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ORIENTATIONS OF THE LATE BRONZE AGE VILLA COMPLEX AT VATHYPETRO IN CRETE

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ABSTRACT

We present the results of our archaeoastronomical study of the villa and the tripartite shrine at Vathypetro. We found orientations to three major celestial events (counting the equinoxes as one): to sunrise at the equinoxes and the winter solstice in the case of the villa and to sunset at the summer solstice in the case of the tripartite shrine. The axis of symmetry of the major room of the villa was oriented to sunrise on the 22nd of October in the Late Minoan period. This was also the orientation of the axis of symmetry of the main cult room in the west wing of the palace at Malia. We propose that this orientation marked the time for planting and thus the beginning of the agricultural year.

It is unusual that archaeoastronomical studies make contributions to historical debates. However certain orientations dating after Late Minoan I seem to reflect the Mycenaean presence in Crete. The orientation of the tripartite shrine to sunset at the summer solstice is the same as the orientations of the small shrines at Malia and Agia Triada, all of which we argue to have been built for Mycenaeans. We propose that there are two types of orientations in the island: those to the east within the limits for sunrise - made by Minoans, and some to the west – made by (or for) Mycenaeans.

KEYWORDS: Archaeoastronomy, Aegean Bronze Age, Minoan, Mycenaean, Bronze Age Crete, Tripartite Shrine.

INTRODUCTION

The investigation of the villa complex at Vathypetro is part of the archaeoastronomical project based at Uppsala University. The main objectives of this project are to discover the extent of Minoan astronomical knowledge, the ways in which this knowledge was used and its possible influence on the Mycenaean and Greek cultures. As the scope of the project is limited, a choice of monuments most likely, because of their importance or position, to display evidence of astronomical orientations was made at the beginning and included seven peak sanctuaries (Petsophas, Modi, Traostalos, Chamaizi, Pyrgos, Juktas, Gonies), the major palaces (Zakros, Malia, Knossos, Phaistos), and five of the large villas (Gournia, Vathypetro, the southeast house at Knossos, Agia Triada, Tylissos), 16 monuments in all. Our publications to date on these sites appear in the list of references under the authors' names.

Basic to archaeoastronomical studies is the measuring of orientations of the archaeological remains of a culture, the evaluation of the data by means of appropriate computer programs and, when relevant, statistical analyses. For measuring the orientations we use a digital theodolite and for the computations of the astronomical data we use the computer programs developed by Henriksson. It is fortunate that peoples of many places and periods have been strongly motivated to establish physical relationships between themselves and the cosmos by orienting their settlements and buildings to prominent celestial events, thus leaving evidence of their astronomical interests.

The study of relevant texts and pictorial material, when they exist, is also of course essential. In the case of the Aegean Bronze Age cultures, however, these sources give only meagre information. The Linear A texts of the Minoans have not yet been deciphered, but none of them seems to contain any astronomical information. The Linear B texts of the Mycenaeans give evidence of a lunisolar calendar, but tell us nothing of the astronomical traditions which are presupposed by it (Blomberg and Henriksson 2003b). The pictorial material, surviving mainly on small objects, has many representations of what appear to be celestial bodies (Goodison 1989), but only in a few instances can they be certainly identified as, for example, the sun or the moon. In most cases we can only say that they are star-like figures. We can derive no specific astronomical information from them. However, we have found that the ancient Greek texts contain useful information relating to Aegean Bronze Age astronomical knowledge, although they are not helpful in the present study. Here we rely primarily on the orientations of buildings and graves and on archaeological data for our interpretations.

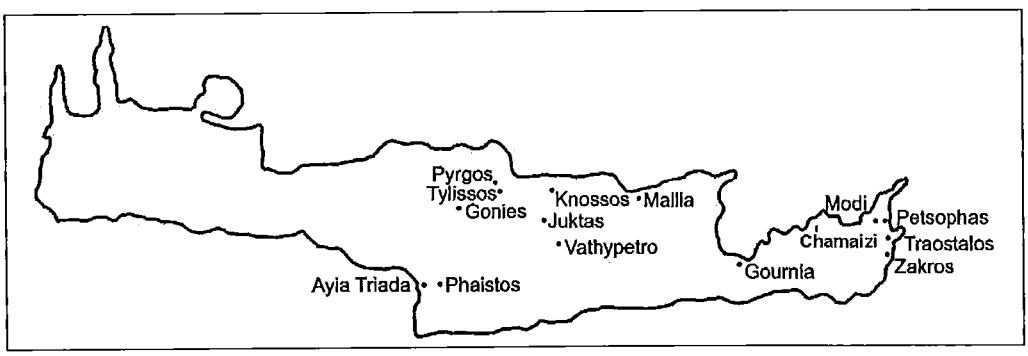

Fig. 1. Map of Crete with locations of the sites in the Uppsala Archaeoastronomical Project.

ARCHAEOLOGICAL HISTORY OF THE VILLA COMPLEX

The villa at Vathypetro seems to have been the largest building in a small settlement located not far from the peak sanctuary on Juktas and about 10 km south of the palace at Knossos; the latitude is 35°13′ and the longitude 25°09′ (Fig. 1). There is what seems to be a tripartite shrine east of the hall with columns and an annex further on to the east (Fig. 2).

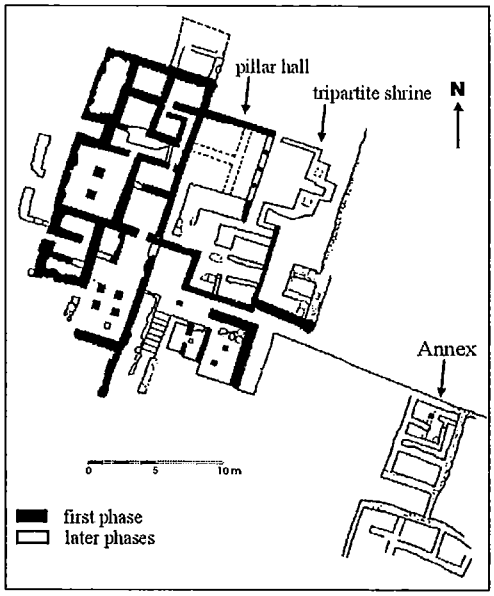

Fig. 2. Plan of the villa at Vathypetro. Use of photo with permission, Myers, Myers and Cadogan (1992).

The complex was excavated by Spyridon Marinatos (1949-1953; 1955-56) who identified two architectural phases: Late Minoan IA (LM IA) and Late Minoan IB (LM IB). In the first phase large well-cut ashlar blocks were used and the construction in general shows many features typical of Minoan palatial architecture. In their study of the complex Driessen and Sakellarakis (1997) suggested that the annex was built in the second phase and that there may even have been a third phase. According to them, Marinatos carried out considerable reconstruction in the interests of a small museum on the site and his alterations have made it difficult to understand the original plan of the building and the changes made at the time of the destruction in LM IA, which was caused most probably by an earthquake. The villa seems to have been destroyed by fire some time in LM IB, the fate of the majority of Minoan villas and palaces (Driessen and MacDonald 1997, 178). Late Minoan III (LM III) shards were found in a building to the north of the pillar hall and a LM III A1 grave nearby, dated by an intact vase from that period (Kanta 1980, 35). The dates in years would be c. 1675-1470 BC for LM I and c. 1435-1370 BC for Late Minoan III 1A according to Manning's chronology (1999, 340).

The excavation of the tripartite shrine revealed no material of significance for its dating, as the area had been very much disturbed by ploughing. Marinatos took it to be part of the religious quarter of the villa, in which he included the columnar hall opposite and some of the rooms to the west of the latter. Fragments of a horn of consecration, found in the courtyard between the hall and the shrine, are mentioned (Marinatos 1952, 609).

The form of the tripartite shrine is considered to be Minoan in origin, but it appears early also in the Mycenaean culture. The one at Vathypetro is the clearest architectural example we have, although several are shown on small objects (Shaw 1978). Of importance for the present study is the disagreement concerning the date of the shrine, as its orientation indicates to us that it was built for Mycenaeans. Most scholars supporting Mycenaean control in Crete see that control as beginning in LM II, following the widespread destructions which occurred in the island at the end of LM IB (Driessen and MacDonald 1997, 178). Driessen and

Sakellarakis (1997, 72) consider the shrine to have been an integral part of the villa on the basis of its relationship to the hall and therefore built at the same time, in LM IA. Shaw (1978, 443) considers it to have been built later due to the 'haphazard' and careless nature of its construction, which is typical of other later buildings on the site. However he does not question that it is Minoan. Indeed, considering the lack of evidence produced, there has not been any reason earlier to do so.

But other evidence, aside from the orientation, can be brought forward. The tripartite shrine is placed on the court surface, as in the case of the small shrine at Malia (Pelon 1980, 96). Its inferior construction and the fact that it is not carefully aligned to the pillar hall of the villa are clearly visible in figure 4 published by Driessen and Sakellarakis (1997, 66) and also in the aerial photo published by Myers, Myers and Cadogan (1992, Fig. 42.3). The axial symmetry has been improved in several later plans. Compare, for example, figures 4 and 5 in Driessen and Sakellarakis (1997). Our archaeoastronomical findings add more evidence that the shrine was a later addition to the complex. The fact that it is precisely oriented to sunset at the summer solstice necessitates the placement that it has been given and this is a more reasonable explanation than its less precise relationship to the room opposite. We think that its construction may be associated with the nearby LM III A1 grave.

ORIENTATIONS OF THE VILLA

According to our measurements, if someone had stood c. 1700 BC against the back wall of the hall at its centre, at our measuring point 43 (Fig. 3), that person could have made the following observations: sunrise at the equinoxes would have appeared immediately to the south of the northernmost column (azimuth 97.7°, horizon height

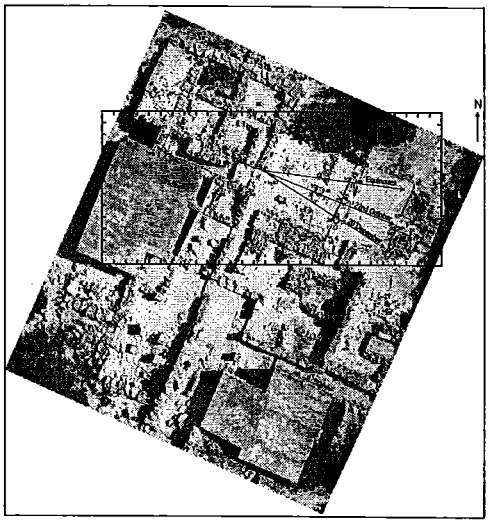

Fig. 3. Vathypetro. Orientations from the centre of the main room (point 43). Use of photo with permission, Myers, Myers and Cadogan (1992).

10.8°), sunrise on the 22nd of October just to the south of the middle column (azimuth 111.9°, horizon height 10.0°), and sunrise on the last days before the winter solstice just to the north of the southernmost column (azimuth 122.3°, horizon height, 4.1°, Fig. 4). The sun appears to move more slowly at the solstices and there is no great difference in its position from one day to another at that

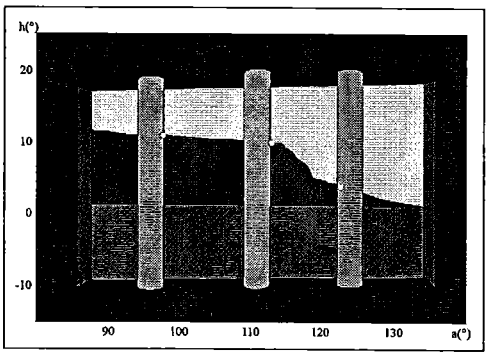

Fig. 4. Observations from the centre of the rear wall of the columnar hall: sunrise on the equinoxes (left), the 22nd of October (centre) and the winter solstice (right).

time. The observations would have been of the first appearance of the sun above the ridge opposite the villa. The east-west axis of the room itself is oriented close to sunrise on October 22nd (110.3°). Of special significance is the fact that these three orientations to sunrise at Vathypetro are marked by man-made foresights, the columns. This assures us that they were intentional and not accidental; it is extremely improbable that the relationships could be chance occurrences (MacKie 1997; Blomberg and Henriksson 2001a). The placing of the villa and the planning of the hall with columns must have been carefully done to achieve these three orientations. This was possible since a site was chosen that extends over fairly flat terrain on all sides except the west. Because of the height of the ridge opposite the hall, the tripartite shrine would not have been in the way of the observations if it had existed in LM I.

Sunrise at the equinoxes and the winter solstice are three of the eight most significant solar events, the others being sunrise at the summer solstice and sunset at the equinoxes and solstices. It is obvious that these events are of crucial calendrical importance and they have been the most common focuses of orientations in cultures of all times throughout the world. The heliacal risings and settings of bright stars are also major celestial events and they figured prominently in the Greek calendars (West 1978, 376-380). The major standstills of the moon should also be included as major celestial events, but it is difficult to know their precise significance without more knowledge of the Minoan culture. In the palace of Zakros the major cult rooms in the west wing are oriented to the southern eastern major standstill of the moon, and there is a natural foresight marking it, as seen from the northern corridor of the west wing (Blomberg and Henriksson 2000, Figs. 10-13). Our studies so far show that at 11 of the 16 monuments in our project there is a total of 20 orientations to major celestial events, several having more than one; there are five at Petsophas (Blomberg and Henriksson 2003a, Fig. 8; Chamaizi has been omitted as we had not begun our study of that site when the figure was published).

Although the significance of the orientation to the 22nd of October may not be immediately apparent, there are two sound reasons for it. The first is that it would have marked a significant calendrical date for the Minoans. We have presented elsewhere the evidence that the Minoan year began at the first appearance of the new crescent moon following the autumn equinox (Blomberg and Henriksson 2003b; Henriksson and Blomberg 1996). The 22nd of October is exactly one moon month after the autumn equinox and thus is the earliest date on which the second month of the Minoan year could have begun.

The second reason for the choice of this orientation concerns farming. From Hesiod (Evelyn-White 1914, lines 383-384; West 1978, 254-256), writing in the 8th century BC and one of the earliest Greek authors, we know that late in October was the time for ploughing, the first and most important event in the agricultural year. The Greeks used a celestial sign to recognize the time to plough, the cosmical setting of the Pleiades, which occurred about the 27th of October at the time of Hesiod and at his latitude. At Vathypetro in LM I, the cosmical setting of the Pleiades would have occurred c. 12th of October. Thus the orientation with a foresight to sunrise on the 22nd of October would have given a closer date for the time to plough in Crete than the sighting of the Pleiades. We may recall that the Bronze Age economy in Crete was based on agriculture and that the villa at Vathypetro was a centre for the production and storage of wine and oil (Driessen and Sakellarakis 1997). A method for recognising the times for important farming events was of utmost importance. In many cases these events would

have been accompanied by religious festivities, adding another dimension to the importance of keeping track of the time of year.

The significance of the 22nd of October for the Minoans is underscored by the fact that the main cult room in the west wing of the palace at Malia is oriented to sunrise on this date above the ridge opposite (azimuth 107.6°), and there was a distinctive natural foresight– the sun rose c. 2000 BC in the deep dip formed by overlapping slopes of the high mountains in the east. Also the altar in the central court was on the orientation line. The palace at Malia, like the villa at Vathypetro, is located on a broad plain, so there was no natural impediment to placing it with the desired relationship to the landscape (Blomberg and Henriksson, article submitted 2001 to the *Proceedings of the 10th meeting of the European Society for Astronomy in Culture*).

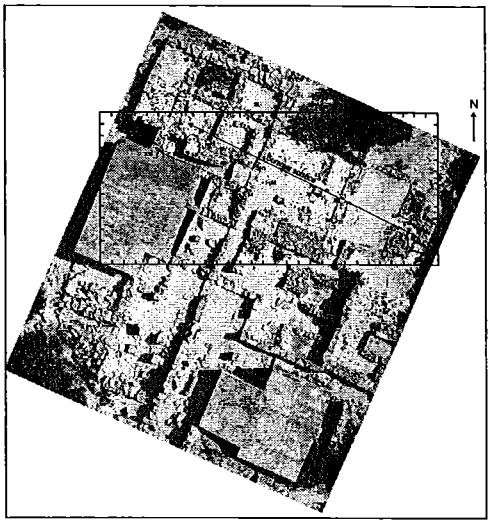

Fig. 5. Orientation of the south wall of the niche in the tripartite shrine to sunset at the summer solstice. Use of photo with permission, Myers, Myers and Cadogan (1992).

ORIENTATION OF THE TRIPARTITE SHRINE

The tripartite shine, in contrast to the hall opposite, faces west and is oriented to sunset at the summer solstice; azimuth 296.0° and height of the horizon opposite 5.2° (Fig. 5). The southern wall of the niche in the tripartite shrine is fully illuminated down to floor level only at sunset at the summer solstice. Alignments to the west of important buildings in Bronze Age Crete are extremely rare. There are three that have been oriented not only to the west but, more specifically, to a major solar event in the west – sunset at the summer solstice: the tripartite shrine at Vathypetro presented here, the oblique building at Malia and building H at Agia Triada (Fig. 6). This orientation for a building is, as far as we know, without parallel in the island. If the shrine at Vathypetro were built after LM I, as we argue, the villa may well have been in ruins, providing no obstacle to the orientation. A reused ashlar block in the floor of the hall is

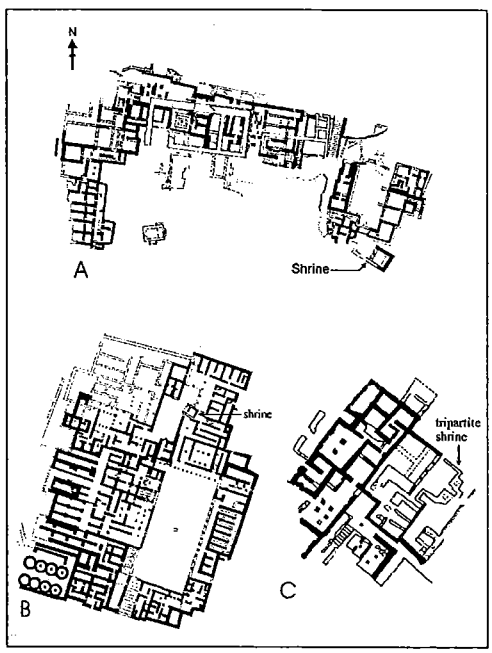

Fig. 6. The shrines at Agia Triada (A), Malia (B) and Vathypetro (C). Plans used with permission, Myers, Myers and Cadogan (1992).

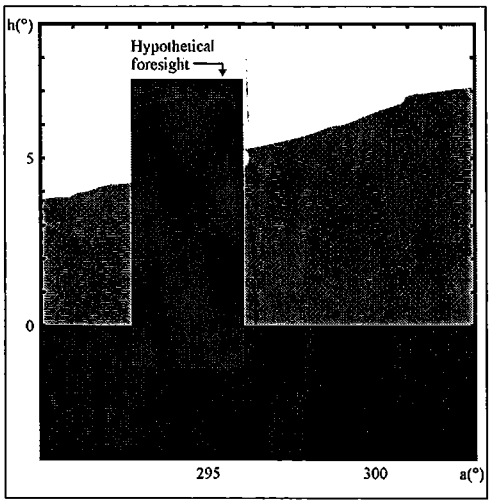

Fig. 7. Sunset behind the western mountain ridge at Vathypetro at the summer solstice as it would have been observed from the southeastern corner of the niche of the tripartite shrine.

placed such that it could have been the base of a pillar built to function as an artificial foresight for sunset at the summer solstice, as we reconstruct in figure 7. This block is mentioned by Driessen and Sakellarakis (1997, 70). The northern side of the block, our measuring points 39 and 40 (Figs. 7 and 8), is aligned with the southern wall of the

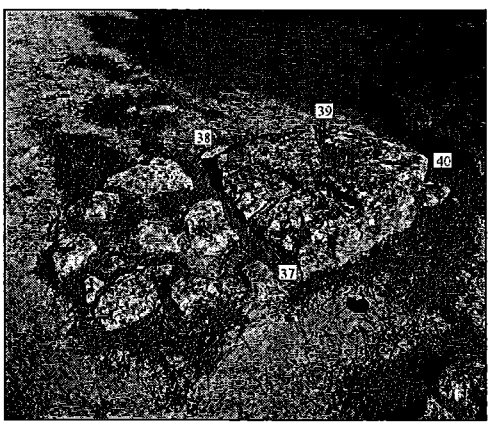

Fig. 8. The stone aligned with the southern wall of the niche in the tripartite shrine.

niche of the shrine (Fig. 5). As in the case of the bâtiment oblique at Malia, the southern wall of the niche is fully illuminated only on the days close to the summer solstice. To us, this phenomenon is a better explanation for the position of the shrine than its less precise relationship to the hall opposite.

All three of the small structures oriented to sunset at the summer solstice are considered to have been shrines on the basis of the archaeological evidence: a small animal figurine found in the shrine at Malia (Pelon 1997, 343), seven snake tubes found in the one at Agia Triada (Gesell 1985, 74), and fragments of a horn of consecration found in the court outside the tripartite shrine (Marinatos 1952, 609). Two of these buildings, the bâtiment oblique at Malia (Pelon 1997, 343) and building H at Agia Triada (La Rosa 1985, 128), have been dated to LM IIIA, after the widespread destructions of LM I that are generally considered to mark the end of Minoan control in Crete (Driessen and MacDonald 1997, 36 and 183). Further evidence of the ruinous condition of the Minoan buildings is the placement of the bâtiment oblique, like the tripartite shrine, on the floor of the courtyard of a Minoan building, and of building H over some walls of the Minoan villa at Agia Triada (Fig. 6).

It seems improbable that these three buildings are not products of the same culture and a culture different from that of the Minoan, as they have precisely the same orientation, sunset at the summer solstice. Judging from the results of our project, important Minoan buildings were oriented to the east, usually to a major celestial event. The eastern orientation holds also for the great majority of graves with dromoi in Crete, although there is not the concentration to major celestial events (Blomberg and Henriksson 2003b, 54 and Fig. 2).

DISCUSSION

We consider one of the most important results of our investigations to be the discovery of clear differences in orientations in Crete of the palatial period and earlier from the orientations of shrines that were constructed in the post-palatial period, during the time when many scholars see a Mycenaean hegemony in Crete. The date and nature of Mycenaean control is a controversial issue in Late Bronze Age studies and new evidence may add to our understanding of this important period in Aegean prehistory. The revelation of Linear B tablets in the palace at Knossos from LM II (Driessen 1990) is a strong indication that there were Mycenaeans settled at Knossos considerably before that time, those who started the process of adapting the Minoan language for their own record-keeping. That adaptation suggests a long-term presence, which implies a group of Mycenaeans living nearby. Their presence, however, tells us nothing about their status, whether visiting tradesmen, emissaries, relatives by marriage or other settlers. But there should have been Mycenaean burials in the area from LM I, at least.

Before the discovery of Linear B tablets in a LM II context, the argument for the control of Knossos by Mycenaeans was based on mortuary practices, in particular the discovery of 'warrior graves' (Preston 1999, 132). However, no graves earlier than LM II have been interpreted as those of Mycenaeans. Moreover, there seems to have been very little Mycenaean influence at any time on the practice in Crete of orienting graves to the east. Aside from the theoretical question as to whether or not ethnic identity can be concluded from grave architecture and artefact assemblages (Preston 1999, 133), it is legitimate to ask why Mycenaeans did not influence the Minoan custom in Crete of eastern orientation of graves, especially in view of the fact that Mycenaean graves in mainland Greece do not at all reflect this custom. If it were important for them to mark their presence in a position of power by orienting their shrines to a direction quite different from that used by the Minoans, why not their graves also? What, in fact, do we know about Mycenaean orientation customs?

If we compare Mycenaean and Minoan orientations of graves and cult rooms, we find striking differences (Blomberg and Henriksson 2003b, Figs. 2, 3, 8 and 9; Whittaker 1997). For a sample of 370 Bronze Age graves with dromoi from mainland Greece there is no pattern of orientation towards any celestial event. There is a significant cluster (59%) in the southwest quadrant, but not concentrated on such an event. We can assume, as we cannot for Crete, that nearly all of these graves contain Mycenaeans.

A sample of 22 Mycenaean cult rooms, both in Greece and in Crete, provide orientations that are more suggestive than the Mycenaean graves. Aside from the three shrines discussed here, there are a few other orientations that may be to significant celestial events, but half are oriented to the south, outside the limits of sunrise and sunset. A point to which we will return is that at both Mycenae and Tiryns in the Argolid there may be orientations to sunrise (Tiryns) and sunset (Mycenae) at the solstices (Blomberg and Henriksson 2003b, Fig. 9). However none of the Mycenaean sites has been the subject of an archaeoastronomical study, other than those three presented here, and therefore we cannot say anything more precise about their orientations.

The orientations of graves in Crete are quite different from those in the mainland. In a sample of 323 graves with dromoi, 86% are oriented to the east within the limits of sunrise and a few more may be so oriented, depending on the horizon profile in the east. Of these,

40% are within ± 10° of due east and may be to equinoctial sunrise, but this must be studied for each case because of the mountainous terrain. Nearly all of these graves are from the Late Bronze Age and therefore we cannot say for certain which of them contain Minoans and which Mycenaeans (Preston 1999). There are, significantly, a few graves from early LM III 1A that are oriented to the west, and two of these, the wealthy, 'warrior graves' Sellopoulo 3 and 4, have been interpreted as being related to graves from the Argolid (Popham 1974). They seem to have the same azimuth (243° ± ca 5°, Blomberg and Henriksson 2003b, 60), which is close to sunset at the winter solstice; but this needs further study. In the case of the Minoan buildings that we have so far studied, the great majority are oriented to a major celestial event and several have orientations to more than one such event, as we point out above. Also, there is an explanation for the orientation at Malia that makes sense with respect to the Minoan calendar and to the agricultural year.

We suggest the following explanation for the absence of Mycenaean influence on grave orientation in Crete in the palatial period. If we are correct in our view that there was a group of Mycenaeans in LM I Crete, that group is not likely to have had a strong position of power. It is not likely to have been able to influence the ancient Minoan custom of orienting graves to the east. Also, this group would not have been inclined to do so as it had no practice of its own in this respect. The situation is different in the case of cult rooms for two reasons:

1) At the time when the orientations of the three small shrines were established to sunset at the summer solstice, the Mycenaeans were in positions of power. To establish cult buildings of their own in close proximity to important Minoan buildings is similar in principle to the Christian appropriation of sacred space in pagan Europe by building their churches over pagan temples. This practice not only makes a strong statement about the position of power of the new culture, but it is also a conciliating gesture in that it recognizes the significance of the earlier places and thus shows them respect (C. Parcero Oubiña *et al.* 1998).
2) There are indications that some Mycenaeans, those from the Argolid, were inclined to orient their sacred rooms to major solar events – for example sunset at the summer and winter solstices at Mycenae and sunrise at the summer solstice at nearby Tiryns (Blomberg and Henriksson 2003b, Fig. 9). As we noted above, the two Sellopoulo 'warrior graves' from early in the post-palatial period were oriented to the west and possibly to sunset at the winter solstice (Popham 1974). Thus we may have indications from both graves and cult rooms that the Mycenaeans in Crete came originally from the Argolid.

CONCLUSIONS

This study of the orientations at the villa complex at Vathypetro and comparisons with those at other Minoan and Mycenaean sites indicate that two types of orientations had emerged in Crete after the destructions of Late Minoan I. The later orientations, which were to the west, concern shrines that were placed above or near earlier Minoan sacred places and thus make a definite statement as to the presence of a new power base in the island, that of the Mycenaeans. These orientations may, in fact, make the most unequivocal statement that we have. In combination with the characteristics of the warrior graves at Sellopoulo from the same period, not least their orientations, it may be suggested that the Mycenaeans who comprised this power base came from the Argolid.

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