

TRUTH LIES IN THE DETAILS: IDENTIFYING AN APIARY IN THE MINIATURE WALL PAINTING FROM AKROTIRI, THERA

by Irini Papageorgiou

Benaki Museum; Akrotiri Excavations, Thera

One of a number of enigmatic depictions in the Aegean iconography of the second millennium BCE is the structure painted on the south wall of the Miniature Frieze from the West House at Akrotiri, Thera. This structure covers the slope of a hill and consists of two vertical blue bands on its western edge and four horizontal blue bands, all with features indicating masonry construction. Five rows of black triangles alternate with the horizontal bands. Each triangle has a round opening in its base. Unique in Aegean iconography, it has been interpreted as a dovecote, a shipshed, a storage space, a rock-cut structure with triangular niches, a geological formation and even a stretch of land with terraces and a vineyard. In one very brief reference it has been identified with an apiary.

In line with contemporary rules of perspective, certain details suggest this structure could represent an apiary on a terraced area, protected on its western edge by a wall to windward. The triangular elements must depict the vertical-type fixed-comb woven beehives, which were in use until quite recently in Greece. A road leading from the apiary and connecting the settlement with the tripartite building at the top of the hill completes the elements needed for organised beekeeping. Similarly, there is a trapezoidal expanse of blue to the east of it which probably depicts a pond, another essential element of beekeeping. Both the extent of the area covered by the installation and the prominence of beekeeping products (indicated by chemical analysis and references on Linear B tablets) raise questions about the management of the apiary and the function of the building at the top of the hill.

INTRODUCTION

When Minoan iconography is concerned with depicting forms from the real world it is characterised by a variety of styles ranging from the quasi-naturalistic to the essentialist. By ‘essentialist’, we refer to the representation of essential characteristics rather than a meticulous, detailed, depiction of forms (Warren 1995; 2000, 364–5). The inevitable difficulties that therefore arise in identifying and interpreting its varied motifs are exacerbated by the use of conventions or rules of perspective that differ from those used in more modern art with which scholars are undoubtedly more familiar (Morgan 1985; 1988, 10–16; 1989, 149; Sourvinou-Inwood 1989, 241–3). Despite all this, and allowing for the artists’ focus on depicting essential details, progress can be made through the careful and detailed description of a scene combined with an understanding of the relationship between it as a three-dimensional object and it as a two-dimensional image constructed according to the rules of perspective in use at the time it was created; this might lead to new interpretive approaches.

THE ENIGMATIC ‘STRUCTURE’ ON THE MINIATURE FRIEZE OF THE WEST HOUSE

One of the images of Aegean iconography that remains enigmatic is the structure depicted on the south wall of the miniature frieze that decorated the upper register of the walls in Room 5 on the upper floor of the West House, a private building in the Late Cycladic I/Late Minoan IA settlement at Akrotiri on Thera (Morgan 1988, 71, 85 no. 33, pls 101, 102 no. 33, col. pl. C; Doulas 1992a, 70 fig. 35, 78–9 fig. 38; Televantou 1994, 112–13 K8, 274 folded col. pl. 4, folded drawing 3; Figs 1, 2). The voyage depicted in the miniature fresco, featuring the fleet



Fig. 1. The 'Flotilla Wall Painting' from the south wall of Room 5, West House, Akrotiri (Akrotiri Excavations, Photographic Archive).

sailing from four cities, has a celebratory conclusion which is 'narrated' by the artist on the south wall.¹ The ships of the fleet, decorated for the occasion, are depicted on the south wall approaching the coastal City V (Arrival Town), which, as has been convincingly argued, represents the settlement of Akrotiri in abbreviated form.² To the west of the city, at the top of the second hill,



Fig. 2. Detail of the 'Flotilla Wall Painting' with the structure on the west of the City V and (highlighted) the outlines of the road/path connecting the City V with the building on the top of the hill (Akrotiri Excavations, Photographic Archive).

¹ On the various interpretative approaches to this miniature frieze, including the view of it as a voyage/expedition within the Aegean or to a distant land and its interpretation as a nautical festival with religious connotations, see Televantou 1994, 309–20 and 321–38 for her own approach; she takes the view that it represents the long sea-voyage of a fleet from the Aegean to an eastern Mediterranean land and back again. For the interpretation of the fresco as a series of scenes inspired by the prehistoric epic oral poetry see Morris 1989; Hiller 1990; Watrous 2007.

² See Marinatos, S. 1974, 55–7; Page 1976, 144; Stucchi 1976, 55–6; Benzi 1977, 11–12; Warren 1979; Doumas 1983, 55–6; Marinatos, N. 1983, 8; Morgan 1988, 92, 161–2; Doumas 1992a, 49; Televantou 1994, 336–7; Shaw and Luton 2000; Doumas 2007; 2014a. On its identification as a settlement on Crete see Immerwahr 1983, 147–8; Alexiou 2015, 155. Immerwahr 1990, 74 is cautious about its identification as a specific town. Strasser 2010 and Friedrich and Sørensen 2010 suggested that the two harbours near the City V, and therefore the city itself, were located in the Thera caldera. According to Strasser and Chapin 2014, the landscape setting of the south wall is Thera.

a tripartite building is depicted (Morgan 1988, 71 nos 30–2, 78–9, 161, pls 101, 102 nos 30–32, col. pl. C; Televantou 1994, 112–13 K9, 274, col. pl. 66, folded col. pl. 4, folded drawing 3; Figs 1, 2). Three male figures wearing white loincloths are running towards it, while two others, in this instance naked, are seen running in the direction of the city (Morgan 1988, 116 pl. 101; Televantou 1994, 113 A256–A260, 216, col. pls 66–7, folded col. pl. 4, folded drawing 3; see also Boulotis 2011, 263–4 fig. 5). Four men clad in animal skins appear to be waiting for them (Televantou 1994, 117 A284–A287, 215–16 fig. 48, pl. 46β, folded col. pl. 4, folded drawing 3). On the shoreline of the second little bay to the west, *i.e.* on the slope of the hill with the building on top, there seems to be a strange architectural construction, as yet of unknown function (although various theories have periodically been put forward from time to time; see below). With a view to re-examining this structure I shall first give a detailed description of it, based on first-hand study of this part of the wall painting.

The structure, which covers almost the whole of one side of the hill, with a length of 16 cm and a height of 8.5 cm, is painted all over in a pinkish-brown colour that matches the surrounding landscape (Figs 1, 2, 3, 4). It is bounded to the west by two narrow, vertical, bands of a bluish hue outlined with a thin black line and with other fine black, horizontal and parallel lines. This is a well-known convention in Aegean Bronze Age wall painting for representing a stone-built wall with two courses of masonry. A horizontal band of bluish colour is joined to the upper edge of these two bands, extending to the right with traces of oblique black lines where the plaster is preserved. Above and below this, over the pinkish-brown painted surface, a series of black triangles are depicted, arranged at more or less regular intervals. Further below there are another three bluish horizontal bands, upon the second and third of which (*i.e.* the bottom band and the one above it) can be seen fine black vertical and oblique lines, perhaps another indicator of masonry construction (Figs 3, 4). Alternating with the blue bands are five series of black triangles. The bottom series of triangles is very close to the shoreline. Above the uppermost triangles there is a horizontal wavy black line, which adjoins a blue rocky mass on the left and yet has nothing to do with the vertical western edge of the enigmatic structure, the upper part of which is some distance from the wavy line. It is worth noting that the vast majority of the surviving triangles that appear on the pinkish-brown background do not touch the outlines of the



Fig. 3. Detail of the 'structure' on the west of the City V (Akrotiri Excavations, Photographic Archive).

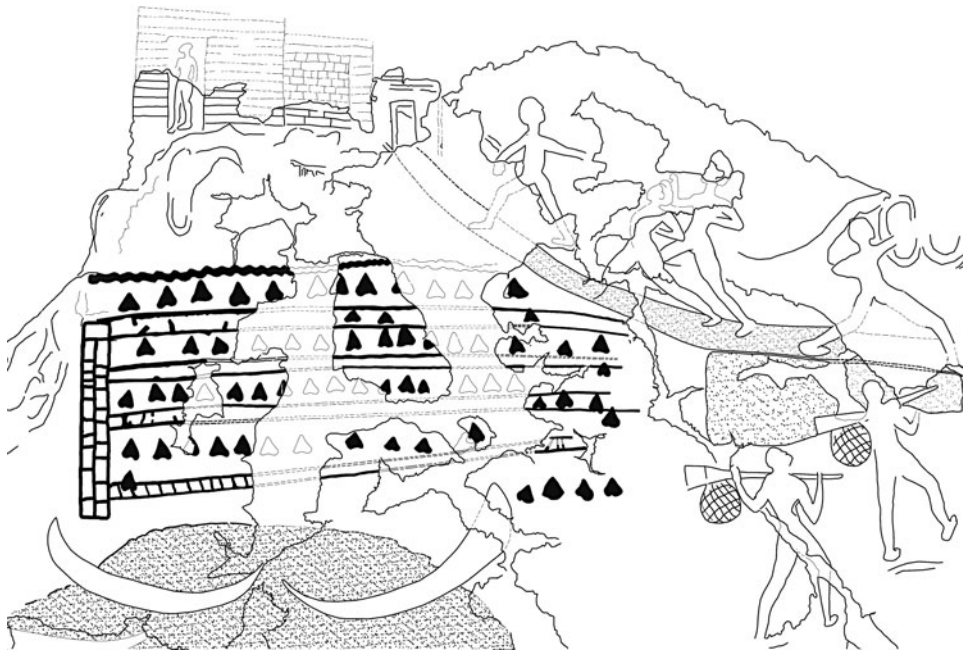


Fig. 4. Drawing of the 'structure' and its surroundings with the road/path and the pond (drawing by D. Stampolis).

horizontal blue bands. Furthermore, at some points black triangles are painted upon the horizontal blue bands or slightly overlap their outlines (Figs 3, 4). Starting at the top, in the first register there are seven fully preserved triangular features and parts of two more; nine fully preserved and part of one more in the second; eight fully preserved and parts of two more in the third; eight fully preserved and parts of two more in the fourth; and four in the fifth, almost at the shoreline. Again, from the top, there are three fully preserved triangles in the first blue horizontal band, three in the third and one in the fourth.

It is striking that all the extant black triangles have an opening at their bases. This opening is rounded, sometimes small, sometimes large, but nevertheless always there, so that the only explanation must be that it is intentional (Figs 3, 4). It should be noted that on the eastern side there is absolutely nothing to suggest the limits of the building.

PROPOSED INTERPRETATIONS OF THE 'STRUCTURE' AND THEIR RECONSIDERATION

This structure takes up a lot of space, being disproportionately large compared with the adjacent buildings depicted there in the coastal settlement. This sort of size does not correspond to a dovecote, a suggestion put forward by S. Marinatos (1974, 43), who was perhaps influenced by the similarities of the triangular features to the three-sided openings on modern dovecotes in the Cyclades. And this theory is all the less convincing given that this structure is open on one side. Its situation immediately above the shoreline later led to the theory that it was a building with some maritime connection, and more specifically a shipshed (Stucchi 1976, 39, fig. 13a–b, pl. V.2; see also Benzi 1977, 11), though that would undoubtedly need some sort of entrance way or entrance ways, which definitely do not exist here.³ If the identification of the low building on the

³ In the drawing that accompanies Stucchi's article (1976, fig. 13b), a four-sided opening, absent from the wall painting, has been inserted into the facade of the building and a vertical boundary line equally arbitrarily added on the eastern side.

shoreline of the City II in the miniature frieze with a shipshed is correct (and this hypothesis is strengthened by the architecture of the shipsheds that have been excavated on Crete),⁴ then it should have three openings in its facade (Shaw, M.C. 1985, 23 pl. IIIb). Nevertheless, the absence of a boundary wall on the east side of the construction tends to undermine any suggestion that it should be identified with a shipshed or even a warehouse (Giesecke 1983, 127). Where scholars have taken this approach, the triangular elements have been interpreted as openings for ventilating the space, which is assumed to be enclosed. The suggestion, briefly made but not elaborated by Page (1976, 144), that the triangles might be beehives set upon a series of terrace walls, has found almost no supporters (exceptionally see Shaw, J.W. 1990, 433, 'a very attractive suggestion').

As Morgan (1988, 85) and Televantou (1994, 112–13) have noted, the pinkish-brown colour given to the structure is reminiscent of the rocky landscape that surrounds the scene, and is used by Thera artists to depict the various shades of the rocks or massifs and is not found in buildings. The exceptional nature of this construction and the lack of iconographic parallels in Aegean art of the second millennium BCE encouraged Televantou to characterise it as a peculiar building carved out of the rock that was problematic to interpret (Televantou 1994, 274; see also Alexiou 2015, 155). According to Morgan (1988, 85) it is a rock-cut structure built into the vertical face of a cliff. Indeed, in looking for parallels in Islamic fortified storage buildings in North Africa or later limestone caves in Palestine, she identifies the triangular shapes as places for storing salt or grain, as domed spaces suitable for practising some religious cult, or for industry or similar (Morgan 1988, 85, 195 nn. 160–1). Yet their regularity and the way they are lined up in straight horizontal lines is not consistent with the untidy arrangement that niches created in a building cut into the rock would be likely to present. We should also take into account the difficulty in this period of carving triangular niches in a rock face, in which rectangular or bell-shaped ones would be more usually cut (we might compare also the niches hewn from the rock in the later open-air sanctuaries of Aphrodite at Daphni and on the northern slope of the Acropolis: Machaira 2008, 20–2 fig. 9, pls 6α, 7, 8α, 41–5α). Moreover, the building's close proximity to the sea and the damp sea air would not create the right conditions for storing foodstuffs. The four horizontal blue bands are thought by the same scholar to be 'wooden struts, which supported the structure from possible collapse (caused by the weakening effect of the openings)' and which may have facilitated the ascent to the building 'as a form of ladder for reaching the storage units' (Morgan 1988, 85).

What remains unexplained in all these approaches is the lack of an external boundary on the east side. Even if we accept that the masonry on the western edge was intended to prop up the building, we would expect to find something similar on the other side too. The bands of blue are bounded at the top and the bottom by fine black lines that form an outline and it is difficult to accept that blue would be used to depict wood, when Thera painters used yellow ochre. They often used blue to render grey, *i.e.* the colour of stone. However, if we suppose that the blue bands depict stone struts, they would still be problematic to account for in a rock-cut structure.

Most recently, Strasser and Chapin (2014) suggest that the structure represents geological formations in the Thera volcanic landscape. They suggest that the black triangles may represent tafoni (small cave-like features in rock surfaces caused by weathering), whereas the vertical blue bands on the west side could be depicting volcanic dikes (fractures in the rock that once served as pathways for pressurised lava rising from the magma chamber) which resemble columns or pillars of rock. Apart from the fact that Strasser and Chapin fail to interpret the five horizontal blue bands of the structure – a significant feature – it should also be noted that in nature tafoni do not, unlike the black triangles in the fresco, form regular

⁴ The Late Minoan IIIA2–IIIB building P at Kommos has been identified as a shipshed, which is made up of parallel rectangular spaces with an equal number of openings on the facade, allowing ships to be laid up there in the winter. See Shaw, M.C. 1985; Shaw and Shaw 1999; Shaw *et al.* 2006, 850–3 pl. 1.12. On the idea that the Hawes' Late Minoan IB 'Shore House' at Gournia functioned as a shipshed, see Fotou 1993, 98 pls 20–1; Watrous 2012, 523–9, figs 1–3, 6–7. For similar rock-cut installations near Nirou Khani, presumably dating to the Bronze Age, see Marinatos, S. 1926, 146; Shaw, J.W. 1990, 433; Shaw and Shaw 1999, 370 fig. 9.

patterns. Nor do they have the same regular shape or a curved bottom. Furthermore, this suggestion does not account for the sparsity of black triangles on the blue surface of the horizontal bands. For the same reasons the identification of the triangles as caves in Vlachopoulos and Zorzos (2014, 192) is not convincing either. It is relevant also to take into account that dikes are usually formed in steep cliffs. The hillside in the wall painting gives the impression that it has a gentle slope, as we may deduce from the fishermen walking up carrying paddles on their shoulders with nets full of their catch (Figs 1, 2).

The suggestion – one only briefly sketched – that the four horizontal blue bands possibly represent terrace walls (Harfouche 2007, 153; Watrous 2012, 538) conforms more closely to the strict iconographic content of the scene (see also Vocotopoulos, Plath and McCoy 2014, 254 n. 16, who are undecided between this last proposal and the view of Strasser and Chapin, 2014). According to Vocotopoulos, Plath and McCoy (2014, 254 n. 16) the black triangles are meant to render young shoots or haystacks, whereas according to Watrous (2012, 538) they represent vines.

A NEW PROPOSAL

Detecting the road that connected City V with the ‘structure’

In attempting to understand just what the enigmatic structure to the west of City V represents, the first thing we must note is the existence of a blue band, which starts from the area of the settlement just behind the place where an altar crowned with horns of consecration is depicted (Televantou 1994, 115–16, 268–70 fig. 58a, col. pl. 67) or, according to another version, an urban shrine.⁵ The band curves around the place where the male figures wearing animal skin cloaks are standing and goes straight on to the tripartite building at the top of the hill, where it would stop (Figs 1, 2). This band, with a width varying between 1 and 1.6 cm, on which five male figures are depicted as running, can only represent a road (for Minoan roads see Tzedakis *et al.* 1989; Müller 1991; Warren 1994). There is no trace anywhere in this band of the black lines that would suggest paving.⁶ Since it is usually accepted that City V in the Miniature Wall Painting depicts the city of Akrotiri, it is interesting to note that the second harbour to the west of the city in the fresco has been identified as the valley of Hagios Nikolaos between Mesovouna Hill and the Cape Mavro Rachidi to the south-west of the ancient settlement, which starts from the sea and tapers off until it reaches the modern village (Figs 5, 6; Doulmas 1983, 55; Marinatos, N. 1984, 42; Morgan 1988, 161–2; Shaw, J.W. 1990, 432–3 figs 18–19, 21; Doulmas 1992a, 49; Televantou 1994, 336–7).⁷ Regardless of the location of the first harbour to the west of the settlement, the second one was most probably in the valley of Hagios Nikolaos (Fig. 6), as the outlines of the hills bordering the harbour where the fleet is arriving have been recognised as the range of hills of Mavro Rachidi (Doulmas 1992b, 25; Palyvou 2005b, 22–3 fig. 22; Doulmas 2014a). In addition to that, the slope of Mavro Rachidi is approached through a natural cleft in the volcanic rock that creates a path to the summit of the hill (Doulmas 1992b, 25; 2014a, 143), which could be convincingly identified with the blue band in the wall painting. In any case it is worth noting that in the area to the west of the settlement, above the chapel of Hagios Nikolaos and around Mount Loumarades, where, in the absence of volcanic deposits, the pre-eruption landscape of Santorini has been preserved, there are impressive topographical similarities with this specific part of the Miniature Wall Painting (Marinatos, S. 1969, 34–5; Morgan 1988, 161–2; Doulmas 1992b, 24–6; 2014a, 142–3). However, careful observation of the route of the road in the fresco suggests something extraordinarily interesting, namely that the last remaining part of

⁵ Morgan 1988, 83, 84–5 no. 34, pls 105, 106 no. 34, 120, col. pl. C; see also Lembessi 1976, 32; Säflund 1981, 197, where the structure is interpreted as a balcony.

⁶ Minoan country roads are usually not paved (Müller 1991, 545–6 and n. 3) except in the parts near houses (Tzedakis *et al.* 1989, 50).

⁷ For the opinion, according to which a harbour was also to the east of the settlement at Potamos river, see Shaw and Luton 2000; Doulmas 2007, 85–8; Palyvou 2005b, 22–3.

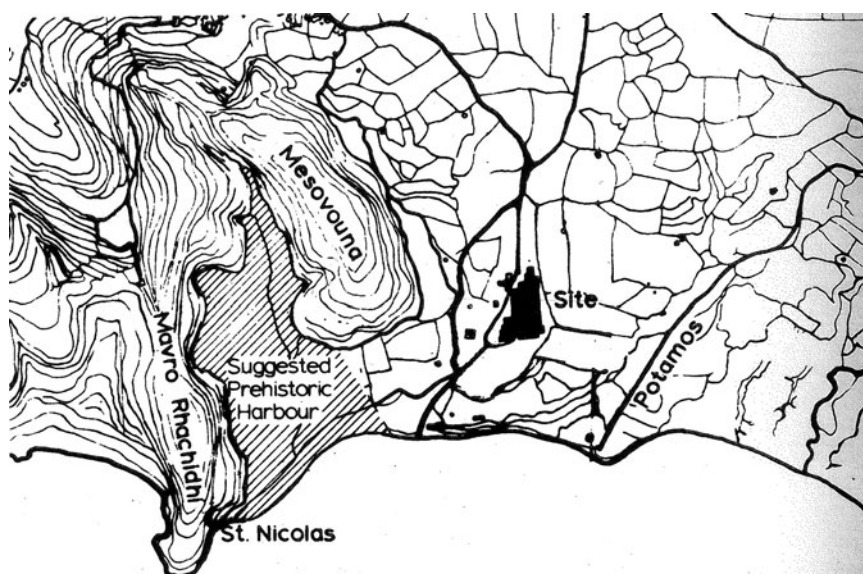


Fig. 5. Akrotiri area plan, indicating the suggested location of Bronze Age harbour (after Doulmas 1983, fig. 2).

the road cuts through the upper right corner of the mystery structure (Figs 1, 2, 4), the roof of which is thought to be delineated by the black wavy line at its upper edge, if indeed this was the facade of a roofed building. There are two possibilities: either that the painter made a mistake, which does not seem likely given that he had sufficient space to reduce the height of the 'building', or that we should not see the 'building' as being depicted in a frontal view. At this point we must



Fig. 6. The valley of Hagios Nikolaos seen from the north (photo: C. Palyvou).

emphasise that this particular painter uses the black wavy line in other places within the miniature fresco in order to show the edges of the rocky landscape, where it exists (Televantou 1994, col. pls 54–6). So, if we remove the element of the roof, we are left with a ‘building’ of pinkish-brown colour, exactly the same as the colour used to depict its surroundings, with black triangles on its facade and on top, though the latter do not touch the upper black line, as one would expect.

Discussing perspective issues

These observations and the special characteristics of the structure – the lack of a vertical edge on the eastern side, absence of a roof, triangular features with arched openings at their bases lined up at more or less regular intervals, presence of horizontal courses of masonry and the existence of a road/path that cuts through the upper right-hand corner – inevitably lead us to a different interpretation. In order to proceed, we shall focus upon the rules of perspective that the painter was using to depict particular iconographic motifs, rules that were also being used in Minoan Crete in this same period.

For anything to do with bodies of water or specific architectural structures, the depiction of which called for the use of a system of perspective, the artist represented them as if seen from above, like a ground plan. This can be observed, for example, with the sea, the rivers in Cities III and IV on the east and south walls, the road mentioned above, the well (Televantou 1994, 70 K3, 273 col. pl. 35, folded drawing 1), the little enclosure with the two trees inside (Televantou 1994, 71 K4, 273 col. pl. 35) and possibly also the ashlar wall surrounding a building in City II on the north wall (Televantou 1994, 274). Alongside them he paints trees, animals and people in frontal view, using a perspectival approach that combines a frontal view with a bird’s-eye view (also known as cavalier perspective); to depict depth he superimposes forms and figures that are supposed to be one behind the other,⁸ sometimes depicting those elements intended to be further away at a smaller scale in an attempt at perspectival diminution (Blakolmer 1996).

The combination of the bird’s-eye view with other methods, such as the frontal view, is considered an Aegean characteristic that influenced Egyptian art (Walberg 1986, 116–38, esp. 136–8; Laffineur 1990; Betancourt 2000, 359–63; Bietak 2000, 230–3) and is also seen in the scene on the Late Minoan IB ‘Peak Sanctuary’ relief rhyton found in the palace at Zakros (Platon, N. 1971, 161–9; Shaw, J.W. 1978, 432–40 figs 5–9; Platon, L. 2003, 342, fig. 4). In this case the side walls of the enclosure of the sanctuary are depicted in an overhead view as vertical, rectangular, bands. Although, according to the usual (*i.e.* linear) perspective, they appear to depict pillars supporting the sanctuary depicted above them, in reality they correspond to the upper part of the cornices on the walls (Shaw, J.W. 1978, 435). In this same image the flight of steps leading up to the entrance to the sanctuary is depicted using a series of horizontal parallel lines, and on the first step we see a portable altar shown in frontal view (Shaw, J.W. 1978, figs 7–9). This is exactly how the steps in the Temple Fresco from Knossos are depicted, in front of which are columns viewed frontally (Evans 1930, 63–4 n. 1 figs 28, 36, col. pl. XVI, who interprets the steps as a depiction of ‘masonry’; Davis 1987, 159–60; Evelyn 1999, 194–6 no. 22). A combination of a ‘ground-plan’ view (*i.e.* a bird’s-eye view) with frontal depiction of subjects is found also in a number of broadly contemporary compositions: those in the House of the Frescoes at Knossos (Cameron 1968; Chapin and Shaw 2006), in the Late Minoan I miniature fresco of the ‘Sacred Grove and Dance’ with the bird’s-eye view of the causeways or walkways and the space in which the moving women are depicted (Evans 1930, 66–7 col. pl. XVIII; Davis 1987, 157; Hood 2005, 63–4 no. 6, fig. 2.12, pl. 10.2), and in the Late Minoan IB composition from Avaris with the bullfighting contest against the background of a maze pattern (probably rendering the pavement of a court: Bietak 2007), and on the Late Helladic I dagger from the Mycenae Shaft Grave V (Marinatos and Hirmer 1960, pls XXXV, top; XXXVIII, bottom).

⁸ Iliakis 1978, 621; Walberg 1986, 116–38; Morgan 1988, 12, 70–1, 86; Immerwahr 1990, 71–3; Laffineur 1990, 246–7; Blakolmer 1996; Betancourt 2000; Palyvou 2005a, 185–6; Tzachili 2011, 222–3, 235–6, 259–66, 272–82.

Identifying an apiary

If in our reading of the structure in the miniature fresco we bear in mind the iconographical convention according to which the viewer is intended to see the image as if he were in mid-air and looking down on masonry structures with a bird's-eye view, then it appears to depict a large plot of land with a built boundary on the west side and some other horizontal built areas adjacent to a road, which almost runs right into it. In other words, there emerges a depiction of a stretch of land with terraces, *i.e.* small, horizontal patches of land, retained by dry-stone walls, similar to those found around Minoan urban centres indicating intensive exploitation of the countryside from the Middle Minoan Period onwards (Vokotopoulos, Plath and McCoy 2014, 251 nn. 2–3 with bibliography). They are similar also to the terrace walls still constructed in the Aegean islands today on the sides of hills or mountains to facilitate cultivation and to exploit the small amount of cultivatable soil as efficiently as possible (Fig. 7). The western masonry boundary that corresponds to a dry-stone wall with two courses would undoubtedly have protected the crops from strong winds. Indeed, if this part of the fresco has been correctly identified as representing the slopes of Mavro Rachidi, it is interesting to note how appropriate a well-built western wall would have been against the strong south-west winds that today blow in this area from the end of summer throughout the autumn and winter.

The shape of the black triangular features is initially reminiscent of the triangular projections that appear on the tops of buildings both on seals (Müller and Pini 1998, 239; Hallager 1985, 19–20, figs 10–11, 15–17) and in wall paintings of the period, such as the Miniature Wall Painting from Akrotiri⁹ and the composition that decorated the northern room (N.18) in the north-east bastion of the city in Ayia Irini on Kea (Morgan 1998, 203 figs 4–5).¹⁰ They nevertheless differ from them inasmuch as they are not drawn with the same care, and their outline is not completely triangular, as would

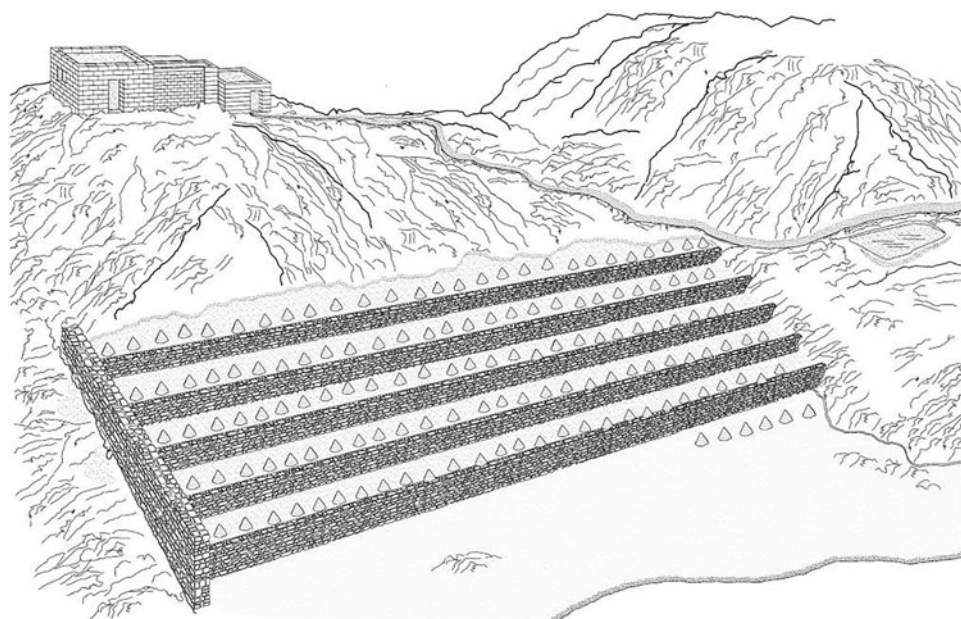


Fig. 7. A possible reconstruction of the apiary on the west of City V (drawing by D. Stampolis).

⁹ In City I on the west wall: Televantou 1994, 61–2, Δ24–Δ25, 265–6 fig. 17, col. pl. 25, folded drawings 10–11, and in City II on the north wall: Morgan 1988, 85 no. 2, 91, pls 2–3, 98 no. 2, col. pl. C; Televantou 1994, 69 KI, 79 B53–56, 192–4, 273–4 col. pl. 43a, folded drawing 1, folded col. pl.

¹⁰ Triangular projections on top of the roofs of buildings have been interpreted as horns of consecration (Hallager 1985, 19–20), chimneys (Müller and Pini 1998, 239), crenellations (Abramovitz 1980, 60 n. 16; *contra* Pavúk 2002, 578), sacred stones or stalagmites (Warren 1987, 48), rooftop granaries (Strasser 1997, 201–7), a protection against earthquakes or cooling devices (Morgan 1998, 203, 206). Televantou (1994, 265–7) interprets the projections on the tops of buildings in City I as subsidiary structures on the roof, perhaps attics and in City II (1994, 273–4) as crenellations.



Fig. 8. A woven skep from Andros island (after Beloyianni 2007, fig. 33.1).

happen if they were, in fact, architectural features: the sides of some of them are more curved and of others less so; but they are distinct also as regards the arched openings at the base. Seen face on, in accordance with the usual rules of perspective employed here, they present a shape that we could call a triangle with curved sides and a base in the shape of an omega (Ω). These forms that are seen placed on terraces show very close similarities with woven beehives (known as ‘skeps’), made from reeds or twigs, which have a small opening near their base for the bees to come and go (Figs 8, 9, 10). In other words, they are most probably a representation of the upright pointed baskets (*epistomo kofini* [open at the bottom]), called ‘fixed-comb’ hives, a traditional type of beehive made using basket-weaving techniques (Crane 1983, 99–111 figs 105–9; Crane 1999, 219–21 fig. 25.4b, 238–57; Beloyianni 2007, 72 fig. 33). They range in height from 50 to 75 cm and the diameter of the opening can be between 25 and 40 cm (Crane 1999, 221). Woven baskets of this type continued to be used until relatively recently throughout mainland Greece, on Andros and in some islands of the Northern Aegean (Anagnostopoulos 2000, 301–2, fig. 6; Mavrofydis and Chatzina 2015, 21 with fig.), and are still used today, mostly in northern Greece. Since they are coated with clay or cow dung or a mixture of the two to insulate them, keeping the inside of the hive at a stable temperature, they acquire a dark-brown appearance on the outside, here depicted in black (Figs 3, 8). Though this particular type of hive is considered primitive, it nevertheless ensures ease of transportation for transhumant beekeeping: they are lighter than ceramic hives, and maintain more stable interior temperature levels (Crane 1999, 219). Roman agricultural writers – a key source of our knowledge on ancient systematic beekeeping, since we lack similar sources from ancient Greece – also count the large temperature fluctuations inside the ceramic hives among their disadvantages (Varro 3.16.15–16; Columella 9.6.1–2; cf. also Fraser 1951, 54). Although the earliest written mention of wicker hives goes back to the Roman period,¹¹ their presence in the prehistoric Aegean, though

¹¹ Columella 9.6.1; Pliny, *Natural History* 21.80; Varro 3.16.15–17; Virgil, *Georgics* 4.33–7; see also Fraser 1951, 54–5; Crane and Graham 1985, 12–16; Lüdorf 1998–9, 51–2; Crane 1999, 203–4.

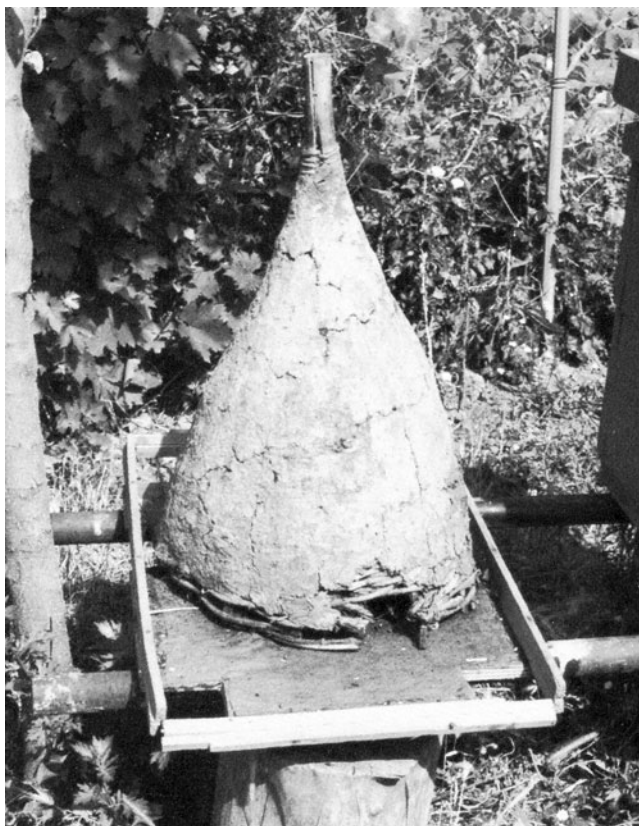


Fig. 9. A woven skep from Macedonia (after Crane 1999, fig. 25.4b).

not to date attested iconographically,¹² has long been suspected, mainly on the basis of common sense but also because of the general conservatism seen in traditional husbandry (Davis 1996, 461; Harissis and Harissis 2009, 60–1 fig. 52; D’Agata and De Angelis 2014, 355; Triantafyllidis 2014, 469). In this context Paul Faure suggested reading the ideogram *I79, a hapax which appears on the linear B tablet Kn U 96 accompanied by a numeric, as a wicker beehive (Fig. 11).¹³ Although this reading was considered likely, it has not been discussed further for lack of any related archaeological material (Vandenabeele and Olivier 1979, 287). In any case, it is interesting that the ideogram depicts a conical object with what are clearly curved sides and an open base, features that are also found in the hives of the apiary in the miniature frieze. The double lines that form its sides and the three parallel horizontal lines on the body may indicate its wicker construction.

Bolstering this view that we are dealing with an apiary (Fig. 7), is the blue, virtually trapezoidal-shaped mass seen to the east of the area in question, not attested in any of the known drawings of the frieze and consistently left out of the discussion on the identity of the mysterious structure (Figs 1, 2, 4, 7). The way in which it has been depicted is quite different from the approach used for the rocks in the Theran frescoes and in Minoan art in general. They have strong dark outlines and, also outlined, oval or triangular areas on the inside, variously depicted in yellow, red or blue. In this case these characteristics are absent, as the blue area, despite some losses of plaster here and there, seems to have an irregular, trapezoidal shape and a very faint outline. The colour infill added in the restoration has somewhat changed the original picture, as it has applied some blue to the

¹² The attempt to identify the buildings on the sealing Müller and Pini 1998, 218 from Kato Zakros with wickerwork beehives (Harissis and Harissis 2009, 60–1) lacks adequate evidence.

¹³ This interpretation was proposed in a letter cited by Vandenabeele and Olivier 1979, 286–7 fig. 196 pl. CXLVI:2; Davaras 1986, 40; cf. Evans 1935, 726 fig. 709d, who sees the sign as a cage.



Fig. 10. A Pomak woven skep from northern Greece (photo: The Roma Basketry Museum, Komotini).

upper right of this area. Indeed, this overpainting covers part of the area in which a segment of the road/path may have once been depicted. Given that it is well known that there must be natural or artificial sources of fresh water near apiaries, it is logical to suppose that what is depicted here in bird's-eye view is a pond for collecting rainwater or surface water, essential not only to

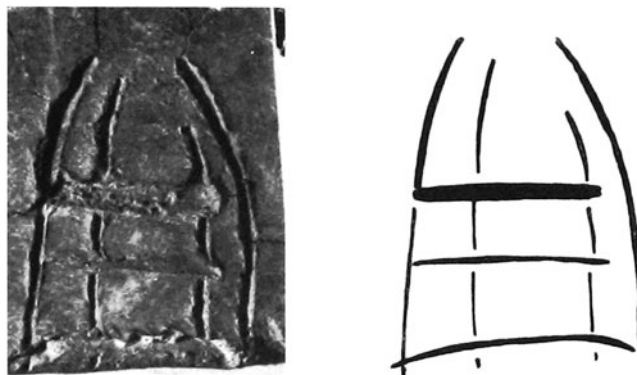


Fig. 11. The ideogram *179 (after Vandenaebale and Olivier 1979, pl. CXLVI:2).

beekeeping (Columella 9.5.5; Varro 3.16.27; *cf.* also Fraser 1951, 55; Crane 1999, 206, 312, 562, 564) but also to agriculture, livestock and possibly the activities hosted in the building on the top of the hill (for water management systems in Minoan Crete see Betancourt 2012; Vokotopoulos, Plath and McCoy 2014, esp. 255–61). The relatively large dimensions of the pond could lead us to assume that its waters may have been employed to irrigate the terraced area, if this was initially used for agriculture before serving as an apiary.

It is also common practice in beekeeping to erect a wall to windward in order to protect the apiary from strong winds. Indeed, sometimes the colony is protected by walled enclosures with well-finished outer and inner sides (Columella 9.7.1; *cf.* also Fraser 1951, 55; Rackham-Moody 1996, 152 and fig. 12.9; Crane 1999, 323–5; Blitzer 2004, 162 figs 6.44–5). Siting apiaries near to the sea is commonplace in areas with little vegetation in the dry heat of the Cycladic islands. Even now, in those Cycladic islands where beekeeping is practised, a colony of bees is often found next to the sea, where various bee-friendly plants, above all thyme, make it possible to produce honey of an exceptionally high quality (Fig. 12). And it is worth noting that the best-quality thyme honey is produced from the harvesting of coastal rather than mountain thyme – mainly because of the wet conditions that prevail by the sea, which also explains the presence of so many apiaries near the sea on the hot, dry islands of the Aegean (Giorgos Mavroyiannis, pers. comm.). Moreover, the fact that the temperature by the sea does not drop to very low levels in the winter allows beekeepers in many places with abundant vegetation to move their bees from mountain sites to somewhere at sea level sheltered from the wind towards the end of the autumn. We cannot know whether the apiary in Akrotiri, if my reading is correct, sited in a place sheltered at least from the north and south-west winds, was a seasonal or a permanent installation. However, recent data from charcoal analysis and archaeobotanical research based on phytolith evidence, suggests that near the area of the settlement there must have been forested areas with pines and oaks as well, of course, as large stretches of shrubs and maquis (Vlachopoulos and Zorzos 2014, 186–9). The more humid climate of the island before the



Fig. 12. A modern apiary near the shoreline at Lefkes, on the northern part of Amorgos island (photo: Y. Kastanos).

eruption would have certainly encouraged the growth of vegetation. Bearing this in mind, we cannot exclude the possibility that beekeeping was practised in the spring and summer months in areas with abundant vegetation and that towards the end of the autumn the hives would be moved to a coastal area, where they would stay throughout the winter, during which period the bees would need very little food but at least a constant supply of fresh water.¹⁴ In addition to all this, the siting of the beekeeping establishment in relation to the settlement at City V also fulfils other essential requirements that still apply today: while it is situated at a considerable distance from any inhabited area, there is an access route and the hives are oriented east or south-east.

Compared with the area of the settlement itself, the area occupied by the apiary is particularly large, and an estimate of the original number of hives depicted (approximately 67, including those that could have been depicted in parts of the fresco from the areas that have not survived) would not, of course, correspond to their actual number. But this extensive installation suggests an undoubtedly thriving beekeeping industry, which apart from meeting the settlement's needs in terms of honey and wax, would also probably have contributed significantly to its economy. And, of course, this is without allowing for the probability that there were other apiaries in other spots near the city.

If this is how things stood and the proposed identification is correct, then we can claim the earliest – and to date the only – depiction of an apiary in the Aegean of the second millennium BCE, a unique topographical witness to the organised and intensive practice of beekeeping in the coastal settlement of City V. Moreover, it highlights the use of the vertical-type, wicker or woven beehives in the second millennium BCE, something which could not have been deduced using material remains on account of their perishable nature. Though this theory has been proposed before, no iconographical evidence had hitherto been identified.

EVIDENCE OF BEEKEEPING IN THE PREHISTORIC AEGEAN

Identification of wax as sealant and illuminant; assuming the existence of honey

The iconography of prehistoric rock-art suggests that honey has been gathered in the Mediterranean from at least as early as the Mesolithic period (Crane 1999, 36–7, 43–4 figs 7.1a–b; Roffet-Salque *et al.* 2015, 226 and nn. 2–3). The exploitation of the produce of bees is attested for the first time in the Aegean in the Neolithic period, suggested by the traces of wax identified by organic residue analysis on Middle and Late Neolithic perforated sherds from the settlements of Limenaria, Thassos and Dikili Tash in Eastern Macedonia; this residue was perhaps left behind after filtration of the honey, which may or may not have come from wild honeycombs (Decavallas 2007; see also Renfrew 2011, 287). Recent analyses have confirmed the presence of beeswax in Neolithic sherds from Attica, the Peloponnese and also the Cyclades (Roffet-Salque *et al.* 2015, 228).

The only indication to date of the existence of organised beekeeping in Akrotiri lies in the traces of wax identified by organic lipid analysis on the inside of sherds from storage jars, in which goods in liquid form were kept, probably wine (Karnava and Nikolakopoulou 2005, 224; Doumas 2014b, 42). The use of wax as a sealant on the inside of jars has also been confirmed in Middle Minoan III – Late Minoan I Crete (Christakis 2005, 52; Christakis and Rethemiotakis 2011, 180–2), while chemical analysis of the inside of lamps and handleless conical cups that had been used as lamps in Late Minoan I Mochlos showed signs also of its use as an illuminant (Evershed *et al.* 1997). This practice could be considered to be in use at least from the Middle Minoan or even Early Minoan period, as indicated by the results of analysis of an Early

¹⁴ Also pointing to the autumn are the activities engaged in by the three figures in Room 5 of the West House: fishermen fishing for tuna and dolphinfish or dorado and a young priestess burning crocus stamens (Papageorgiou 2000, 964–5). Morgan (1988, 155–62, 164–5) concludes that the time of year indicated in the events of the miniature frieze corresponds to late spring/early summer.

Minoan – Middle Minoan II rim sherd of a lamp from Pseira (Beck *et al.* 2008, 62, 72). Its likely uses in shipping and in other sectors of technology, like vessel burnishing, sealing and other uses (Decavallas 2007, 154 with collected bibliography) are to be added to its self-evident presence in the technique of lost-wax casting, known in the Aegean from as early as the Early Bronze Age (Bernabò-Brea 1964, 64, 591 pl. 85*d*; Branigan 1974, 82 fig. 4; Davay 2009, 147, 151).

The identification, through chemical analysis, of a mixture of fermented liquids (resinated wine and barley beer) that may have contained honey mead,¹⁵ not only on the inside of Late Minoan IA handleless conical cups from Chania-Splanzia,¹⁶ but also inside Late Minoan IIIA2–B vessels from the cemetery at Armenoi¹⁷ or in a Late Minoan IIIC cooking vessel from Chamalevri (Tzedakis and Martlew 1999, 170 no. 161 [M. Andreadaki-Vlazaki]; MacGovern *et al.* 2008, 176, 195) suggests that honey was used throughout the Late Bronze Age, not only as food and as a natural source of sugar and a foodstuff with a high nutritional index, but also in rituals, as the written sources of the historical period clearly convey (Weilhartner 2003, 46–7). The fact that it may have been mixed with wine undoubtedly recalls the documentary evidence from Mycenaean Pylos, where one of the sealings from the Wine Magazine may record wine treated with honey (Aura Jorro 1985, 440–1 *s.v.* *meritijo*; Bendall 2007, 150).

In addition to all this it seems that from as far back as the Old Palace period, if not before, honey had gained a place in the Cretans' perceptions of the afterlife and the myths that sprang up around them, as the unique clay model of a boat with a honeycomb in the hull, presumably from a tomb in the environs of the Hodegetria Monastery, Asterousia, seems to suggest (Davaras 1984; 1992). It may also be suggested by the famous early Middle Minoan gold pendant from a richly endowed tomb at Chrysolakkos, Malia, with the very abbreviated depiction of the cycle of production of honey.¹⁸

Clay beehives and tools related to beekeeping

Suggestions have been made about the use of clay vessels with holes under the lip as beehives both for the Neolithic Argolid (Vitelli 1993, 187 and n. 6) and for Early Bronze Age Attica (Liaros 2003, 239–40), though these have not been taken into consideration in later discussions. The theory that there may have been clay beehives on Minoan Crete was expounded on the basis of the convincing identification of ideogram *168 with a clay, 'pipe-like' horizontal-style beehive by Davaras (1986). Indeed, all over Crete and on the islands of Antikythera, Kasos, Karpathos and Rhodes numerous parts and fragments of clay beehives have come to light, most probably of a horizontal type and all undecorated (Melas 1999; D'Agata and De Angelis 2014), which confirm the practice of organised beekeeping, though at present there exists no confirmation of their use from chemical analysis and they do not seem to have been depicted in Minoan art.¹⁹ They are coarse vessels, cylindrical or truncated cone-shaped in form, with horizontal or vertical handles and a flat base, dated to the third or second millennium BCE and not very different from the horizontal type of pottery beehives, which have been identified in sites of the historic period in Greece (Lüdorf 1998–9, 71–6; D'Agata and De Angelis 2014, 350–1 nn. 8–9 with extensive bibliography; Triantafyllidis 2014). They all

¹⁵ The results were based either on traces of wax residue found in the mixture or on evidence of potassium gluconate, the principal organic acid in honey (MacGovern *et al.* 2008, 194).

¹⁶ Martlew 1999; Tzedakis and Martlew 1999, 167–8 nos 153–6 (M. Andreadaki-Vlazaki); MacGovern 1999, 207–8; MacGovern *et al.* 2008, 173–4, 194, 202.

¹⁷ Martlew and MacGovern 1999; Tzedakis and Martlew 1999, 176–7 nos 167–9 (E. Protopapadaki); MacGovern 1999, 207–8; MacGovern *et al.* 2008, 194.

¹⁸ Demargne 1930, 411–21, pl. XIX; Evans 1935, 75–6; on the immense bibliography on this piece of jewellery and the identifications of the insects as wasps, bees or hornets see Bloedow and Björk 1989, 11–13.

¹⁹ Crowley identifies an upright construction, usually depicted next to or in front of a tree and generally thought to represent a pithos (*cf.* Persson 1942, 82; Marinatos, N. 1989, 130, 135; Wedde 2000, 181–2), seen in a series of Late Minoan signet rings (Crowley 2014, fig. 11.1), as a clay beehive, but without adequate argumentation. As a result, she interprets the dots seen in the background of the scene, sometimes touching the upright construction and sometimes not, as bees. In any case the clearly oval shape of the construction cannot support its identification with a tubular beehive of horizontal type.

have incisions on the middle and lower part of their inside walls, mostly criss-crossed diagonally but in a few cases simple oblique lines and impressed spirals on the inside of the bottom (D'Agata and De Angelis 2014, 352). According to a very recent opinion, these distinctive characteristics recall the structure of the corresponding wicker beehives (D'Agata and De Angelis 2014, 351–2), the use of which has been proposed from as far back as the prehistoric period in the Peloponnese too (another place where there is no sign of ceramics with incised marks on the inside that are so characteristic of beehives: Davis 1996, 461), as well as in Crete after the Late Minoan IB period when examples of clay beehives are rare (D'Agata and De Angelis 2014, 355). In any case, nothing precludes wicker beehives having been in use in Crete at the same time as the clay ones and before the Late Minoan IB, a suggestion supported by the small number of sherds identified to date, a number that is disproportionately low in relation to the size of the island.²⁰ And the same has been alleged for beekeeping in the historic period too, when horizontal-type clay beehives abound, whereas the vertical sort – that may have been represented by wicker beehives – is rare (Triantafyllidis 2014, 469). Indeed, given that wicker beehives are made with materials found in abundance in these particular areas (Anagnostopoulos 2000, 301–2), it is logical that they would have been used in Late Cycladic Akrotiri too, where basket weaving apparently had a long tradition and the osier and the reed were endemic (Beloyianni 2007; Beloyianni 2008, esp. 201).²¹

At this point the identification of two cylindrical clay vessels decorated with painted plant motifs from Akrotiri as beehives should be noted (Doumas 1976, 309–10 fig. 1, 556, pl. 284β; 1983, 118 fig. 19; 2014b, 42 fig. 38a–b). These vessels have open bases, perforated bottoms and a four-sided opening between bottom and base with a removable, clay lid. The proposed identification is untenable for the following reasons: the size of the opening, which would have allowed rodents and other small animals to get in, and the lavish painted decoration (with crocuses and spirals) which would be unsuited to the intended function of the vessels and their permanent exposure to the elements. Moreover, this sort of vessel shows no similarity to any of the types of clay beehive known to date (Aravantinos 1985, 25; Crane and Graham 1985, 30), nor does it have any incisions on its inside walls, a sure sign that a clay vessel can be identified as a beehive (see above). Furthermore, no such marks have been found on the insides of any of the ceramics found to date in Akrotiri (Irina Nikolakopoulou, pers. comm.), which may indicate the absence of clay beehives in the settlement. Even the two clay vase-shaped rhytons with conical tops from Xeste 3, which were once thought to be miniature beehives (Marinatos, S. 1976, 30–1 pl. 52c; Doumas 2014b, 42 fig. 38c) and which are depicted in the same form on Thera vessels and Minoan talismanic seals (Marthari 2008, 375–7 figs 26–31), do not seem to represent any recognisable type of beehive.

The fragments of clay beehives of the third and second millennia BCE from Crete and neighbouring islands suggest, however, that there was organised beekeeping from the Early Bronze Age. In addition, the Middle Minoan I – Late Minoan IIIA clay beehive smokers found at Zakros (Davaras 1989, 1–4 figs 1–2, pl. 1α–δ; Kopaka 2011, 277 fig. 24.8 [top], 280–1 and n. 24) and perhaps Palaikastro (Late Minoan IIIA2: MacGillivray *et al.* 1989, 433–4 pl. 66d), at Knossos (Middle Minoan IIIB – Late Minoan IA: Davaras 1989, 4–6 fig. 3, pl. 1ε), Phaistos (Middle Minoan II: Davaras 1989, 6 and n. 30) and Ayia Irini in Kea (Late Minoan IA/Late Helladic I – Late Minoan IB/Late Helladic II: Georgiou 1986, 42–3, 48 nos 169–70, pls 11, 20; Davaras 1989, 6 and n. 33) offer vital evidence for the second millennium BCE. These vessels, whose function was initially puzzling, were identified as beehive smokers, not only by Davaras (1989), but also as a result of a recent experimental application of a replica Minoan vessel of this type from Zakros in an apiary (Tyree, Robinson and Stamataki 2007; see also Moody 2012, 254).

²⁰ Moreover, top-bar wicker hives were in use in western Crete up to the 20th century: L. Nixon, 'Traditional Beekeeping in Sphakia, SW Crete' (available online <<http://sphakia.classics.ox.ac.uk/beeconf/nixon.html>> accessed July, 2016).

²¹ Where transhumant beekeeping is concerned, woven hives would not seem to be very functional, as the uncovered base would remain open during transportation, making it possible for the bees to fly away. However, according to Eva Crane (1999, 219), woven hives were also used and are still used where temporary changes of location are involved, with cloth wrapped around the beehive.

Middle Minoan I – Late Minoan IIIA tools and pots related to beekeeping have been found in a cave at Zakros (Kopaka 2011). Another set of Middle Minoan III – Late Minoan II vessels from the so-called ‘snake room’ of a private house south-west of the ‘South-West Treasury House’ (actually the North-West Treasury House: Evans was mistaken) next to the palace at Knossos (Evans 1935, 138–56 figs 109, 111, 115a, 118–19) also seem to be related to beekeeping (Harissis and Harissis 2009, 32–40). The identification of an Old Palace miniature vessel from Quartier Mu in Malia as a small-scale copy of a clay beehive (D’Agata and De Angelis 2014, 355 pl. CXIIB–c) reminds us moreover of the importance of beekeeping, since miniature vessels were sometimes used in ritual contexts (Tournavitou 2009; Knappett 2012).

Evidence from Linear B

The data from the Linear B tablets should be added to the evidence that demonstrates the practice of organised beekeeping in the Aegean of the second millennium BCE. Apart from the possible identification of the ideogram *179 with a wicker hive (see above, Fig. 11) and of the ideogram *168 with a horizontal-type clay beehive (see above), the appearance in the entries in Linear B tablets of the ideograms *142 and *172 should be noted, since they may represent beeswax and honeycomb respectively (Killen 2015a, 1029–30);²² the latter is sometimes ligatured with KE-RO₂₅, possibly κηρίον (*kērion*, i.e. wax or honeycomb).²³

Additionally, the records of the ligature ME-RI and the word me-ri = /meli/ (honey) on Linear B tablets from Knossos and Chania point to beekeeping occupying a particularly important place in the economy of Crete. Indeed, at Knossos, honey emerges as a highly important commodity, second only to olive oil, and was used as an offering. It is recorded as being offered to deities, usually accompanied by the ideogram *209 that corresponds to the amphora, or by a unit of liquid measurement other than the amphora.²⁴ As the ultimate use of the product remains unclear from the shorthand records of the tablets, combining consideration of them with the references in the sources of the historic period has led to the theory that honey was an ingredient in libations made in the sanctuaries of the gods (Weilharter 2003). In some of the Knossos Linear B tablets (Gg(2) set) honey is also mentioned in connection with people involved in the perfume industry.²⁵ In this regard, the probable identification of traces of it on the inside of Middle Minoan IA vessels from Chamalevri (Andreadaki-Vlazaki 1999, 48, 51 nos 16, 19) as an ingredient in the production of aromatic oils and pharmaceutical substances acquires a certain added interest (for honey as an ingredient of perfumes, see Foster 1974, 103–4; Shelmerdine 1985, 19; and as a component of remedies, see Arnott 2008, 112).

The Linear B tablets from Knossos also allow us to make suggestions about financial aspects of the exploitation of the products of beekeeping, which would certainly have been taken into account. In the Knossian Gg (4) set of Linear B tablets, most probably concerned with tax payments, the recorded quantity of honey (47 amphorae) is apparently owed to the palace²⁶ (Weilharter 2005, 44–5; Bendall 2007, 144–5; Fappas 2010, 55). The honey ideogram appears also on tablet Gg 995 from Knossos together with the term ku-pi-ri-jo (Aura Jorro 1985, 405–6 *s.v.* kupirijo;

²² For the ideogram *172 and its possible interpretation as honeycomb see also Bendall 2007, 146–7. In contrast, see Weilharter 2005, 51, who identifies it as a vessel, while Vandenabeele and Olivier 1979, 283–4 pl. CXLIII categorise it as one of the unidentified ideograms. See also Foster 1977, 24.

²³ Ventris and Chadwick 1973, 51, 290, 302, 553; Vandenabeele and Olivier 1979, 283–4; Evershed *et al.* 1997, 981; Weilharter 2005, 51 n. 93; Bendall 2007, 146–7; Killen 2015a, 1029.

²⁴ The deities recorded include: pa-si-te-oi (All the Gods), da-pu-ri-ti-jo po-ti-ni-ja (Lady of the Labyrinth), e-ne-si-da-o-ne (Enesidaōn [Ἐνεσιδῶων], an epithet of Poseidon), a-mi-ni-so e-re-u-ti-ja (Eileithya at Amnissos), and on a tablet from Chania di-wi-jo (Zeus) and di-wo-nu-so (Dionysos) (Ventris and Chadwick 1973, 309–11; Aura Jorro 1985, 438–9 *s.v.* meri; Bendall 2007, 140–2, 145–50). For the Fs set from Knossos on which small amounts of honey are recorded with their various recipients see Weilharter 2003, 49–50; Bendall 2007, 108–11.

²⁵ Foster 1977, esp. 30, 32, 35; Bendall 2007, 143–4; see also the possible recording of honey on tablets from Pylos related to perfumery: Shelmerdine 1985, 17; Bendall 2007, 151.

²⁶ Some very large amounts (180+, 780+) are recorded on the backs of the tablets, but we cannot be sure that they are referring to the same product (Weilharter 2005, 44–5; Bendall 2007, 145).

Bendall 2007, 143–4), which, apart from being a simple anthroponym ('the Cypriot'), seems in certain contexts to indicate a 'collector', in other words a commercial agent of the palace in charge of various economic activities including the exchange of products consigned to him by the palace for others (Killen 1995; Bendall 2007, 121–2, 143–4; Sacconi 2009). If that is the case, then honey was undoubtedly considered part of the produce destined for export from Cretan territory, whose abundant flora, full of aromatic plants, seems likely to have made it much sought after in the markets of the time.²⁷

It is interesting to explore the relationship between beekeeping as practised by specialist beekeepers, the products it produced, and political and perhaps also religious authorities. We should also add to what has already been said about the information that can be gleaned from the Linear B tablets from Knossos about the trade in honey (which appears to have been carried on under the aegis of the palace) a probable reading of the term *me-ri-te-wo* μελιτεύς (beekeeper?) in the land-tenure tablets from Mycenaean Pylos (Aura Jorro 1985, 440 *s.v.* *meritewo*; Bendall 2007, 150–2), as well as the occupational titles *me-ri-du-ma-te* and *me-ri-da-ma-te* (μελιδάμαρες?) in the Pylian tablets. The latter appear in lists of temple servants and may correspond to religious functionaries, whose duties are related in some way to the production of honey, perhaps as its superintendents (Aura Jorro 1985, 439–40 *s.v.* *meridamate*, *meridumate*; Bendall 2007, 50, 61, 150 n. 47; Killen 2015b, 1093–4).

The religious and royal associations of honey in Egypt are clear. There, where the earliest depiction relating to the extraction of honey from horizontal-type clay beehives is dated to the Fifth Dynasty of the Old Kingdom and comes from a stone bas-relief from the sun temple of the King Niuserre (2445–2421 BCE) at Abu Gurab,²⁸ we know of the beekeepers of the god Amun (Erman and Grapow 1971, 434), while in the Eighteenth and Nineteenth Dynasties the priests of the god Min also seem to be associated with the collection of honey (Montet 1950, esp. 23–7). The honey bee is above all strongly linked with sacred kingship, appearing as far back as the Second Dynasty, symbolising Lower Egypt (the Kingdom of the North), as an integral part of the king's titulary (Gardiner 1957, 73–4; Faulkner 1962, 79–80 *s.v.* *bity*; Helck and Otto 1975, col. 787–8 *s.v.* *Biene* [J. Leclant]).

THOUGHTS ON THE MANAGEMENT/EXPLOITATION OF THE APIARY TO THE WEST OF THE CITY V

On the basis of the Linear B data from Mycenaean Crete and Mainland Greece we can assert that at least some beekeeping would have been practised under the supervision of the palace. Although the chronological discrepancy between the archives of Linear B tablets and the data from the earlier settlement at Akrotiri is by no means negligible, we should bear in mind that the management of extensive beekeeping as an industry demanded in both cases the existence of a structured social hierarchy. In the case of a flourishing trading and maritime society like that at Akrotiri the

²⁷ Cretan honey was famous in later periods too and Pliny, *Natural History* 11.14, notes that the island was distinguished for the quantity of honey in its honeycombs.

²⁸ For the relief at Abu Gurab see Kuény 1950, 84 fig. 1; Helck and Otto 1975, col. 786–9 *s.v.* *Biene* (J. Leclant); Crane 1983, 36 fig. 17; Crane and Graham 1985, 3–5 fig. 1; Serpico and White 2000, 410 fig. 17.9. Wall paintings from the tombs of Amenophis, regent to Hatshepsut (Helck and Otto 1975, col. 786 [J. Leclant]; Crane 1983, 36, fig. 18; Crane and Graham 1985, 4–5 fig. 3; Serpico and White 2000, 410) and of Rekhmire, a high-ranking official of the 18th Dynasty (c.1450 BCE) (Kuény 1950, 85 fig. 2; Helck and Otto 1975, col. 786 [J. Leclant]; Crane 1983, 36, fig. 16; Crane and Graham 1985, 3–5 fig. 2; Serpico and White 2000, 410) provide two witnesses to the intensive practice of beekeeping in Egypt under the New Kingdom. They depict the continued use of the horizontal type of clay beehives arranged in alternate rows, just as in the wall painting from the 26th Dynasty (660–525 BCE) from the tomb of the official Pabesa (Kuény 1950, 85 fig. 3; Helck and Otto 1975, col. 786 [J. Leclant]; Crane 1983, 36–7, fig. 20; Crane and Graham 1985, 3–5 fig. 4; Serpico and White 2000, 410). Beekeeping continued to be practised in Egypt until at least the 1980s with few differences from the way it had been more than 4400 years ago (Crane 1983, 39–42).

question that inevitably arises is: who managed the output of such an extensive apiary? Did it belong to some wealthy individual, who was either a beekeeper himself or who delegated to others the supervision and production, and then traded the produce, not just to meet the needs of the local settlement²⁹ but also outside the island? In the case of an independent beekeeper/producer and/or trader,³⁰ it is also reasonable to ask to whom the land belonged on which his apiary had been set up, and all the more so because it included the slopes of a hill. From the land-tenure tablets from Mycenaean Pylos relating to a palatial society it can be deduced that plots of land beside the palace could also belong to sanctuaries, communities and/or private individuals (for the extensive treatment of the subject with collected bibliography see Palmer 1998–9; see also Bendall 2007, 65–77). Or was the administration perhaps done by some sort of central authority, for which clear archaeological evidence is lacking at Akrotiri? The close proximity of the extensive beekeeping installation to City V in the Miniature Wall Painting and the road that connects it with the settlement (and seems to end in the tripartite building at the top of the hill) may not be merely topographical data but could also reflect other associations, as they seem to make up part of an iconographic ensemble. In other words, perhaps the apiary would have had some kind of communal management and the community would have been the body exploiting its produce.³¹ Given the link this would involve between intensive cultivation and complex social structures, it should be stressed that the nature of the latter in Late Cycladic Akrotiri is difficult to elucidate, all the more so since such a small sample of the settlement has been excavated. Nevertheless, there is a little evidence of some kind of group management from the excavated kitchens that seem to have served a number of households (Devetzi 2008, 363).

In this case, investigation of the complex web of ownership, production and trade would be significantly helped by knowing the use of the building at the top of the hill in the fresco, which has been thought to be an observation post or watchtower (Doumas 1983, 106; Hallager 1985, 17; Morgan 1988, 71 nos 30–2, 78–9, 161, pls 101, 102 nos 30–2, col. pl. C; Televantou 1994, 112–13 K9, 274, col. pl. 66, folded pl. 3; Figs 1, 2, 4). However, its tripartite articulation and the dressed stone masonry of its walls justifiably raise doubts about the correctness of this suggestion. In organised, outdoor, beekeeping establishments it is often judged necessary to have a neighbouring building for storing the tools needed for this occupation and for the initial processing of the produce from the hive, consisting of straining the honeycombs and extraction of the wax. This is essential, given that apiaries are generally situated at some distance from inhabited settlements. The spatial contiguity of the extensive installation on the hillsides to the buildings on the hill, with which they are connected by a roadway, allows us to suppose that one of them was related to the business of beekeeping. If this were the case, what of the use of the other buildings? The strategic position they occupy – at the summit of a hill, allowing surveillance of not just almost all the coastline but also of the harbour³² while at the same time having direct visual contact with the settlement – combined with their carefully constructed facade, might give the impression that what is depicted here is a building in the manner of a

²⁹ In addition to what has generally been said about the use of the products of beekeeping, honey could have been used to preserve the purple dyestuff. We have a valuable pointer to the production of this precious pigment in the Late Cycladic settlement of Akrotiri in the floor strewn with crushed murex shells in the Pithoi Storeroom in Sector Alpha (Devetzi 2009–10, 51, 71 fig. 53). The juxtaposition of apiaries with places for processing purple pigment or dyestuffs in the New Palace period on Crete (D'Agata and De Angelis 2014, 350 n. 6, 354–5) as well as in the Classical and Hellenistic periods (Kardara 1961; Triantafyllidis 2014, 468) has attracted the attention of scholars who, basing themselves on the evidence of Plutarch (*Life of Alexander* 36), have suggested that honey was used as an antioxidant in the preservation of this precious colouring agent, though, once it has been prepared, the purple colour will last for ever without the addition of other media (Sophia Sotiropoulou, pers. comm.).

³⁰ This is the sort of theory that would follow from the model proposed by Schachermeyr (1978) and Doumas (1982) in relation to the earliest maritime republic in Akrotiri.

³¹ Though they are much later, it is worth mentioning examples of Hellenistic apiaries that, according to written sources, were publicly owned or belonged to some of the great sanctuaries, which leased them out to private individuals (Triantafyllidis 2014, 472–3).

³² Similarly, strategically important sites were occupied by the buildings identified in Raos and Chalarovounia in the vicinity of Akrotiri and which are thought to date to the final phase of the settlement (Marthari 2004).

Minoan rural villa.³³ In a Minoan context, this would describe a free-standing building built in a strategic location in the hinterland of a settlement with the aim of controlling a micro-region of special political, administrative or economic interest (Sakellarakis and Panagiotopoulos 2006, 62–3).³⁴

On the crest of Mavro Rachidi, on the summit of the Red Mountain, which is generally identified with the hill in the wall painting, architectural remains have been found, offering one more indicator of the identification of City V with Akrotiri. And from this area too ceramics have been collected as well as good quality plaster, a piece of metal and part of a vase made from veined marble (Marinatos, S. 1969, 35–6; Doumas 1983, 55–6), though it remains unclear how big a space the building(s) occupied, how many there were and where exactly the portable finds came from. These questions will remain unanswered until the area is properly explored and the character of the architectural remains found on the Red Mountain elucidated. For now, any theory about the connection between the function of this building and the beekeeping installation that seems to spread over the hillside must also be treated with caution.

The proposal for the existence of an extensive apiary to the west of City V obviously raises a series of new questions. The identification of the structure, until now considered enigmatic, as an apiary is based on the observation of certain details, the use of the rules of perspective current at that time, and the similarity of the black triangular elements to the woven skeps. If this is the case, then what we have is the earliest, and, so far, unique depiction of an apiary in the Aegean art of the second millennium BCE. Moreover, as far as we know, it seems that this iconographic subject is absent from the repertoire of both ancient Greek art and the art of the Roman period.

ACKNOWLEDGEMENTS

Special thanks go to the Director of Excavations at Akrotiri, Prof. Christos Doumas, for our fruitful discussions, his constant encouragement and, of course, permission to publish the photographs of Figs 1, 2 and 3. Thanks are due also to the conservator, Mr Panayiotis Angelidis, to archaeologists Mrs Kiki Birtacha and Dr Tania Devetzi and to the Senior Researcher at the Ormylia Foundation, Dr Sophia Sotiropoulou, for their useful advice; to the beekeepers, Mr Giorgos Nikolaidis and Mr Giorgos Mavroyiannis, who shared their precious knowledge about beekeeping with me; to Prof. Claire Palyvou, to Mr Antonis Liapis from the Roma Basketry Museum, Komotini, and to Mr Yannis Kastanos, to whom I am indebted for the photographs in Figs 6, 10 and 12; to archaeologist Mr Nikos Liaros for his generous help with bibliography relating to traditional beekeeping, and to Dr Vassilis Chrysikopoulos for his warm response to questions about ancient Egyptian beekeeping; to civil engineer Mr Dimitris Stampolis for his patience and the drawings in Figs 4 and 7; to Mrs Valerie Nunn for the translation of the text into English and to Dr Colin

³³ On the history of the use of the term ‘villa’ in Minoan archaeology and the definition of the word, see Effenterre and Effenterre 1997, 9–11; Cadogan 1997, 99–100. On their classification in three basic categories according to their location, see Westerburg-Eberl 2000, who divides them into palatial, urban and rural. Betancourt and Marinatos 1997, 91–2 divide them into country, manorial and urban, though what distinguishes the first from the second is not altogether clear.

³⁴ On rural villas, which combine residential areas and cult spaces with storage facilities and workshops, see Effenterre and Effenterre 1997, 11–12; Betancourt and Marinatos 1997, 91–2; Westerburg-Eberl 2000, 90–5. The majority of scholars agree that the buildings associated with this type of villa were minor administrative centres, charged with controlling a specific area of land and collection of agricultural produce, but dependent on one or more palace centres which used them as intermediate stages in their taxation system (Sakellarakis and Panagiotopoulos 2006, 65–6 and n. 49 with bibliography). According to another view, however, they were the residences of members of the local aristocracy, who maintained only loose ties with the palace centres (Sakellarakis and Panagiotopoulos 2006, 65 n. 50 with bibliography). Schoep 2001, esp. 95–100 favours the idea of Late Minoan IB local centres having relative administrative autonomy as a result of their private ownership of land and their engagement in trade.

Macdonald for editing the English text; and to the two anonymous referees for their most useful suggestions. Special thanks also go to the Friends of the Benaki Museum and above all to their president, Mrs Roxanni Tsimbiropoulou, without whose financial support it would not have been possible to complete this article. A previous version of this paper was prepared for the volume edited by P.P. Creasman and R.H. Wilkinson, *Ancient Mediterranean Interconnections: Papers In Honor of Nanno Marinatos* (Journal of Ancient Egyptian Interconnections, vol. 7, no. 3, 2015), but for reasons beyond my control my contribution was not ready in time. In any case, this revised approach to an obscure motif in the Theran frescoes meets Prof. Marinatos' belief that it is not only new discoveries that give rise to new ideas, but also well-established facts, as long as they are suitably illuminated from another point of view. This article is therefore dedicated to her.

papageorgiou@benaki.gr

REFERENCES

- Abramovitz, K. 1980. 'Frescoes from Ayia Irini, Keos. Parts II–IV', *Hesperia* 49, 57–85.
- Alexiou, S. 2015. 'The Naval Wall-Painting of Thera', in Macdonald, C.F., Hatzaki, E. and Andreou, S. (eds), *The Great Islands. Studies of Crete and Cyprus presented to Gerald Cadogan* (Athens), 152–8.
- Anagnostopoulos, I.T. 2000. "Δύο τύποι εγχώριων κυψελών της φλωρινιώτικης μελισσοκομίας", in *Η μέλισσα και τα προϊόντα της. ΣΤ' Τριήμερο Εργασίας Νικητή, 12–15 Σεπτεμβρίου 1996* (Πολιτιστικό Τεχνολογικό Ίδρυμα ΕΤΒΑ; Athens), 295–310.
- Andreadaki-Vlazaki, M. 1999. 'The production of aromatic and pharmaceutical oils in Minoan Crete: the case of Chamalevri', in Tzedakis and Martlew (eds) 1999, 48–51.
- Aravantinos, V. 1985. 'L' apiculture nel mondo minoico-miceneo', *Minos* 19, 11–27.
- Arnott, R. 2008. 'Chrysokamino, occupational health and the earliest medicines in the Aegean', in Tzedakis, Martlew and Jones (eds) 2008, 108–20.
- Aura Jorro, F. 1985. *Diccionario micénico*, vol. I (Madrid).
- Beck, C.W., Stout, E.C., Wovkulich, K.M. and Phillips, A.J.J. 2008. 'Absorbed organic residues in pottery from the Minoan settlement of Pseira, Crete', in Tzedakis, Martlew and Jones (eds) 2008, 48–73.
- Beloyianni, M. 2007. "Η καθαπολεκτική, τέχνη διαχρονική, και τα προϊόντα της στο προϊστορικό Ακρωτήρι", *ΑΑΣ* 5, 46–88.
- Beloyianni, M. 2008. "Η καθαπολεκτική και η ψαθοπλεκτική τέχνη στην οικονομία του Ακρωτηρίου", in Doumas (ed.) 2008, 199–214.
- Bendall, L.M. 2007. *Economics of Religion in the Mycenaean World: Resources Dedicated to Religion in the Mycenaean Palace Economy* (Oxford University School of Archaeology monograph no. 67; Oxford).
- Benzi, M. 1977. 'Gli affreschi dell' Ammiraglio a Thera', *Prospettiva* 10 (July 1977), 3–15.
- Bernabò-Brea, L. 1964. *Poliochni, città preistorica nell' isola di Lemnos*, vol. I (Rome).
- Betancourt, P.P. 2000. 'The concept of space in Theran compositional systemics', in Sherratt (ed.) 2000, 359–63.
- Betancourt, P.P. 2012. *The Dams and Water Management Systems of Minoan Pseira* (Philadelphia).
- Betancourt, P.P. and Marinatos, N. 1997. 'The Minoan Villa', in Hägg (ed.) 1997, 91–103.
- Bietak, M. 2000. 'The mode of representation in Egyptian art in comparison to Aegean Bronze Age art', in Sherratt (ed.) 2000, 209–46.
- Bietak, M. 2007. 'Discussion of the Taureador scenes from Avaris (Tell el Dab'a/ 'Ezbet Helmi)', in Bietak, M., Marinatos, N. and Palyvou, C., with a contribution by Brysbaert, A., *Taureador Scenes in Tell el-Tab'a (Avaris) and Knossos* (Österreichische Akademie der Wissenschaften. Denkschriften der Gesamtakademie vol. 43/Untersuchungen der Zweigstelle Kairo des Österreichischen Archäologischen Institutes vol. 27; Vienna), 67–86.
- Blakolmer, F. 1996. 'Optische Verkürzung und Linearperspektive in der frühägäischen Bildkunst?', in Blakolmer, F., Krierer, K.R., Krinzinger, F., Landskron-Dinstl, A., Szemethy, H.D. and Zhuber-Okrog, K. (eds), *Fremde Zeiten. Festschrift für Jürgen Borchardt zum sechzigsten Geburtstag am 25. Februar 1996 dargebracht von Kollegen, Schülern und Freunden*, vol. II (Vienna), 7–26.
- Blitzer, H. 2004. 'Agriculture and subsistence in the Late Ottoman and Post-Ottoman Mesara', in Watrous, L.V., Hadzi-Vallianou, D. and Blitzer, H. (eds), *The Plain of Phaistos. Cycles of Social Complexity in the Mesara Region of Crete* (Los Angeles), 111–217.
- Bloedow, E.F. and Björk, C. 1989. 'The Mallia pendant: a study in iconography and Minoan religion', *SMEA* 27, 9–67.
- Boulotis, C. 2011. "Στρέφοντας πίσω το κεφάλι: Το ταξίδι ενός αφηγηματικού μοτίβου από το "αγγείο των θερσιτών" μέχρι μια σαρκοφόρο από την Ταυτόγρα", in Carinci, F., Cucuzza, N., Militello, P. and Palio, O. (eds), *Κρήτης Μινωίδος. Tradizione e identità Minoica tra Produzione Artigianale, Pratiche Cerimoniali e Memoria del Passato. Studi offerti a Vincenzo La Rosa per il suo 70° compleanno* (Studi di Archaeologia Cretese X; Padua), 259–84.
- Branigan, K. 1974. *Aegean Metalwork of the Early and Middle Bronze Age* (Oxford).

- Cadogan, G. 1997. 'The role of the Pyrgos Country House in Minoan society', in Hägg (ed.) 1997, 99–103.
- Cameron, M. 1968. 'Unpublished paintings from the "House of the Frescoes" at Knossos', *BSA* 63, 1–31.
- Chapin, A.P. and Shaw, M.C. 2006. 'The frescoes from the House of the Frescoes at Knossos: a reconsideration of their architectural context and a new reconstruction of the Crocus Panel', *BSA* 101, 57–88.
- Christakis, K.S. 2005. *Cretan Bronze Age Pithoi. Traditions and Trends in the Production and Consumption of Storage Containers in Bronze Age Crete* (Prehistory Monographs 18; Philadelphia).
- Christakis, K.S. and Rethemiotakis, G. 2011. 'Identifying household activities: the case of House 2 at Galatas Pediada', in Glowacki and Vogeikoff-Brogan (eds) 2011, 177–84.
- Crane, E. 1983. *The Archaeology of Beekeeping* (London).
- Crane, E. 1999. *The World History of Beekeeping and Honey Hunting* (London).
- Crane, E. and Graham, A.J. 1985. *Beehives of the Ancient World* (reprint from *Bee World* 66, 25–41, 148–170; International Bee Research Association).
- Crowley, J.L. 2014. 'Beehives and bees in gold signet ring designs', in Nakassis, D., Gulizio, J. and James, S.A. (eds), *KE-RA-ME-ȚA. Studies presented to Cynthia W. Shelmerdine* (Philadelphia), 129–139.
- D'Agata, A.L. and De Angelis, S. 2014. 'Minoan beehives. Reconstructing the practice of beekeeping in Bronze Age Crete', in Touchais, Laffineur and Rougemont (eds) 2014, 349–57.
- Davaras, K. 1984. 'Μινωικό κηριοφόρο πλοιάριο της Συλλογής Μητσotάκη', *ArchEph* 123, 55–95.
- Davaras, K. 1986. 'A new interpretation of the ideogram *168', *Kadmos* 25, 38–43.
- Davaras, K. 1989. 'Μινωικά μελισσοουργικά σκεύη', in Chatzidakis, M., Platon, N., Sakellarakis, Y., Travlos, I. and Zepos, P. (eds), *Φίλια Έπη εις Γεώργιον Ε. Μυλωνάν διά τα 60 έτη του ανασκαφικού του έργου*, vol. Γ (Βιβλιοθήκη της εν Αθήνας Αρχαιολογικής Εταιρείας no. 103; Athens), 1–7.
- Davaras, K. 1992. 'The clay boat', in Marangou, L. (ed.), *Minoan and Greek Civilization from the Mitsotakis Collection* (Athens), 107–8 no. 91.
- Davay, C.J. 2009. 'The early history of lost-wax casting', in Mei, J. and Rehren, T. (eds), *Metallurgy and Civilisation: Eurasia and Beyond: Proceedings of the 6th International Conference on the Beginnings of the Use of Metals and Alloys* (BUMA VI; London), 147–54.
- Davis, E.N. 1987. 'The Knossos Miniature Frescoes and the function of the central courts', in Hägg, R. and Marinatos, N. (eds), *The Function of the Minoan Palaces. Proceedings of the fourth International Symposium at the Swedish Institute in Athens, 10–16 June, 1984* (Stockholm), 157–61.
- Davis, J.L. 1996. 'A page turns in the history of Greek regional studies', review article of Jameson, M.H., Runnels, C.N. and Andel, T.H. van, *A Greek Countryside: The Southern Argolid from Prehistory to the Present Day* (Stanford 1994), *JRA* 9, 458–65.
- Decavallas, O. 2007. 'Beeswax in Neolithic perforated sherds from the northern Aegean: new economic and functional implications' in Mee, C. and Renard, J. (eds), *Cooking up the Past: Food and Culinary Practices in the Neolithic and Bronze Age Aegean* (Oxford), 148–57.
- Del Frio, M. (ed.) 2015. *John T. Killen, Economy and Administration in Mycenaean Greece. Collected papers on Linear B, vol. III (2004–2012)* (Rome).
- Demargne, P. 1930. 'Bijoux minoens de Mallia', *BCH* 54, 404–21.
- Devetzi, A. 2008. 'Lithic material from the "kitchen" in Pillar Shaft 65N', appendix in Birtacha, K. "Cooking" installations in Late Cycladic IA Akrotiri on Thera: a preliminary study of the "kitchen" in Pillar Shaft 65', in Brodie, N.J., Doole, J., Gavalas, G. and Renfrew, C. (eds), *Horizon-Ορίζων. A Colloquium on the Prehistory of the Cyclades* (Cambridge), 349–76.
- Devetzi, A. 2009–10. 'Πίσω από την τέχνη. Τα χρώματα στο Ακρωτήρι Θήρας', *ΑΑΣ* 7, 31–74.
- Doumas, C.G. 1976. "Ανασκαφή Θήρας", *Prakt* 131, 309–29, 555–6.
- Doumas, C.G. (ed.) 1978. *Thera and the Aegean World I. Papers presented at the Second International Congress, Santorini, Greece, August 1978* (London).
- Doumas, C.G. 1982. 'The Minoan thalassocracy and the Cyclades', *AA*, 5–14.
- Doumas, C.G. 1983. *Thera: Pompeii of the Ancient Aegean* (London).
- Doumas, C.G. 1992a. *The Wall Paintings of Thera* (Athens).
- Doumas, C.G. 1992b. "Στις ρίζες της ελληνικής ναυτιλίας. Το προϊστορικό λιμάνι της Θήρας", *Ναυτική Επιθεώρηση*, 473 (February 1992), 18–27.
- Doumas, C.G. 2007. 'Akrotiri, Thera: some additional notes on its plan and architecture', in Betancourt, P.P., Nelson, M.C. and Williams, H. (eds), *Krinoi kai Limenes. Studies in Honor of Joseph and Maria Shaw* (Philadelphia), 85–92.
- Doumas, C.G. (ed.) 2008. *Ακρωτήρι Θήρας. Τριάντα χρόνια έρευνας, 1967–1997. Επιστημονική Συνάντηση, 19–20 Δεκεμβρίου 1997* (Βιβλιοθήκη της εν Αθήνας Αρχαιολογικής Εταιρείας no. 257; Athens).
- Doumas, C.G. 2014a. 'Le paysage côtier de la region d' Akrotiri, Théra, avant l' éruption volcanique du Bronze Récent', in Touchais, Laffineur and Rougemont (eds) 2014, 141–4.
- Doumas, C.G. 2014b. *Food for Thought. Dietary Habits in the Bronze Age City at Akrotiri, Thera (3200–1600 BC)* (Athens).
- Effenterre, H. van and Effenterre, M. van 1997. 'Towards a study of Neopalatial "Villas": modern words for Minoan things', in Hägg (ed.) 1997, 9–13.
- Erman, A. and Grapow, H. (eds) 1971. *Wörterbuch der ägyptischen Sprache, vol. I* (Berlin).
- Evans, A.J. 1930. *The Palace of Minos at Knossos, vol. 3* (London).
- Evans, A.J. 1935. *The Palace of Minos at Knossos, vol. 4* (London).
- Evely, R.D.G. (ed.) 1999. *Fresco. A Passport into the Past. Minoan Crete through the Eyes of Mark Cameron* (exhib. cat. British School at Athens/Goulandris Foundation; Athens).
- Evershed, R.P., Vaughan, S.J., Dudd, S.N. and Soles, J.S. 1997. 'Fuel for thought? Beeswax in lamps and conical cups from Late Minoan Crete', *Antiquity* 71, 979–85.
- Fappas, I. 2010. *Έλαιον ευώδες, τεθυομένον. Τα αρωματικά έλαια και οι πρακτικές χρήσης τους στη μυκηναϊκή Ελλάδα και την αρχαία Εγγύς Ανατολή (1405–1305 αι. π.Χ.)* (Κρητική Εστία 13 [2009–2010]; Chania).

- Faulkner, R.O. 1962. *A Concise Dictionary of Middle Egyptian* (Oxford).
- Foster, E.D. 1974. 'The manufacture and trade of Mycenaean perfumed oil' (unpublished PhD dissertation, Duke University; Ann Arbor University Microfilms).
- Foster, E.D. 1977. 'An administrative department at Knossos concerned with perfumery and offerings', *Minos* 16, 19–51.
- Fotou, V. 1993. *New Light on Gournia: Unknown Documents of the Excavation at Gournia and Other Sites on the Isthmus of Ierapetra by Harriet Ann Boyd* (Aegaeum 9; Liège and Austin).
- Fraser, H.M. 1951. *Beekeeping in Antiquity*, 2nd edition (London).
- Friedrich, W.L. and Sørensen, H. 2010. 'New light on the Ship Fresco from Late Bronze Age Thera', *PZ* 85, 243–53.
- Gardiner, A. 1957. *Egyptian Grammar*, 3rd edn (London).
- Georgiou, H.S. 1986. *Ayia Irini: Specialized Domestic and Industrial Pottery* (Keos vol. VI; Mainz).
- Giesecke, H.-E. 1983. 'The Akrotiri Ship Fresco', *IJNA* 12, 123–43.
- Glowacki, K.T. and Vogeikoff-Brogan, N. (eds) 2011. *ΣΤΕΓΑ. The Archaeology of Houses and Households in Ancient Crete* (Hesperia Supplement 44).
- Häggl, R. (ed.) 1997. *The Function of the 'Minoan Villa'. Proceedings of the Eighth International Symposium at the Swedish Institute at Athens, 6–8 June 1992* (Acta Instituti Atheniensis Regni Sueciae, Series in 4°, 46; Stockholm).
- Hallager, E. 1985. *The Master Impression. A Clay Sealing from the Greek-Swedish excavations at Kastelli, Khania* (Studies in Mediterranean Archaeology 69; Gothenburg).
- Hardy, D.A., Dumas, C.G., Sakellarakis, I.A. and Warren, P.M. (eds) 1990. *Thera and the Aegean World III, Vol. I. Proceedings of the Third International Congress, Santorini, Greece, 3–9 September 1989* (London).
- Harfouche, R. 2007. *Histoire des paysages méditerranéens terrassés: aménagements et agriculture* (BAR International Series 1634; Oxford).
- Harissis, H.V. and Harissis, A.V. 2009. *Apiculture in the Prehistoric Aegean. Minoan and Mycenaean Symbols revisited* (BAR International Series 1958; Oxford).
- Helck, W. and Otto, E. (eds) 1975. *Lexikon der Ägyptologie* (Wiesbaden).
- Hiller, S. 1990. 'The Miniature Frieze in the West House – evidence for Minoan poetry?', in Hardy, Dumas, Sakellarakis and Warren (eds) 1990, 229–36.
- Hood, S. 2005. 'Dating the Knossos frescoes', in Morgan (ed.) 2005, 45–81.
- Iliakis, K. 1978. 'Morphological analysis of the Akrotiri wall-paintings of Santorini', in Dumas (ed.) 1978, 617–28.
- Immerwahr, S.A. 1983. 'The people in the frescoes', in Krzyszkowska, O. and Nixon, L. (eds), *Minoan Society. Proceedings of the Cambridge Colloquium 1981* (Bristol), 143–53.
- Immerwahr, S.A. 1990. *Aegean Painting in the Bronze Age* (Pennsylvania).
- Kardara, C. 1961. 'Dyeing and weaving work at Isthmia', *AJA* 65, 261–6.
- Karnava, A. and Nikolakopoulou, I. 2005. 'A pithos fragment with a Linear A inscription from Akrotiri, Thera', *SMEA* 47, 213–25.
- Killen, J.T. 1995. 'Some further thoughts on "Collectors"', in Laffineur, R. and Niemeier, W.-D. (eds), *Politeia. Society and State in the Aegean Bronze Age. Proceedings of the Fifth International Aegean Conference, University of Heidelberg, Archäologisches Institut, 10–13 April 1994* (Aegaeum 12; Liège and Austin), 213–226.
- Killen, J.T. 2015a. 'The commodities on the Pylos Ma tablets', in Del Frio (ed.) 2015, 1015–31.
- Killen, J.T. 2015b. 'The two provinces of Pylos revisited', in Del Frio (ed.) 2015, 1079–105.
- Knappett, C. 2012. 'Meaning in miniature: semiotic networks in material culture', in Jessen, M.P., Johannsen, N. and Jensen, H.J. (eds), *Excavating the Mind. Cross-sections through Culture, Cognition and Materiality* (Aarhus), 87–109.
- Kopaka, K. 2011. 'On caves and households in Bronze Age Crete: "Της Ουρανίας το Φρούδι" Cave at Zakros', in Glowacki and Vogeikoff-Brogan (eds) 2011, 273–84.
- Kuény, G. 1950. 'Scènes apicoles dans l'ancienne Égypte', *JNES* 9, 84–93.
- Laffineur, R. 1990. 'Composition and perspective in Thera wall-paintings', in Hardy, Dumas, Sakellarakis and Warren (eds) 1990, 246–51.
- Lembessi, A. 1976. "Ο οικίσκος των Αρχανών", *ArchEph* 115, 12–43.
- Liaros, N. 2003. "Κορακοβούνι Υμηττού. Η προϊστορική κατοίκηση", in Vlachopoulos and Birtacha (eds) 2003, 231–46.
- Lüdorf, G. 1998–9. 'Leitformen der attischen Gebrauchskeramik: Der Bienenkorb', *Boreas* 21/22, 41–170.
- MacGillivray, J.A., Sackett, L.H., Driessen, J., Bridges, R. and Smyth, D. 1989. 'Excavations at Palaikastro, 1988', *BSA* 84, 417–45.
- MacGovern, P.E. 1999. 'Retsina, mixed fermented beverages, and the cuisine of pre-classical Greece', in Tzedakis and Martlew (eds) 1999, 206–8.
- MacGovern, P.E., Glusker, D.L., Exner, L.J. and Hall, G.R. 2008. 'The chemical identification of resinated wine and a mixed fermented beverage in Bronze Age pottery vessels of Greece', in Tzedakis, Martlew and Jones (eds) 2008, 169–218.
- Machaira, V. 2008. *Το ιερό Αφροδίτης και Έρωτος στην Ιερά Οδό* (Βιβλιοθήκη της εν Αθήναις Αρχαιολογικής Εταιρείας no. 253; Athens).
- Marinatos, N. 1983. 'The West House at Akrotiri as a cult center', *AM* 98, 1–19.
- Marinatos, N. 1984. *Art and Religion in Thera. Reconstructing a Bronze Age Society* (Athens).
- Marinatos, N. 1989. 'The tree as a focus of ritual action in Minoan glyptic art', in Müller, W. (ed.), *Fragen und Probleme der bronzezeitlichen ägäischen Glyptik. Beiträge zum 3. Internationalen Marburger Siegel-Symposium, 5.–7. September 1985* (Corpus der minoischen und mykenischen Siegel Beiheft 3; Berlin), 127–43.
- Marinatos, S. 1926. "Ανασκαφαί Νήρου Χάνι Κρήτης", *Prak* 81, 141–7.
- Marinatos, S. 1969. *Excavations at Thera II* (Athens).
- Marinatos, S. 1974. *Excavations at Thera VI* (Athens).
- Marinatos, S. 1976. *Excavations at Thera VII* (Athens).
- Marinatos, S. and Hirmer, M. 1960. *Crete and Mycenae* (London).
- Marthari, M. 2004. 'Raos and Chalarovounia. Preliminary evidence from two new sites of the Late Cycladic I period on Thera', *AAΣ* 2, 53–65.

- Marthari, M. 2008. "Αγροτική οικονομία και αγροτική λατρεία στο Ακρωτήριο Θήρας. Στοιχεία από την εξέταση μιας θηραϊκής κεραμικής κατηγορίας", in Doumas (ed.) 2008, 363–86.
- Martlew, H. 1999. 'Mixed fermented beverages during the Late Bronze Age: c. 1600–1100 BC', in Tzedakis and Martlew (eds) 1999, 166.
- Martlew, H. and MacGovern, P.E. 1999. 'Minoan funerary ritual', in Tzedakis and Martlew (eds) 1999, 174.
- Mavrofyridis, G. and Chatzina, F. 2015. "Η μελισσοκομία στην Ελλάδα πριν την έλευση της σύγχρονης κυψέλης", *Δήμητρα* issue 9, 18–21.
- Melas, M. 1999. 'The ethnography of Minoan and Mycenaean beekeeping', in Betancourt, P.P., Karageorghis, V., Laffineur, R. and Niemeier, W.-D. (eds), *Meletemata. Studies in Aegean Archaeology presented to Malcolm H. Wiener as he enters his 65th Year*, vol. II (Aegaeum 20; Liège and Austin), 485–90.
- Montet, P. 1950. 'Études sur quelques prêtres et fonctionnaires du dieu Min', *JNES* 9, 18–27.
- Moody, J. 2012. 'Hinterlands and hinterseas: resources and production zones in Bronze Age and Iron Age Crete', in Cadogan, G., Iacovou, M., Kopaka, K. and Whitley, J. (eds), *Parallel Lives. Ancient Island Societies in Crete and Cyprus. Papers Arising from the Conference in Nicosia Organized by the British School at Athens, the University of Crete and the University of Cyprus, in November–December 2006* (British School at Athens Studies 20; London), 233–71.
- Morgan, L. 1985. 'Idea, idiom and iconography', in Darcque, P. and Poursat, J.C. (eds), *L' iconographie minoenne. Actes de la table ronde d'Athènes, 21–22 avril 1983* (BCH Supplément XI), 5–19.
- Morgan, L. 1988. *The Miniature Wall Paintings of Thera. A Study on Aegean Culture and Iconography* (Cambridge).
- Morgan, L. 1989. 'Ambiguity and interpretation', in Müller, W. (ed.), *Fragen und Probleme der bronzzeitlichen ägäischen Glyptik. Beiträge zum 3. Internationalen Marburger Siegel-Symposium, 5.–7. September 1985* (Corpus der minoischen und mykenischen Siegel Beiheft 3; Berlin), 145–61.
- Morgan, L. 1998. 'The wall paintings of the north east bastion at Ayia Irini, Kea' in Mendoni, L.G. and Mazarakis Ainian, A. (eds), *Kea-Kythnos History and Archaeology. Proceedings of an International Symposium, Kea-Kythnos, 22–25 June 1994* (Athens), 201–10.
- Morgan, L. (ed.) 2005. *Aegean Wall Painting. A Tribute to Marc Cameron* (British School at Athens Studies 13; London).
- Morris, S.P. 1989. 'A tale of two cities: the miniature frescoes from Thera and the origins of Greek poetry', *AJA* 93, 511–35.
- Müller, S. 1991. 'Routes minoennes en relation avec le site de Malia', *BCH* 115, 545–60.
- Müller, W. and Pini, I. 1998. *Corpus der minoischen und mykenischen Siegel II. Iraklion, Archäologisches Museum. Teil 7. Die Siegelabdrücke von Kato Zakros, unter Einbeziehung von Funden aus anderen Museen* (Berlin).
- Page, D. 1976. 'The miniature frescoes from Akrotiri, Thera', *PrakAthAk* 51, F, 135–52.
- Palmer, R. 1998–9. 'Models in Linear B landholding: an analysis of methodology', in Bennet, J. and Driessen, J. (eds), *A-na-qa-ta. Studies presented to J.T. Killen* (Minos 33–4), 223–50.
- Palyvou, C. 2005a. 'Architecture in Aegean Bronze Age art: facades with no interiors', in Morgan (ed.) 2005, 185–97.
- Palyvou, C. 2005b. *Akrotiri Thera: An Architecture of Affluence 3,500 Years Old* (Philadelphia).
- Papageorgiou, I. 2000. 'On the rites de passage in Late Cycladic Akrotiri, Thera: a reconsideration of the frescoes of the "Priestess" and the "Fishermen" of the West House', in Sherratt (ed.) 2000, 958–70.
- Pavúk, P. 2002. 'The city on the slope: some observations on two-dimensional representations of architecture in Aegean art', in Aslan, R., Blum, St., Kastl, G., Schweizer, F. and Thumm, D. (eds), *Mauerschau. Festschrift für Manfred Korfmann* (Remshalden-Grünbach), 567–83.
- Persson, A.W. 1942. *The Religion of Greeks in Prehistoric Times* (Berkeley–Los Angeles).
- Platon, L. 2003. "Το ανάγλυφο ρυτό της Ζάκρου, κάτω από ένα νέο σημασιολογικό πρίσμα", in Vlachopoulos and Birtacha (eds) 2003, 331–66.
- Platon, N. 1971. *Zakros. The Discovery of a Lost Palace of Ancient Crete* (New York).
- Rackham, O. and Moody, J. 1996. *The Making of the Cretan Landscape* (Manchester; New York).
- Renfrew, C. 2011. *The Emergence of Civilisation. The Cyclades and the Aegean in the Third Millennium BC*, 2nd edition (Oxford).
- Roffet-Salque, M., Regert, M., Evershed, R.P., Outram, A.K., Cramp, L.J.E., Decavallas, O., Dunne, J., Gerbault, P., Mileto, S., Mirabaud, S., Pääkkönen, M., Smyth, J., Šoberl, L., Whelton, H.L., Alday-Ruiz, A., Asplund, H., Bartkowiak, M., Bayer-Niemeier, E., Belhouchet, L., Bernardini, F., Budja, M., Cooney, G., Cubas, M., Danaher, E.M., Diniz, M., Domboróczki, L., Fabbri, C., González-Urquijo, J.E., Guilaine, J., Hachi, S., Hartwell, B.N., Hofmann, D., Hohle, I., Ibáñez, J.J., Karul, N., Kherbouche, F., Kiely, J., Kotsakis, K., Lueth, F., Mallory, J.P., Manen, C., Marciniak, A., Maurice-Chabard, B., MacGonigle, M.A., Mulazzani, S., Özdoğan, M., Perić, O.S., Perić, S.R., Petrasch, J., Pétrequin, A.-M., Pétrequin, P., Poensgen, U., Pollard, C.J., Poplin, F., Radi, G., Stadler, P., Stäuble, H., Tasić, N., Urem-Kotsou, D., Vuković, J.B., Walsh, F., Whittle, A., Wolfram, S., Zapata-Pena, L. and Zoughlami, J. 2015. 'Widespread exploitation of the honeybee by early Neolithic farmers', *Nature* 527 (12 November), 226–31.
- Sacconi, A. 2009. 'Ku-pi-ri-jo and mycenaean trade', in Daniilidou, D. (ed.), *Δόρον. Τιμητικός τόμος για τον καθηγητή Σπύρο Ιακωβίδη* (Athens), 611–17.
- Säflund, G. 1981. 'Cretan and Thera questions', in Hägg, R. and Marinatos, N. (eds), *Sanctuaries and Cults in the Aegean Bronze Age. Proceedings of the First International Symposium at the Swedish Institute in Athens, 12–13 May 1980* (Stockholm), 189–208.
- Sakellarakis, Y. and Panagiotopoulos, D. 2006. 'Minoan Zominthos', in Gavrilaki, I. and Tzifopoulos, Y. (eds), *Mylopotamos from Antiquity to the Present: Environment, Archaeology, History, Folklore, Sociology* (Rethymnon), 47–75.
- Schachermeyr, F. 1978. 'Akrotiri – first maritime republic?', in Doumas (ed.) 1978, 423–8.
- Schoep, I. 2001. 'Managing the hinterland. The rural concerns of urban administration', in Branigan, K.

- (ed.), *Urbanism in the Aegean Bronze Age* (Sheffield Studies in Aegean Archaeology 4; London), 87–102.
- Serpico, M. and White, R. 2000. 'Oil, fat and wax', in Nicholson, P.T. and Shaw, I. (eds), *Ancient Egyptian Materials and Technology* (Cambridge), 390–429.
- Shaw, J.W. 1978. 'Evidence for the Minoan tripartite shrine', *AJA* 82, 429–48.
- Shaw, J.W. 1990. 'Bronze Age Aegean harboursides', in Hardy, Doumas, Sakellarakis and Warren (eds) 1990, 420–36.
- Shaw, J.W. and Luton, M. 2000. 'The foreshore at Akrotiri', in Sherratt (ed.) 2000, 453–66.
- Shaw, J.W. and Shaw, M.C. 1999. 'A proposal for Bronze Age Aegean ship-sheds in Crete', in Tzalas, H. (ed.), *Fifth International Symposium on Ship Construction in Antiquity* (Tropis V; Athens), 369–82.
- Shaw, J.W., Shaw, M.C., Rutter, R.B. and Moortel, A. van de 2006. 'Conclusions: the history and functions of the monumental Minoan buildings at Kommos', in Shaw, J.W. and Shaw, M.C. (eds), *The Monumental Minoan Buildings at Kommos* (Kommos. An Excavation on the South Coast of Crete by the University of Toronto under the Auspices of the American School of Classical Studies at Athens, vol. V; Princeton), 845–78.
- Shaw, M.C. 1985. 'Late Minoan I buildings J/T, and Late Minoan III buildings N and P at Kommos: their nature and possible uses as residences, palaces and/or emporia', in Shaw, J.W. and Shaw, M.C. (eds), *A Great Minoan Triangle in Southcentral Crete: Kommos, Hagia Triadha, Phaistos* (Scripta Mediterranea VI; Toronto), 19–25.
- Shelmerdine, C.W. 1985. *The Perfume Industry of Mycenaean Pylos* (Gothenburg).
- Sherratt, S. (ed.) 2000. *The Wall Paintings of Thera. Proceedings of the First International Symposium, Petros M. Nomikos Conference Centre Thera, Hellas, 30 August–4 September 1997* (Athens).
- Sourvinou-Inwood, C. 1989. 'Space in Late Minoan religious scenes in glyptic—some remarks', in Müller, W. (ed.), *Fragen und Probleme der bronzezeitlichen ägäischen Glyptik. Beiträge zum 3. Internationalen Marburger Siegel-Symposium, 5.–7. September 1985* (Corpus der minoischen und mykenischen Siegel Beiheft 3; Berlin), 241–57.
- Strasser, T.F. 1997. 'Horns of consecration or rooftop granaries? Another look at the Master Impression', in Laffineur, R. and Betancourt, P.P. (eds), *TEXNH. Craftsmen, Craftswomen and Craftsmanship in the Aegean Bronze Age. Proceedings of the 6th International Aegean Conference, Philadelphia, Temple University, 18–21 April 1996* (Aegaeum 16; Liège and Austin), 201–7.
- Strasser, T.F. 2010. 'Location and perspective in the Theran Flotilla Fresco', *JMA* 23.1, 3–26.
- Strasser, T.F. and Chapin, A.P. 2014. 'Geological formations in the Flotilla Fresco from Akrotiri', in Touchais, Laffineur and Rougemont (eds) 2014, 57–64.
- Stucchi, S. 1976. 'Il Giardino delle Esperidi e le tappe della conoscenza greca della costa cirenaica', *QAL* 8, 19–73.
- Televantou, C.A. 1994. *Ακρωτήριο Θήρας: οι τοιχογραφίες της Δυτικής Οικίας* (Βιβλιοθήκη της εν Αθήναις Αρχαιολογικής Εταιρείας no. 143; Athens).
- Touchais, G., Laffineur, R. and Rougemont, F. (eds) 2014. *Physis. L'environnement naturel et la relation homme-milieu dans le monde égéen protohistorique. Actes de la 14e Rencontre égéenne internationale, Paris, Institut National d'Histoire de l'Art (INHA), 11–14 décembre 2012* (Aegaeum 37; Leuven and Liège).
- Tournavitou, I. 2009. 'Does size matter? Miniature pottery vessels in Minoan peak sanctuaries', in D'Agata, A.-L. and Moortel, A. van de (eds), *Archaeologies of Cult: Essays on Ritual and Cult in Crete in Honor of Geraldine C. Gesell* (Hesperia Supplement 42), 213–30.
- Triantafyllidis, P. 2014. "Πήλινες κυπέλες από την αρχαία Τραγαία (Αγαθονήσι)", in *Πρακτικά Η' Επιστημονικής Συνάντησης για την ελληνιστική κεραμική, Ιωάννινα 5–9 Μαΐου 2009* (Athens), 467–74.
- Tyree, L., Robinson, H.L. and Stamataki, P. 2007. 'Minoan bee smokers: an experimental approach', in Mantzourani, E. and Betancourt, P.P. (eds), *Philistor: Studies in Honor of Costis Davaras* (Philadelphia), 221–30.
- Tzachili, I. 2011. *Μινωικά εικαστικά τοπία. Τα αγγεία με τις επίθετες πλαστικές μορφές από το Ιερό Κορυφής του Βρύσινα και η αναζήτηση του βόθρου* (Athens).
- Tzedakis, I., Chrysosoulaki, S., Voutsaki, S. and Venieri, Y. 1989. 'Les routes minoennes: Rapport préliminaire. Défense de la circulation ou circulation de la défense?', *BCH* 113, 43–75.
- Tzedakis, I. and Martlew, H. (eds) 1999. *Minoans and Mycenaean. Flavours of their time* (Athens).
- Tzedakis, Y., Martlew, H. and Jones, M.K. (eds) 2008. *Archaeology meets Science: Biomolecular Investigations in Bronze Age Greece. The Primary Scientific Evidence 1997–2003* (Oxford).
- Vandenabeele, F. and Olivier, J.-P. 1979. *Les idéogrammes archéologiques du Linéaire B* (Études crétoises 24; Paris).
- Ventris, M. and Chadwick, J. 1973. *Documents in Mycenaean Greek*, 2nd edition (Cambridge).
- Vitelli, K.D. 1993. *Franchthi Neolithic Pottery, vol. I. Classification and Ceramic Phases 1 and 2. Excavations at Franchthi Cave, Greece, Fasc. 8* (Bloomington and Indianapolis).
- Vlachopoulos, A. and Birtacha, K. (eds) 2003. *Αργοναύτης. Τιμητικός τόμος για τον καθηγητή Χρίστο Γ. Ντούμα από τους μαθητές του στο Πανεπιστήμιο Αθηνών (1980–2000)* (Athens).
- Vlachopoulos, A. and Zorzos, L. 2014. 'Physis and Techne on Thera: reconstructing Bronze Age environment and land-use based on new evidence from phytoliths and the Akrotiri wall-paintings', in Touchais, Laffineur and Rougemont (eds) 2014, 183–97.
- Vokotopoulos, L., Plath, G. and McCoy, F.W. 2014. 'The yield of the land: soil conservation and the exploitation of arable land at Choiromandres, Zakros in the New Palace Period', in Touchais, Laffineur and Rougemont (eds) 2014, 251–63.
- Walberg, G. 1986. *Tradition and Innovation. Essays in Minoan Art* (Mainz).
- Warren, P. 1979. 'The Miniature Fresco from the West House at Akrotiri, Thera, and its Aegean Setting', *JHS* 99, 115–29.
- Warren, P. 1987. Review of Hallager, *The Master Impression*, *JPR* 1, 48–50.

- Warren, P. 1994. 'The Minoan roads of Knossos', in Eveley, D., Hughes-Brock, H. and Momigliano, N. (eds), *Knossos. A Labyrinth of History. Papers presented in honour of Sinclair Hood* (British School at Athens), 189–210.
- Warren, P. 1995. 'Realism and naturalism in Minoan art – partes pro toto', *Πεπραγμένα του Ζ' Διεθνούς Κρητολογικού Συνεδρίου* (Rethymno), 973–80.
- Warren, P. 2000. 'From naturalism to essentialism in Thera and Minoan art', in Sherratt (ed.) 2000, 364–80.
- Watrous, L.V. 2007. 'The Fleet Fresco, the Odyssey and Greek epic narrative', in Morris, S. and Laffineur, R. (eds), *Épos: Reconsidering Greek Epic and Aegean Bronze Age Archaeology. Proceedings of the 11th International Aegean Conference, Los Angeles, UCLA – The J. Paul Getty Villa, 20–23 April 2006* (Aegaeum 28; Liège and Austin), 97–106.
- Watrous, L.V. 2012. 'The harbor complex of the Minoan town at Gournia', *ΑΪΑ* 116, 521–41.
- Wedde, M. 2000. *Towards a Hermeneutics of Aegean Bronze Age Ship Imagery* (Peles, Studien zur Archäologie und Geschichte Griechenlands und Zyperns, vol. 6; Mannheim und Möhnesee).
- Weilhartner, J. 2003. 'Oil and honey on some of the Linear B-offering tablets from Knossos. Considerations about their possible application', *JPR* 16–17, 46–52.
- Weilhartner, J. 2005. *Mykenische Opfergaben nach Aussage der Linear B-Texte* (Österreichische Akademie der Wissenschaften vol. 22; Vienna).
- Westerburg-Eberl, S. 2000. 'Minoische Villen in der Neupalastzeit', in Siebenmorgen, H. (ed.), *Im Labyrinth des Minos Kreta – die erste europäische Hochkultur* (exhib. cat. Badisches Landesmuseum Karlsruhe Schloss, 27.1.–29.4.2001; Munich), 87–95.

Η αλήθεια κρύβεται στη λεπτομέρεια: ανασυνθέτοντας έναν μελισσόνα στη Μικρογραφική Τοιχογραφία από το Ακρωτήρι Θήρας

Ανάμεσα στις αιγιματικές παραστάσεις της αιγιακής εικονογραφίας της 2ης χιλιετίας π.Χ. συγκαταλέγεται η κατασκευή που εικονίζεται στο νότιο τείχος της Μικρογραφικής Ζωοφόρου από τη Δυτική Οικία του Ακρωτηρίου Θήρας. Η κατασκευή καταλαμβάνει την πλαγιά ενός λόφου και αποτελείται από κατακόρυφη διπλή γαλάζια ζώνη στο δυτικό της όριο και τέσσερις οριζόντιες γαλάζιες ζώνες, όλες με ενδείξεις ότι αποδίδουν λιθοδομή. Φέρει πέντε σειρές μελανών τριγώνων εναλλάξ με τις οριζόντιες ζώνες, τα οποία έχουν καμπύλο άνοιγμα στη βάση τους. Η μοναδική στην αιγιακή εικονογραφία κατασκευή έχει ερμηνευτεί ως περιστεριώνας, νεώσοικος, αποθήκη, κτίσμα λαξευμένο στην πλαγιά του λόφου με τριγωνικές κόγχες, γεωλογικός σχηματισμός, αλλά και έκταση γης με αναβαθμίδες και καλλιέργεια αμπελιού. Σε μία εντελώς συνοπτική αναφορά είχε χαρακτηριστεί και ως απόδοση μελισσιού.

Συγκεκριμένες λεπτομέρειες και η χρήση των κανόνων προοπτικής κατά την περίοδο αυτή συνηγορούν υπέρ της υπόθεσης ότι αναπαριστά μελισσοκομική εγκατάσταση σε εδαφική έκταση με αναβαθμίδες, προστατευμένη στο δυτικό της όριο από προσήνεμο τείχος. Τα τριγωνικά στοιχεία πρέπει να απεικονίζουν πλεκτές κυνέλες κάθετου τύπου, τα επίστομα κοφίνια σταθερής κηρήθρας, σε χρήση έως εντελώς πρόσφατα σε πολλές περιοχές του ελλαδικού χώρου. Τα στοιχεία ενός οργανωμένου μελισσοκομείου συμπληρώνει δρόμος που διέρχεται από τον μελισσόνα συνδέοντας τον οικισμό με το τριμερές κτίσμα στην κορυφή του λόφου. Όπως επίσης και γαλάζια τραπεζοειδής επιφάνεια στα ανατολικά του που πιθανότατα αναπαριστά νερόλακκο για συλλογή υδάτων, εντελώς απαραίτητων στη μελισσοκομία. Η μεγάλη έκταση της εγκατάστασης σε συνδυασμό με τη σημασία των μελισσοκομικών προϊόντων, όπως υποδεικνύουν χημικές αναλύσεις και αναφορές σε πινακίδες Γραμμικής Β, εγείρουν ερωτήματα σχετικά με την αρχή διαχείρισης του μελισσοκομείου καθώς και με τη λειτουργία του κτίσματος στην κορυφή του λόφου.