees dated back to antiquity. Even though the use of frames and spacing developed in other parts of the world, the first steps towards modern beekeeping had a Mediterranean origin.

16 Gallo 1596.

17 Crane 1999.

18 Wheler 1682.

19 Crane 1999.

20 Crane 1999.

21 Kritsky 2010.

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