THE FUNCTION OF THE MINOAN OVAL HOUSE AT CHAMAIZI

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Abstract

We report the results of our archaeoastronomical investigation of the unique building at Chamaizi in eastern Crete. The structure has been an enigma to Aegean archaeologists because of its oval shape, which is unparalleled in Minoan architecture. Religion has figured prominently in the discussions of the house's function, primarily due to the discovery of a well and some figurines. We had included it in our pilot study of Minoan astronomical interest since some scholars have categorized it as a peak sanctuary, and these sites are ideally located for astronomical observations. An axial symmetry for the building, however, was impossible to calculate, and this discouraged us to the extent that we left its evaluation to a late stage in our work. When we returned to our data, with the knowledge acquired from our study of a number of other Minoan buildings, we were in a better position to study the house and understand its function. The main entrance was orientated to sunrise on the morning of the winter solstice in the early Middle Minoan period (ca. 2000 BCE) and the door on the northern side framed the heliacal setting of Arcturus in the same period.

The orientation to sunrise at the winter solstice occurs also at the important villa of Vathypetro, and the orientation to Arcturus is the fourth that we have found at Minoan sites. Thus our results from Chamaizi add to the accumulating data that the Minoans consistently oriented important monuments to major celestial events and precisely those events important for maintaining a calendar. A hypothesis that may be made from these results is that the contacts between Minoan sites known from trade can be understood to have included also the intellectual exchange of scientific information resulting in a common calendar and probably also common rituals in connection with it: celebrations of the new year, the beginning and end of the sailing season, and important events in the agricultural year such as ploughing, as we have tried to show in earlier studies.

Introduction

The house lies far to the east in the island and, as it was our ambition to study all Minoan so-called peak sanctuaries with architectural remains (Rutkowski, 1986: 73-98), we included it initially in the Uppsala University archaeoastronomical project (Fig. 1). It does not, however, fit neatly into that category, primarily because no small terracotta anatomical

Fig. 1. Minoan sites in the Uppsala archaeoastronomical project.

parts of humans and animals were found there. We have found that the presence of such objects is the most characteristic feature of peak sanctuaries aside from their hilltop location, and they usually occur in large numbers at these places. Moreover, they have been shown to have had an astronomical function (P. E. Blomberg, 2000).

The term 'peak sanctuaries' will be retained for convenience, but it does not adequately describe the function of such sites. We have argued that they also served as places for observing the motions of celestial bodies (Henriksson and Blomberg, 1996). We do not, however, dispute the function of sanctuary. The celestial bodies were most likely considered by the Minoans to be sacred and thus the study of them would have had a religious dimension.

Four simple terracotta figurines and a few fragments of some others were found just to the east of the building (Evans, 1921: 147; Davaras, 1972: 285-86). Primarily on the basis of these and the presence of the well in the open court, the building has been considered by several scholars to have been a domestic sanctuary, as opposed to a peak sanctuary (Davaras, 1972: 285-88). It was built in the early Middle Minoan period, which began about 2000 BCE, i.e., the beginning of the Middle Bronze Age in the Aegean according to Manning's chronology (1999: 340).

The house was built on top of a high hill (h. 501 m), which lies in open country. It is surrounded by much higher mountains that are some distance away and this gives the impression that it lies in a valley despite its elevation. There is a pass through the mountains both to the northeast and to the northwest so that the Mediterranean is visible in those two directions. The building was constructed above at least three building phases from the third millennium (Fig. 2). The fact that the site was used for a very long time is essential, of course, for the people there to have become familiar with how astronomical phenomena appeared in relation to the local surroundings.

Archaeoastronomical methods

We measured the walls and the profiles of the relevant surrounding mountains with a digital theodolite and

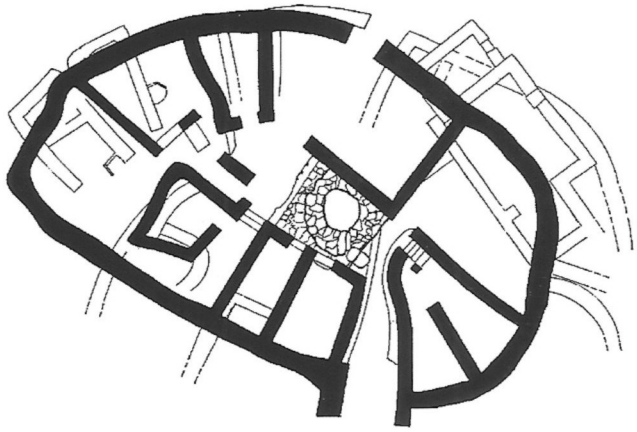

Fig. 2. Plan of the oval house at Chamaizi. With permission of Myers, Myers & Cadogan (1992: 79).

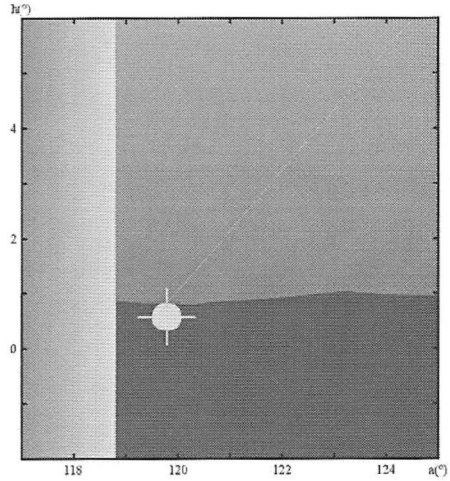

Fig. 4. Sunrise at the winter solstice, 19 December 1900 BCE, 07.21.50 local mean solar time, azimuth 119.8°.

calculated the astronomical data using the computer programs developed by Henriksson. The parameters for calculating the visibility of bright stars close to the horizon at dawn and twilight are from Bemporad (1904), Sidentopf (1941), Ljunghall (1949), and Schmidt (1865). It is important to use Schmidt's visibility calibrations for Athens from ca. 1850, as his observations were made before modern air pollution.

Orientations

We found that the main entrance, in the southeast, was oriented to sunrise at the winter solstice at the time when the house was built. Sunrise at the winter solstice in the year 1900 BCE, about the beginning of the Middle Bronze Age in the Aegean, was on the 19th of December and appeared very near the northern jamb of the main entrance door (Figs 3 and 4). The foundation stones of the jamb may have been affected by time and our reconstruction is therefore somewhat uncertain, but it is not likely to be far off from the original structure. In any case the focus on sunrise at the winter solstice is not in doubt, as this event is visible in the doorway only at that time of the year. It is possible that there may have been some arrangement to heighten the perception of the visibility of the rising sun, e.g. the use of a reflection or shadow as we have found at Knossos in the Central Palace Sanctuary (Blomberg and Henriksson, 2000: 110-12). We have a similar effect from a shadow at sunrise on the equinoxes at the peak sanctuary on Juktas, about 10 kilometres south of Knossos (Blomberg and Henriksson, 2002: 83). These examples suggest that there may have been a similar arrangement at Chamaizi that no longer exists.

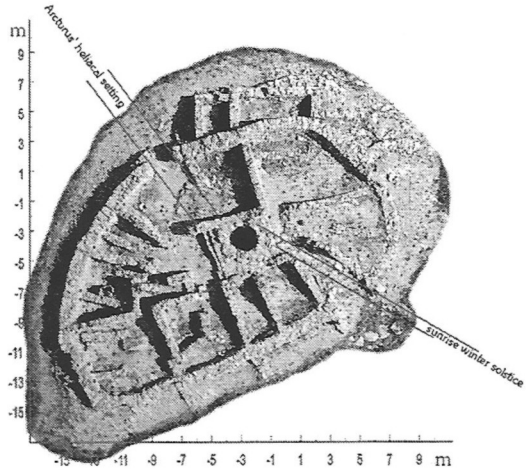

Fig. 3. The orientations at Chamaizi to sunrise at the winter solstice and the heliacal setting of Arcturus at the beginning of the Middle Bronze Age. Photo with permission of Myers, Myers & Cadogan (1992: 79).

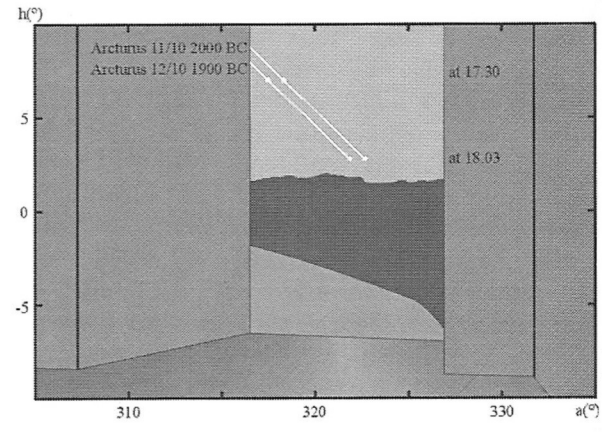

Fig. 5. Heliacal setting of Arcturus, 11 October 2000 BCE (right) and 12 October 1900 (left). The settings took place at 18:03 and 18:02 respectively and the corresponding azimuths were 322.7° and 321.8°

An earlier entrance on the north-western side had been oriented in the same period to the heliacal setting of Arcturus, to an observer standing against the wall opposite the door opening (Figs 3 and 5). The door was later closed off, apparently at the time when fortification walls were built around the site (Davaras, 1972).

Discussion

If we compare the orientations at Chamaizi with those we have found earlier in Crete, we may add a second orientation to sunrise at the winter solstice and a fourth orientation to the heliacal setting of Arcturus (Fig. 6) We have found orientations to Arcturus only at the peak sanctuaries and this would strengthen the case for considering the site of Chamaizi as such a place despite the fact that no terracotta anatomical parts of humans and animals have been found there. We have not yet completed our study of the peak sanctuaries on Gonies and Modi or of the villas at Gournia, Tylissos and Knossos, but the 12 structures which we have completed show 19 orientations to a major celestial event. The peak sanctuary on Petsophas has four. Thirteen of the orientations have a surviving natural or man-made foresight.

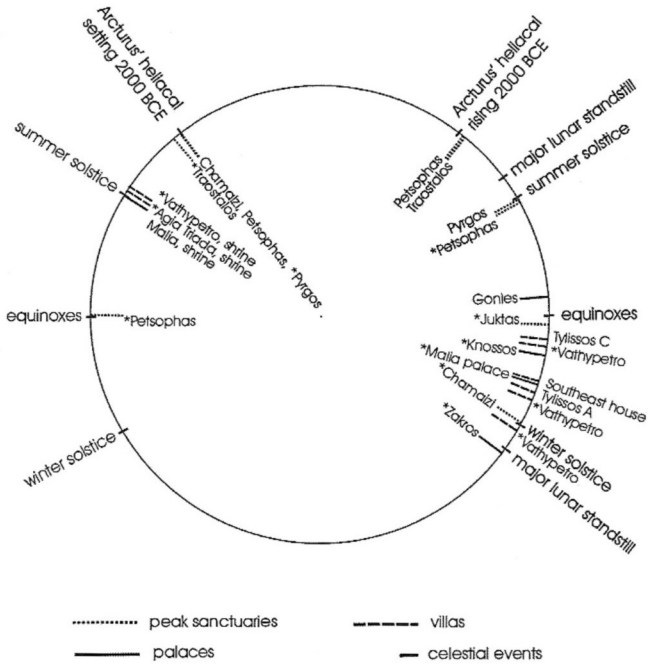

Fig. 6. Orientations of 15 Minoan monuments in the Uppsala archaeoastronomical project. An asterisk indicates a foresight

Another remarkable fact about these orientations is that no Minoan building seems to have an orientation to sunset at the solstices and the only orientation to sunset at the equinoxes occurs at Petsophas, a site that seems to have played a unique role in Minoan astronomy (Henriksson and Blomberg, 1996, 1997-8).

When it comes to major solar events, the Minoans seem not to have been interested in the west, except for the one case of sunset at the equinoxes at Petsophas. As for the three orientations to sunset at the summer solstice, this is true for three small shrines that are late in date, and we have argued elsewhere that the buildings were not Minoan, but were made by or for Mycenaeans (Blomberg & Henriksson, 2001: 75; Blomberg & Henriksson, 2005). Thus their orientations reflect an important historical development in Crete and they may, in fact, make the most unequivocal statement that we have of a new power base in the island in the later periods of the Late Bronze Age (Blomberg & Henriksson, 2005).

In the case of the bright stars, there seem to have been orientations only to Arcturus; although the importance of Orion is indicated by the fact it is framed in the doorway into the Central Palace Sanctuary in the same period (work in progress). We think focus on Arcturus is due to the fact that its dawn and evening risings and settings occurred in the Middle Bronze Age at times that made it easy for the Minoans to know when to intercalate a month in their lunisolar calendar (Blomberg & Henriksson, 2000 & 2002) and also when to begin and end their sailing season (Blomberg & Henriksson, 1999). These latter two are very important times for an island empire in a sea where it was dangerous to sail outside of that season.

Another reason for including Chamaizi among the Minoan peak sanctuaries is that we think such places played an important role in the transmission of information across the island. Chamaizi is situated such that it would have been an excellent relay point in a system of communication. Its location, in fact, would have made it a crucial link in such a system. We have confirmed that there is visual contact across the island from Petsophas in the east to Modi, from Modi to Traostalos and Chamaizi, from Chamaizi to Selena just south of Malia. The peak of Selena could have filled the chain of communication points on to Mt Juktas near Knossos, from there to Mt Ida, visible from Phaistos, and on to Vrysinas south of Rethymnon. These connections mean that the major sites of Minoan Crete could have been in rapid touch with each other. The remarkable uniformity of the Minoan culture over millennia presupposes such a system of communication. If we speculate about the ways in which communications were conveyed from such places, we have a suggestive drawing from the 17th century of the site of a peak sanctuary just west of Zakros – smoke by day and fire by night (Davaras, 1976: 237). In Sweden fire signals of this type were used by the military until the 19th century.

The orientation to sunrise at the winter solstice at Chamaizi, considered together with the orientations to sunrise at the summer solstice at Petsophas and Pyrgos, to the southern lunar standstill at Zakros, to the equinoxes at Knossos, Phaistos and Vathypetro, and to the traditional time for ploughing at Malia and Vathypetro, gives additional evidence that Minoan sites were carefully planned so that an accurate calendar could be maintained, being oriented as they are, to different major celestial events and thus pinpointing the important times of the year (Fig. 6).

Conclusions

We conclude that there were at least two important functions for the oval house at Chamaizi and most likely a third. It was part of the Minoan system for collecting astronomical information necessary for the regulation of the calendar and it was part of a system for rapid communication from

one Minoan site to another. The category of peak sanctuary implies the third function, one related to religion in some way. It seems to us quite possible, perhaps even probable, that places used to study the celestial bodies and to keep track of the calendar would have had a religious significance as well. An important aspect of calendar keeping would very likely have been to make sure that the festival days to the gods occurred at the right times. There is, however, no clear evidence for a more detailed account of the nature of the religious function of such places, and therefore we do not have grounds for saying much more about it.

Acknowledgements

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References

Bemporad, A.: "Zur Theorie der Extinktion des Lichtes in der Erdatmosphäre", *Mitteilungen Grossh. Sternwarte zu Heidelberg* **4**, 1904, 1-78.

Blomberg, M. & Henriksson, G.: "Orientations of the Late Bronze Age Villa Complex at Vathypetro in Crete", *Mediterranean Archaeology & Archaeometry*, **5**, 2005, 51-61.

Blomberg, M. & Henriksson, G.: "The calendaric relationship between the Minoan peak sanctuary on Juktas and the palace at Knossos", *Astronomy of ancient Civilizations: Proceedings of the Conference of the European society for Astronomy in Culture (SEAC) and National Astronomical Meeting (JENAM):, Moscow, May 23-27, 2000* (Potyomkina, T.M. & Obridko, V.N., eds.), Moscow (Nauka) 2002, 81-92.

Blomberg, M. & Henriksson, G.: "Differences in Minoan and Mycenaean orientations in Crete", *Astronomy, Cosmology and Landscape: Proceedings of the SEAC 98 meeting, Dublin, Ireland, September 1998* (Ruggles, C., Prendergast, F. & Ray, T., eds.) Bognor Regis (Ocarina Books) 2001, 72-91.

Blomberg, M. & Henriksson, G.: "Further evidence for the Minoan origins of the Greek calendars", *Proceedings of the 8th Cretological congress, Heraklion (Crete), Greece, 9-14 September 1996* (Karetsou, A. et al, eds.), Heraklion (Etairia Kritikon Istorikon Meleton) 2000, 109-28.

Blomberg, M. & Henriksson, G.: "Evidence for the Minoan origins of stellar navigation in the Aegean", *Actes de la Vème conférence de la SEAC, Gdańsk, 5-8 septembre 1997 (Światowit supplement series H: Anthropology II)*. (Le Beuf, A. & Ziólkowski, M., eds.) Warsaw 1999, 69-81.

Blomberg, P.E.: "An Astronomical Interpretation of Finds from Minoan Crete", *Astronomy and Cultural Diversity: Proceedings of the International Conference Oxford VI and SEAC 99*, La Laguna, 21-29 June 1999, (Estaban, C. & Belmonte, J.A., eds.), Tenerife (Organismo Autónomo de Museos del Cabildo) 2000, 311-18.

Davaras, C.: *Guide to Cretan Antiquities*, 2nd ed., Athens (Eptalofos S.A.) 1976.

Davaras, C.: "The Oval House at Chamaizi Reconsidered", *Athens Annals of Archaeology* **5**, 1972, 283-88.

Evans, A.: *The Palace of Minos*, **1**, London (Macmillan and Co., Ltd) 1921.

Henriksson, G. & Blomberg, M.: "Petsophas and the summer solstice", *Opuscula Atheniensia* **22-23**, 1997-1998, 147-51.

Henriksson, G. & Blomberg, M.: "Evidence for Minoan astronomical observations from the peak sanctuaries on Petsophas and Traostalos", *Opuscula Atheniensia* **21**, 1996, 99-114.

Ljunghall, A.: "The intensity of twilight and its connection with the density of the atmosphere", *Meddelanden från Lunds astronomiska observatorium*, ser. 2, vol. 13, no. 125, 1949.

Manning, S.: *A test of time. The volcano of Thera and the chronology and history of the Aegean and east Mediterranean in the mid second millennium BC*, Oxford (Oxbow Books) 1999.

Myers, J. W., Myers, E. E. & Cadogan, G.: *The Aerial Atlas of Ancient Crete*, London (Thames and Hudson) 1992.

Rutkowski, B.: *The Cult Places of the Aegean*, 2nd ed., New Haven & London (Yale University Press) 1986, 11-12, 73-98.

Schmidt, J. F.: "Über die Dämmering", *Astronomische Nachrichten* **63**, 1865, article no. 1495.

Siedentopf, H.: "Neue Messungen der visuellen Kontrastschwelle", *Astronomische Nachrichten* **271**, 1941, 193-203.