

# STONE BEEHIVES ON THE ISLANDS OF THE EASTERN MEDITERRANEAN

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Stone is not a conventional material in the construction of beehives, and its use for this purpose creates several problems. First and foremost, constructing a stone beehive is usually a laborious task. Secondly, moving such a hive is extremely difficult, if not impossible, while its insulating properties, in most cases, are poor.

However, many beekeepers around the Mediterranean, especially in its eastern part, and mainly on the islands (**Fig. 1**), used various types of stone hives in traditional beekeeping. These hives were created in different ways: by chipping away and carving natural rock to create a cavity that could suitably function as a hive; by chipping away and carving a transportable piece of rock for the same purpose; by bonding stone slabs together in order to form a hive; by building the hive with or without the use of bonding material; and finally, by creating hives in dry wall terraces, in homes or even building specialised “bee houses”.

On several occasions, the choice of stone as material for creating hives seems that it had to do with the lack of abundant alternative raw materials for their construction, such as wood or the various branches used to weave baskets. Another reason was the cost, which the beekeeper often had to incur when selecting another material, such as hives made out of fired clay, for instance, which had to be ordered from a potter, or those made out of wooden boards, for which the necessary boards had to be purchased.

Nonetheless, stone hives did have advantages: they were long-lasting, they prevented theft to a great extent, and in some instances, such as in those

of wall hives, allowed beekeeping to be practiced more easily and often more rationally.

Ancient authors do not mention stone hives, and only Columella (*De Re Rustica*, IX, 6, 2-3), referring to Celsus, informs us about hives built out of brick, which he actually does not hold in high esteem due to their inability to be transported. For these hives, there is the view<sup>1</sup> that they were basically recesses in a brick wall.

The first written reference of a stone beehive was made by Abbot Alberto Fortis, who travelled throughout Dalmatia and published his travel impressions in 1774. On the island of Brač, he encountered many hives made out of stone slabs bonded together. The top slab was used as a lid and was definitely movable, while for the protection against strong winds, other stones were placed on it<sup>2</sup>. Later, Valerijan Ritterman<sup>3</sup> mentions that apiaries with similar stone hives existed on many parts of the island. They were exploited not only by individuals, but also by the monks of the Monastery of Blaca.

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Here, I must once more express my deepest gratitude to the late agronomist and interminable researcher of traditional beekeeping, Thanassis Bikos, for his unre-served assistance on various issues relating to stone beehives. Thanks must also go to Lefteris Eleftheriou and Georgios Dimitriou from Cyprus for providing information and photographic material regarding the bee houses of the Alaminos village.

1 Crane 1998, 11.

2 Fortis 1774, 186-187.

3 Ritterman 1953, 178-179.



**Fig. 1** Map of the Eastern Mediterranean. On the islands in red, stone beehives were used.

The aforementioned hives were in use until 1942-43, at which point they were abandoned. They were 60 cm in length, while their width and height was about 30-40 cm. In the upper part of these rectangular hives were placed a layer of twigs from olive or mulberry wood, to which the bees attached their honeycombs, without however resulting in movable-combs. Besides, the practice of beekeeping with movable-combs was unknown to local beekeepers. The reason for placing twigs in the top opening of these hives had to do with the high temperatures reached by the upper slab during the summer and the risk of the combs melting if they were attached to it<sup>4</sup>. The twigs, in other words, acted as insulation material, protecting the honeycombs from melting during the hot summer days.

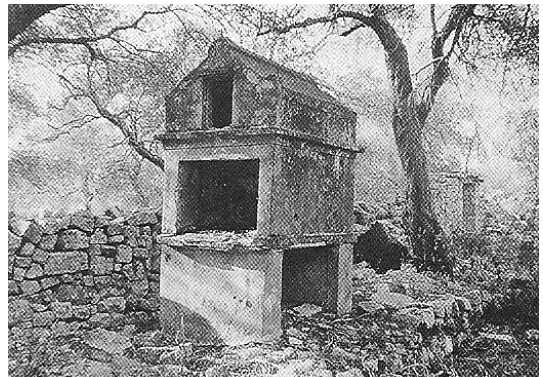
Further south, on the island of Corfu, beekeepers in the northern part of the island used, among others, hives built out of stones and mud. On the top opening, they placed wooden bars, and above them a stone slab<sup>5</sup>. However, movable combs were not created. The bars used, as in the pottery vertical hive of the island (the "klembouri"), were too broad. Like their colleagues on the island of Brač, the beekeepers on Corfu did not know how to create movable-combs.

On Paxos, an island near Corfu, the local hives were built. They were rectangular in shape and consisted of three levels or floors (**Fig. 2**). According to a published photograph<sup>6</sup>, on the lower floor, they had an opening on the wider side, and on the middle floor, the opening

4 Ritterman 1953, 179; Crane 1999, 392.

5 Mavrofridis 2013, 34.

6 Rammou & Bikos 2000, 430.



**Fig. 2** Built hive of Paxos (photo: E. Rammou & Th. Bikos).

was located on the narrower side. These openings occupied the entire corresponding side of each floor of the hive and were probably closed with a wooden lid. The third floor had a characteristic shape, with a pitched roof, which reminds one of a rectangular church or perhaps a home. Even the opening, which was small, resembles a church doorway.

On the island of Kefalonia, again in the Ionian, their traditional hives were also built (**Fig. 3 & 4**). They were horizontal and were built out of slate. They were usually stand-alone structures, but sometimes stood in groups of two, or one next to the other. The roof was usually made out of tiles, while in some cases, a horizontal stone slab served as a roof. Slate and tiles were bonded together using a bonding material (some type of lime-based mud) so as to create a



Fig. 3 Built hives of Kefalonia (photo: Th. Bikos).



Fig. 4 Built hive of Kefalonia with the date 1875 engraved on it (photo: G. Seferiadis).



Fig. 5 Stone beehives of Lefkas (photo: Ch. Lazaris).

single entity. The length of the hive reached 30-40 cm, its internal width was approximately 30 cm, while its height exceeded 30 cm. The hive was closed from the front and back using two stone slabs. The front slab was permanently attached and had an opening at its base for the entrance of the bees. The rear slab was movable, so it could be removed during harvesting and when other work on the hive had to be carried out<sup>7</sup>.

On Poros, in the southeast of the island, a built wall with a series of hives has been detected and recorded<sup>8</sup>. These hives took their internal shape from three tiles, positioned longways, so that their edges touched each other. In this way, they created a single space, which had three cavities, though. This "bee wall" is very old and has been in use in the area for at least two centuries<sup>9</sup>.

On the island of Lefkas, beekeepers used, among others, hives which could be characterized as "hybrids". The primary hive was made out of local stones bonded together with lime and sand (Fig. 5). This resulted in a space with an opening only at the front, which was closed by a movable lid. However, this hive had a limited capacity, and when, as spring progressed, the bee population increased, a horizontal extension was adapted to the opening. This extension was made out of boards or even out of goat hides<sup>10</sup>. Only the combs that were attached to the extension were harvested, and the bees wintered in the primary hive, which, as witnessed, was made out of stone.

On Kythera, local beekeepers practised beekeeping exclusively with top-bar hives, which, in many cases, were made out of stone. In fact, several types of stone hives existed on the island. The most common one, called "gourna" (trough)<sup>11</sup>, was constructed out of a piece of local porous rock, which was severed from the bedrock and then carved internally until it took on the desired form (Fig. 6). On the one long side, and near the base, an oblong hole was opened, which allowed for the entrance of the bees. At the opening of the hive, were placed wooden bars smeared with a layer of mud so that the hive

7 Nicolaidis 1955, 146; Komis 1987, 10; Bikos 2005, 94; Bikos 2015a, 213, fig. 12-13.

8 Bikos 2005, 96-98.

9 Similar walls with the use of three tiles to create beehives have also been recorded in the Southern Peloponnese, in the region of Mani (Mavrofridis 2015, 53-55, fig. 10-17).

10 Bikos 2009, 18-19.

11 Nicolaidis 1955, 146; Bikos 1995, 14; Rammou & Bikos 2000, 425-426; Bikos & Rammou 2002, 9; Mavrofridis and Anagnostopoulos 2012, 483.

was tightly closed on its upper part<sup>12</sup>. For protection against the elements, a stone slab was placed above the bars with the mud.

A similar hive was constructed on Kythera out of five stone slabs: one serving as a base, with the others placed vertically on it so as to form a rectangle<sup>13</sup>. At the opening of the hive, were placed bars smeared with mud, and above them, a stone slab for protection. Sometimes, between the bars and the protective slab, branches of different bushes were placed for additional protection from the high summer temperatures.

On the same island, beehives carved out of natural rock have been recorded. Their dimensions were generally similar to those of the “gourna” hives and to those made out of bonded stone slabs<sup>14</sup>. Naturally, these also included bars at the top openings in order to create movable-combs.

Some beekeepers on the island of Antikythera, where movable-comb hives were also known, practised beekeeping using fixed-comb hives built in recesses of stone walls. The upper side of the hives in question was semicircular, while the base and the sides were at right angles to each other<sup>15</sup>.

On Crete, stone hives were not customary, but there is a reference to hives that were carved into natural rock in the village Komitades, in the prefecture of Chania<sup>16</sup>.

In the late 18th century, Abbot Della Rocca<sup>17</sup> refers to the use of horizontal hives made out of stone slabs on the island of Syros. Similar hives were recorded in the last century on the island of Tinos<sup>18</sup> (**Fig. 7 & 8**), too. These hives were 80-90 cm in length, and usually 40-50 cm in height and width. They were constructed out of four elongated slabs and two smaller ones for the narrow sides. On the front slab was, of course, an opening (or openings) for the entrance of the bees.

Stone horizontal hives of the same style were known to other islands of the Cyclades, such as Paros (**Fig. 9**) and Antiparos<sup>19</sup>. Here, for these hives, lids made out of stone and wooden boards were used.

12 Protopsaltis 2000, 289-294.

13 Bikos 1995, 13; Rammou & Bikos 2000, 425-426.

14 Mavrofridis 2007a, 161; Mavrofridis 2007b, 136; Mavrofridis 2009, 289.

15 Mavrofridis 2007a, 161.

16 Crane 1998, 14.

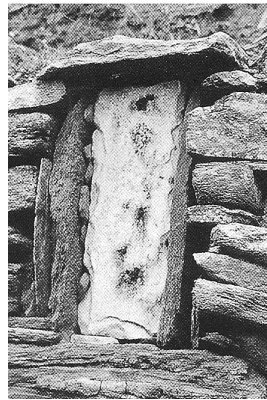
17 Della Rocca 1790, 24-25.

18 Florakis 1971, 129; Rammou & Bikos 2000, 418-419; Bikos 2013, 178-180.

19 Rammou & Bikos 2000, 424; Bikos 2008, 310-311.



**Fig. 6** Stone top-bar hive of Kythera (photo: G. Mavrofridis).



**Fig. 7** Stone horizontal hive from Syros (photo: E. Rammou & Th. Bikos).



**Fig. 8** Stone horizontal hive from Tinos (photo: N. Karagiorgis).



Fig. 9 Stone horizontal hives from Paros (photo: M. Roussos).



Fig. 10 Horizontal hives from Kythnos (photo: D. Varela & P. Harizanis).

These often bore many small holes - bee entrances.

Kythnos is another island where horizontal stone hives were used<sup>20</sup>. However, these were mainly used by beekeepers who did not have a large number of hives, and who often practised subsistence beekeeping. On this island, though, in addition to hives constructed out of stone slabs, whether they were free-standing or bonded together, they also used horizontal hives with one open end, which were carved out of natural rock (**Fig. 10**) and called “melissospilies” (bee caves).

All these Cycladic horizontal stone hives were used just like the horizontal pottery hives with one open end, known in most cases as “ypselia”, which prevailed on the islands in question. However, this was not the case on the islands of Kea and Andros, which belonged to the same chain of islands, as their beekeepers employed different beekeeping practices.

On Kea, local beekeepers made exclusive use of mobile-comb hives, mostly made out of fired clay and sometimes woven or made out of boards. However, reports dating to the last century mention the presence of top-bar stone hives made out of bonded slate<sup>21</sup>.

As for Andros, apiculture on the island is more complicated due to the many types of hives used by the beekeepers there. The simplest stone hive of the island was the “spilia” (cave), which consisted of a hollow piece of natural rock that was closed with a stone slab<sup>22</sup> (**Fig. 11**). In several cases, the beekeeper was forced to carry out building work in order to adapt the hollow rock to his needs. In other cases, a wooden frame with a door was positioned over the

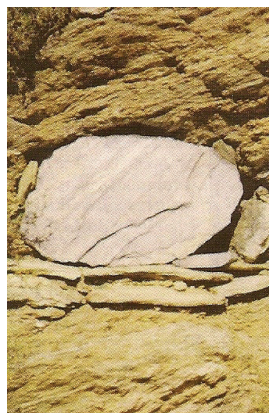


Fig. 11 “Spilia” (cave) hive of Andros (photo: I. Rerras).

hollow rock and the interior took on the shape of a cupboard. This type of hive is called a “spiliodoulapo” (cave cupboard)<sup>23</sup>. Similar hives, known as “doulapia” (cupboards - in the singular “doulapi”), were also created in dry wall terraces, some of which measured 51 X 48 X 51 cm in depth<sup>24</sup>. The bee entrance consisted of an opening in the door of the “doulapi”, from which the harvest was also carried out.

“Doulapia” hives that opened from the inside, though, while on their exterior was an entrance hole, were constructed on the walls (**Fig. 12**) of abandoned and other houses, too (wall hives). If the house was inhabited, the swarm would get caught in the “doulapi” and be relocated to some type of movable hive<sup>25</sup>. Their dimensions were extremely varied. “Doulapia” hives measuring 40 X 42 X 43 cm

20 Varela and Harizanis 2011, 146.

21 Bikos 1999, 7; Rammou & Bikos 2000, 424.

22 Rammou & Bikos 2000, 422; Speis 2003, 16; Bikos 2011a, 110-113; Speis 2016, 33.

23 Speis 2003, 63; Bikos 2011a, 113-115; Speis 2016, 76-77.

24 Speis 2003, 60-61; Speis 2016, 74, fig. 35.

25 Bikos 1996a, 362-362; Bikos 1996b, 424-465; Speis 2003, 61-62; Speis 2016, 75-76, fig. 36; 53-55.



**Fig. 12** "Doulapi" (cup-board) hive in the wall. Andros (photo: F. Hatjina).



**Fig. 13** "Melissokipi" (bee house) of Andros (photo: G. Speis).

and others measuring 52 X 70 X 38 cm have been recorded. In addition, there were "doulapia" hives constructed (in the north of the island) in specially designed buildings (**Fig. 13 & 14**), usually made out of slate. They had beamed roves, which supported slabs on which soil was placed. These buildings were called "melissokipia" (bee gardens) or "melissotopia" (bee places)<sup>26</sup>. In some cases, the bee entrance was located in the corner of the "doulapi"<sup>27</sup> in order for the bees to build their combs at a 45 degree angle. Also, when it was a good year and there was ample nectar, extensions were added to the "doulapia" hives<sup>28</sup> so that the bees could construct combs there, too.

Finally, there is the view, expressed for the first time by the late local beekeeper, Ioannis Rerras<sup>29</sup>, that

26 Toufexis 1909, 89; Nicolaidis 1955, 147; Bikos 1996a, 360-362; Bikos 1996b, 462-462; Rammou & Bikos 2000, 421-422; Speis 2003, 64-70; Bikos 2011b, 190-191; Speis 2016, 76-83, fig. 42-52; 56-110.

27 Bikos 2011b, 191.

28 Speis 2003, 70; Speis 2016, 83.

29 See Speis 2003, 68; Bikos 2011a, 110; Speis 2016, 81.



**Fig. 14** "Melissokipi". The "cupboards" clearly seen as the roof has collapsed (photo: G. Speis).

the "doulapi" hive of Andros is the evolutionary result of the simple "spilia" hive, which initially evolved into the "spiliodoulapo" hive, and later into the built-in "doulapi" hive and "melissokipia".

On Chios, especially in the village of Agios Georgios Sykousis, hives in a wall of a stone house, which opened from the inside, have been recorded (**Fig. 15**). There were more than 20 of these hives and they were arranged in four rows<sup>30</sup>. Due to the lack of information, we assume that on the inside, there would have been some type of wooden construction - a type of door - in order to inspect the bees and carry out the harvest. The exterior would have closed securely with a stone slab, or perhaps again with some type of wooden construction. The practice of beekeeping with wall hives, such as those at Agios Georgios Sykousis, was not widespread on the island, and it seems to have been an exception.

Another type of Chian hive consisted of clay tablets which were connected to form a triangular hive<sup>31</sup>. In a number of cases, it appears that instead of clay tablets, similar stone slabs were used for their construction. On this island, there also existed horizontal stone hives, with openings at both ends, made out of four stone slabs<sup>32</sup>.

On the islands of Fourni, in addition to horizontal pottery hives, beekeepers also used horizontal stone ones made of slabs with one open end (**Fig. 16**), such as those on the Cyclades<sup>33</sup>. These stone hives served as a cheaper alternative to local beekeepers, due to the fact that they constructed them themselves, while the pottery hives had to be purchased from other

30 Tselios 1998, 242; Bikos & Rammou 2002, 12; Bikos 2014; Bikos 2015b, 252, fig. 19-20.

31 Tselios 1998, 242; Anonymus 1998, 8.

32 Kourounis 2010, 29.

33 Bikos 2012, 102-103



Fig. 15 Wall hives of Chios (photo: Th. Bikos).



Fig. 16 Horizontal stone hives from Fourni (photo: Th. Bikos).



Fig. 17 Astypalaia. Horizontal stone hive (photo: Th. Bikos).

islands. It is noteworthy to mention that, in the region of Bizani, there were about two hundred of these stone hives. These were known on these islands as "chtistes" (built hives).

Similar hives were known further south as well, on Astypalaia (Fig. 17). In their construction there however, smaller stones were often used<sup>34</sup>. The hives were of different sizes, but they were all horizontal with one open end. Sometimes, on Astypalaia, these hives were built into the natural rock. Here, they were called "petrina" (made of stone) or "thyrides".

On the islands of Rhodes and Karpathos, the horizontal stone hives used by local beekeepers were open at both ends. This type of hive dominated not only on these islands, but in general on most of the Dodecanese. They also made traditional hives out of other materials: fired clay, boards, logs or bark. On Rhodes, the stone beehive was called "thyri", and was constructed out of stone slabs (Fig. 18), and the lids which existed on either side were made out of pine bark. Many such hives were arranged side by side, and in some cases, one on top of the other, and given the name "toura"<sup>35</sup>.

On Karpathos the horizontal stone hives with two openings were made out of bonded stone slabs as on Rhodes, or carved out of porous stone, or out of a combination of both materials - the sides were made out of stone slabs and the semicircular roof carved out of porous stone. The caps in all instances were made out of wood. On Karpathos, besides the hives with two openings, they sometimes constructed makeshift stone constructions out of different types of stone, which also served as beehives<sup>36</sup>. They had a single opening and were usually created at the base of rocks (Fig. 19).

For the island of Cyprus, we have the testimony of Denis Possot, who, in 1536, described the hives he had encountered in a village near Larnaka four years earlier<sup>37</sup>. These were located on the walls of houses and their openings were on the inside. On their exterior were small holes for the entrance of bees.

Similar hives were recorded later on the island as well. Two "melissospita" (bee houses) with hives built on their walls have been recorded in the village of Alaminos, in the region of Larnaka (Fig. 20). According to our source, Georgios Dimitriou<sup>38</sup>, a descendant of a beekeeper, these hives were made out of sun-dried bricks and covered with a drystone wall to protect

34 Bikos 2007a, 285-287; Bikos 2007b, 345-346.

35 Vrontis 1938, 195.

36 Bikos 2003, 345.

37 Gobham 1908, 65.

38 Dimitriou 2013.

against corrosion. The “melissotrypes” (bee holes), as these hives were called, were created with stone slabs in the upper and lower side and measured approximately 30 X 30 X 50 cm. For harvesting and any other work that had to be carried out, they were opened from the inner side, which had a wooden lid. The outside was permanently closed with marble, at the bottom end of which was the bee entrance and a stone protruberance to assist the insects with their flight. The arrival of varroasis in the area led to the closure of the “melissotrypes”, and since 1983, they stand empty.

Beyond the islands we examined, where stone hives have been recorded, there are lexicographic accounts regarding the existence of stone hives in the past on some other islands, too. These islands are Anafi in the Cyclades, Evia - specifically the village of Vrissi, and Lesbos<sup>39</sup>.

To synthesise, stone hives, whether as stand-alone constructions or as constructions on walls were used on many islands of the Eastern Mediterranean. They were usually used along with hives built out of other materials; nevertheless, in some instances, stone hives were the only hives in use. Regarding their function, these hives were of various types. There were hives which had bars and created movable-combs on islands where beekeepers were aware of this method (Kythira, Kea); hives with bars and twigs, where beekeepers were unaware of how to create and use movable-combs (Brač, Corfu); permanent hives of relatively small dimensions without extensions (Paxos, Kefalonia, Andros, Karpathos), or with extensions (Lefkas); large horizontal hives which mimicked corresponding pottery hives with one opening (Syros, Tinos, Paros, Antiparos, Kythnos, Fourni, Astypalea), or with two openings (Rhodes, Karpathos); and finally, built-in wall hives in one row (Kefalonia, Antikythera, Andros) or several rows (Andros, Chios, Cyprus), and in some cases specially constructed buildings (Andros, Cyprus).



**Fig. 18** Horizontal, open at both ends, stone hives from Rhodes (photo: N. Melissourgos).



**Fig. 19** Stone hive of Karpathos (photo: Th. Bikos).



**Fig. 20** Bee house (melissospito or melissonas) of Cyprus (photo: L. Eleftheriou).

<sup>39</sup> Katsouleas 2000, 354; 359.



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