Comparing the Labor Investment and Production of Early and Late Bronze Age Ceramic Roofing Tiles in Mainland Greece

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Introduction

In contemporary, romantic images of the Mediterranean, ruddy ceramic tiled roofs crown centuries-old buildings and strike a vivid contrast with the deep blue sea and yellow-green countryside (fig. 1).[1] The modern ubiquity of the tiled roof, however, obscures a multivalent and complex past that, in prehistory at least, was anything but a romantic cliché. On three separate occasions, ceramic roofing tiles were invented in mainland Greece – the Early Bronze Age (Early Helladic 'EH', ca. 3100–2000 BC), the Late Bronze Age (Late Helladic 'LH', or Mycenaean, ca. 1600–1050 BC),[2] and the Archaic period (ca. 700–480 BC). In all three periods, ceramic tiles were initially used only sparingly.[3] Although ceramic roofing tiles offered some functional advantage over their typical vernacular counterparts (flat clay and pitched thatch roofs) with more durability and protection,[4] their greatest impact was as a visually striking architectural feature whose materiality attested to a significant investment of labor and resources. With such qualities, the ceramic tiled roof marked a form of social power and contributed a monumental effect to the buildings that they crowned,[5] even if the buildings were otherwise not considered monumental.

In this paper, I provide a brief economic analysis of Bronze Age tile production to articulate the degree to which these roofs demanded an increased investment of labor relative to the vernacular. This approach can provide a greater understanding of the significance of the tile roofed structures to their communities and the surplus capital and labor available for production. I demonstrate that the production of ceramic roofing tiles, in both periods, required substantially greater time and labor. A comparison of the EH and LH tile production, however, demonstrates differences in the production. Whereas much of the production of EH ceramic roofing tiles could have been performed with the significant help from relatively unskilled laborers, the LH counterparts integrated ceramic specialists for more of the production process.

Tile Production

EH and LH ceramic roofing tiles are easily distinguishable from each other. The EH tiles are thin rectangular pads of fired clay that were hung in a shingle-type arrangement:

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Fig. 1: The tiled roofs of Corfu Chora.

each row overlapped approximately 50% of the row below (fig. 2). Typical dimensions are 20–25 × 20–25 × 1.0–1.5 cm.[6] Such tiles have been found at 22 sites in mainland Greece and are mostly concentrated in the Argolid, Corinthia, and Attica (fig. 3). Although the tiles are often discussed alongside the period's corridor houses, EH tiles are in fact associated with a variety of structures: monumental corridor houses, fortifications, and vernacular constructions.

The LH ceramic tiled roof utilized two different tile types and functioned like the later Archaic hybrid roofing system (fig. 4). Pan tiles (ca. 40–50 × 40–50 cm) were placed on the roofing surface, slightly overlapping the pan tiles of the lower row. The raised flanges (ca. 3–7 cm tall) on two sides of the tile abutted the flanges of the neighboring tiles. Semi-cylindrical cover tiles (ca. 40–55 cm length; 13–20 cm diameter) were then placed over these abutting flanges and rested on the upper surface of the flat pan tiles to create a waterproofed exterior. Fewer LH tiles have been recovered relative to their EH counterparts, but the extent of their distribution is generally equivalent (fig. 5).[7] While the publication record of these tiles is not robust enough to assign the tiles to specific structures in many cases, LH tiles have been found at palatial and non-palatial sites alike.[8]

In previous and ongoing studies, I have reconstructed the *chaînes opératoires*, or ordered steps of construction, for each of the tile assemblages by closely examining the visible markings and impressions that are evident on the surfaces of the tiles. Although some variation in production methods between sites has been identified, for this study I reconstruct the production of two representative assemblages: the EH tiles from Mitrou

Fig. 2: EH roofing tile fragments (l) Mitrou, East Lokris (LY784-539-020); (r) Zygouries, Corinthia (Z014).

and the LH tiles from Eleon.[9] With an understanding of the construction processes for these tiles, the economics of production and the tilemakers' relationships to established craft traditions can be better evaluated. In the following, I briefly summarize these *chaînes opératoires* and comment on the economic implications of their production.

The production of Mitrou's EH tiles was recently described as using a "mold-and-cut" method.[10] Moistened clay was placed in a mold and spread within the frame. The mold was then removed and individual tiles were cut along the narrowest width before they were left to dry prior to firing. With this reconstructed *chaîne opératoire*, dedicated training or much specialized equipment by the individuals forming the tiles was not necessary. In fact, the forming methods drew from an established architectural tradition for creating mold-made mud brick. Because every structure required several hundred mud bricks for construction, almost everyone had experience making mud bricks in their personal or communal building projects. The only action that required some specialized knowledge was the firing of clay.[11] Still, the forming of EH tiles was essentially vernacular in its methods and could have been achieved by almost anyone with the time and access to materials.

The production of the LH tiles was more complex, with each type (cover/pan tile) requiring a distinct set of methods and techniques. Pan tiles were exclusively handmade, but had a rather idiosyncratic forming method; a pad of clay was placed on a flat surface and one set of parallel walls was made by bending the edges of the pad upwards.[12] Before drying and firing, further refinements were made by the tilemaker such as finishing the lip of the wall and exerting downward force on the walls for better articulation. The cover tiles were formed as coil-built tubes of clay and finished on the wheel.[13] These

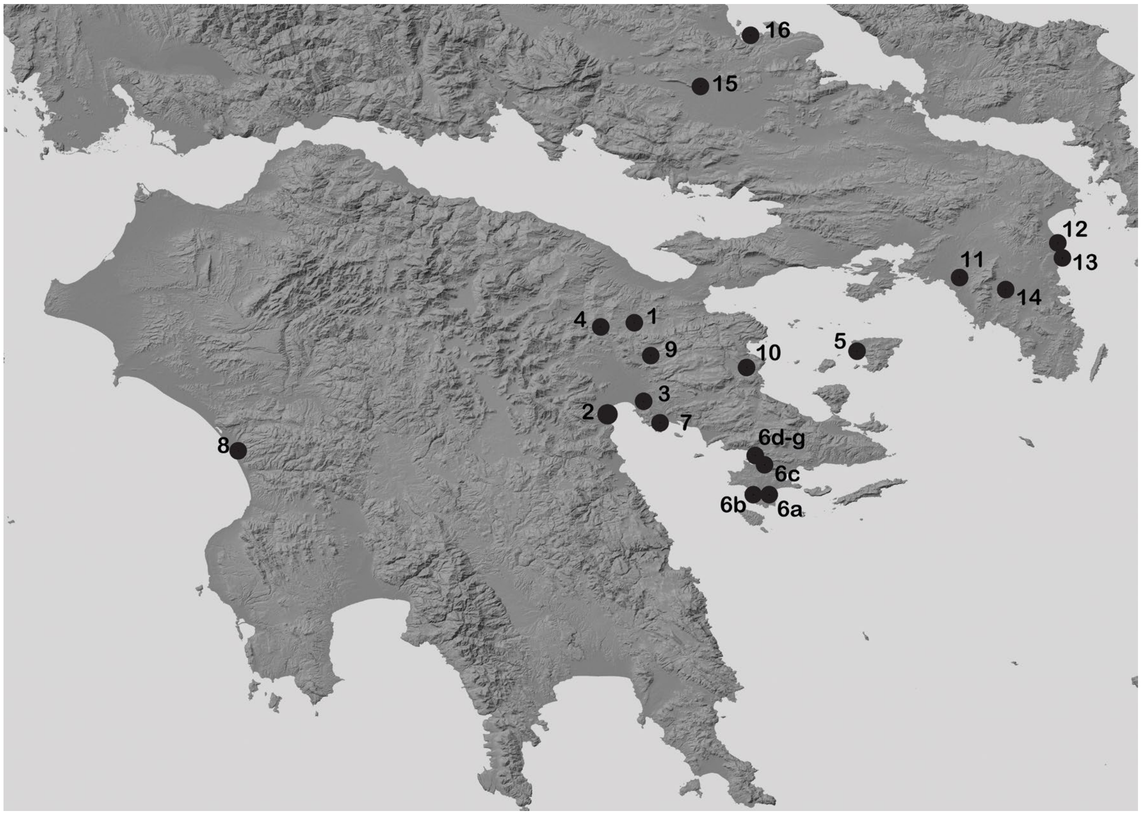

Fig. 3: EH settlements with ceramic roofing tiles: 1. Zygouries; 2. Lerna; 3. Tiryns; 4. Tsoungiza; 5. Kolonna (Aegina); 6. Southern Argolid Exploration [7 sites]; 7. Asine; 8. Ag. Dimitrios; 9. Berbati; 10. Vassa; 11. Rouf; 12. Asketario; 13. Rafina; 14. Koropi; 15. Orchomenos; 16. Mitrou.

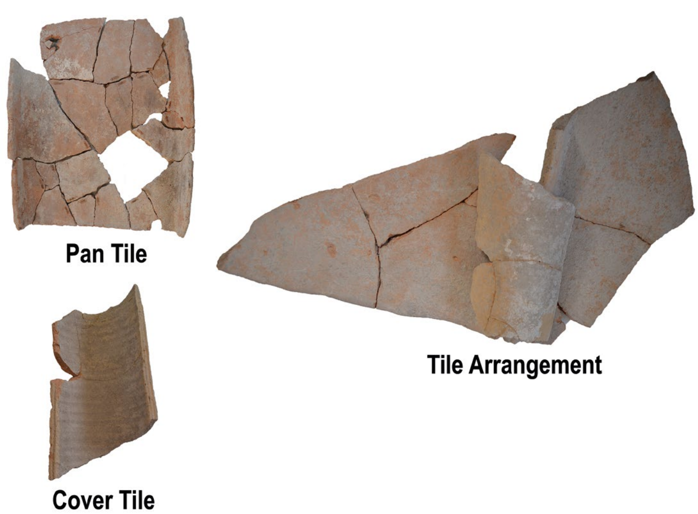

Fig. 4: Left: Mycenaean pan (SF0443) and cover tile (SF0230) from the site of Eleon. Right: Mycenaean pan tiles (SF0507; SF0506) and cover tile (SF0230) from the site of Eleon.

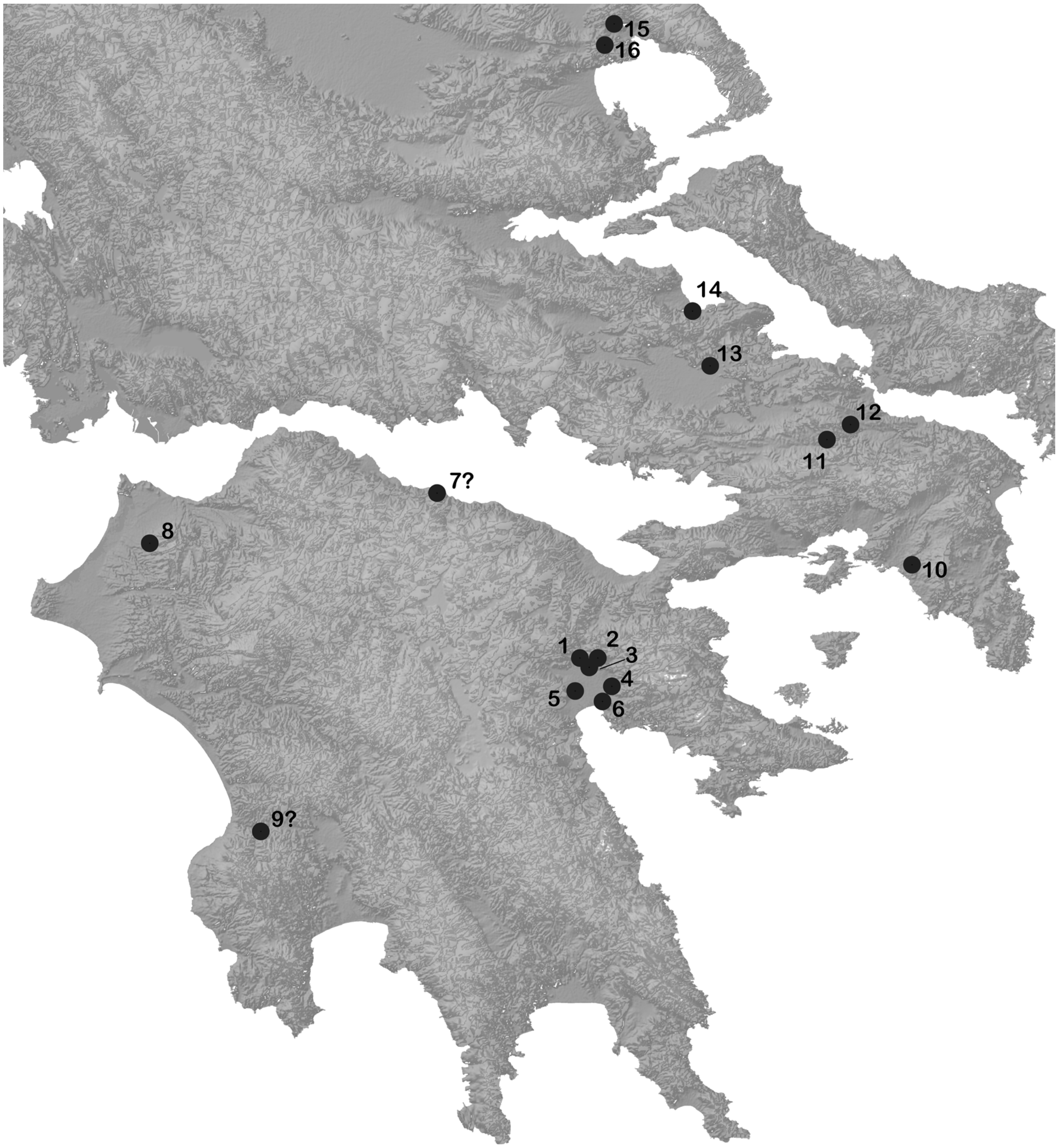

Fig. 5: Mycenaean settlements with ceramic roofing tiles: 1. Mycenae; 2. Berbati; 3. Chania; 4. Midea; 5. Argos; 6. Tiryns; 7. Aigeira (unlikely); 8. Chalandritsa; 9. Malthi (unknown); 10. Athens (unlikely); 11. Thebes; 12. Eleon; 13. Gla; 14. Mitrou; 15. Dimini; 16. Aerino.

tubes were then cut in half to produce two equal cover tiles which were left to dry before firing.[14] Evidence for this production method is found in the undulating remains of the coils on the interior surface of the tile and the rotating smoothing marks on the exterior surface.

Fig. 6: A utilitarian tray from Mitrou (LE795-070-016). This shows the interior wall and a cross-section of the base.

Unlike the EH tiles that have analogs in mud brick production, LH tiles demonstrate a clear dialog with established ceramic craft traditions. The idiosyncratic production of the pan tiles, for instance, has its clearest parallel in hand-made "utilitarian trays" that have been found at several sites in mainland Greece (fig. 6).[15] Both the pan tiles and the utilitarian trays are generally similar in shape and possess a coarse fabric with straw temper and vertical flanges. Utilitarian tray fragments can easily be mistaken for pan tiles, but their curved walls, greater straw temper, and lower firing temperatures help to distinguish them. While it is possible that pan tiles were formed by individual households, the cover tiles certainly required specialist training and habituated movements for their forming and finishing on the wheel. Therefore, the most likely identity of the cover tilemaker is the local potter.

In summary, the production of tiles in EH and LH Greece required distinct abilities. Whereas the EH tiles could have primarily been formed by non-specialists, the construction of the LH tiles demanded at least some trained craftsmen for much more of the production process. This suggests that there were also different economic processes associated with tile production. Unless construction methods were guarded in the EH period, anyone who had access to the materials and basic ceramic firing knowledge potentially had the ability to form their own tiles. While it is quite likely that specialist potters contributed to the firing and clay paste preparation, production was not necessarily exclusive to them with several steps potentially being delegated to non-specialist workers. In contrast, LH ceramic-tiled roofs, in almost all instances, must have demanded a means – economic, cooperative, or coercive – to convince the potters to devote a greater portion of their time to both tile forming and firing. The cover tiles for a large structure would have required a similar amount of time to produce several hundred fine-ware vessels![16] The cost to roof such a structure, therefore, was likely to have been greater than the cost of the equivalent number of ceramic vessels.

Energetic Analysis

To shed further light on the economic impact of a ceramic-tiled roof in each period, I also pursued a comparative energetic analysis of EH tiles, LH tiles, and vernacular roofing construction. Energetic analyses assign labor costs to each step in the production sequence.[17] The cumulative cost of these then provides a quantifiable means with which to evaluate scales of production and compare them between projects. Although the use of finite work rates for such studies has been criticized for their cultural contingency and imprecision,[18] there is still great heuristic value in this approach for understanding relative measures of labor investment. With the application of an energetic analysis to prehistoric roof constructions, I do not seek an accurate representation of labor expenditures. Instead, I offer a means to compare the labor investment among the different roofing systems.

The prevailing vernacular roofing methods against which the tiles' construction are compared are flat clay and pitched thatched roofs.[19] The production methods for both these roof types can vary significantly, from extremely elaborate, multi-stepped methods to rudimentary constructions. This variability makes it difficult to provide accurate energetic analyses for comparison. Archaeological evidence, however, offers some help reconstructing the flat clay roofs. Clay roofing fragments recovered from Bronze Age sites, such as Lerna, often attest to a layer of parallel reeds or small branches spanning crossbeams that formed a suitable bed for the clay roofing material.[20] The clay was then deposited to a depth of a few centimeters (averaging 6–8 cm) on this foundation. This type of flat roof could have conceivably been built by the household in both periods. It seems likely that most thatch roofs in EH Greece were also made using vernacular methods because of the dearth of evidence for centralized and full-time craft specialists in EH Greece. The fundamental need for roofs in every community, as well as their ongoing maintenance would have also made reliance on itinerant craftsmen somewhat prohibitive. In the mature LH period, very few buildings were entirely thatched as suggested by the complex, agglomerative ground plans of the typical structure. Therefore, it is also unlikely that thatch was the predominate roofing technique.

For the energetic analysis, I evaluate the labor investment for each roofing method to cover the same reconstructed building: a 25 × 8 m rectilinear structure with a roof pitched at 36.87˚. These precise dimensions are not reconstructed from a single excavated structure but were chosen because they represent the scale of monumental buildings in EH (corridor houses) and LH (palatial megara) periods.[21] They also allow for easy calculations of absolute tile numbers required to cover the surface. The application of an energetic analysis to a hypothetical structure is beneficial by allowing fair comparison among roofing types while producing a relative metric that will not be mistaken as a representation of actual prehistoric labor rates.

Using average tile dimensions for each period, I have reconstructed the number of EH and LH tiles necessary to roof the hypothetical structure and the total volume of clay needed to produce these tiles (Table 1).[22] Ethnographic data from previous energetic analyses offer relevant work rates for excavating and transporting this clay.[23] The transport rates assume that the material was brought by an animal-drawn cart from a source 1 km away. All considered, roofing the same structure would have required 50% more labor for the LH tiles compared to the EH.[24] There certainly would have been significant additions to these estimated times for levigating, mixing, and adding temper to the clay in both periods, but each tile type likely had unique requirements and methods that cannot currently be reconstructed.

Like the tiles, the vernacular flat roof also required the excavation and transport of clay. A roofing fragment from Lerna, RF8, provides a template for calculating the necessary volume of clay.[25] A flat roof with a 6.8 cm thick layer of clay demands the most clay for construction and, as a result, significantly greater labor for extraction and transport, as much as double the requirements for EH roofing tiles!

At first glance, the production of tiles seems to have been a material- and labor-saving activity. However, several important steps of the *chaîne opératoire* for the tiles still remain unaccounted. Significant additional time was necessary for refining the clay, collecting fuel, forming, drying, and firing the tiles, building the wooden roofing supports, as well as placing the tiles on the roof. Whereas labor rates for the complete construction of the support beams and assembly of a flat roof for the hypothetical structures is estimated at only 500 ph,[26] simply firing EH or LH tiles would have required several months of additional time for a single kiln to heat, fire the tiles, and cool.[27] The tiled roof, therefore, required several orders of magnitude of increased labor and time with the construction of a single LH roof perhaps occupying a single potter and his/her kiln(s) for a year's production season.

Among all roofing types, thatch roofs were seemingly the least labor intensive.[28] Although I was unable to find data on prehistoric straw volumes and densities to calculate transport costs for direct comparison, the lesser weight of the straw would have likely demanded significantly less transport time. It is also possible that the straw/thatch used for the roof was an agricultural biproduct that had been acquired at harvest and already available on site.[29]

Ethnographic data for thatched roof construction by professional English thatchers from the turn of the 20th century AD provide additional insight into the labor costs of assembly.[30] Their rate of 10 ph per "square" (10 × 10 ft) of thatch roofing is applied to the hypothetical structure to suggest 269 ph for assembly – almost half the labor investment to complete a flat clay roof. This is perhaps a maximum value because of the likely greater refinement and technical quality of the thatch roofs that were constructed in England at the time. Even after considering the necessary labor to build the structural support of the thatch roof, the labor requirements for the thatch roof likely did not match that of the flat clay roof, much less those of the tiled roofs.

	Length	Width	Roof Pitch	Pitched Surface Area	Flat Surface Area	
Structure	25 m	8 m	36.87°	250 m^2	200 m^2	
	Length	**Width/Diameter**	**Base Thick.**	**Wall Height**	**Wall Thick.**	**Volume/tile**
EH Tile	25	25	1	N/A	N/A	.000625 m^3
LH Pan	50	40	1.5	4	2	.004 m^3
LH Cover	50	14	1.5	N/A	N/A	.00165 m^3
	Total Tiles	**Total Volume**	**Total Weight**			
EH Tile	7800	4.9 m^3	5336.1 kg			
LH Pans	1300	5.2 m^3	5662.8 kg			
LH Covers	1274	2.1 m^3	2286.9 kg			
Flat Roof	N/A	12.0 m^3	13068 kg			
Clay Excavation rate		0.54 m^3/ph				
Clay Transport rate		(kg/2100)*(2*km/1.67)				
	Excavation	**Transport**	**Total**			
EH Tiles	9.07 ph	3.043 ph	**12.11 ph**			
LH Tiles	13.52 ph	4.533 ph	**18.05 ph**			
Flat Roofs	22.22 ph	7.45 ph	**29.37 ph**			

Table 1: A volumetric and energetic analysis of EH tile, LH tile, and flat roof material acquisition. The work rates are taken from Harper 2016. The energetic analysis assumes a standard transport distance of 1 km by animal-powered cart and a volume/weight conversion of clay at 1 m^3 / 1089 kg. All values are in cm unless noted otherwise.

Beyond their greater labor investment, the production of tiles was also a highly conspicuous activity that required a significant surface area for forming and initial drying, 3–6 times greater than the surface area of the building itself.[31] It also would have been prohibitive to produce all the tiles at one time because 9–14 available kilns would have been necessary to fire all the tiles for a single building simultaneously. More realistically, the tiles were likely formed, dried, and fired in batches. In contrast, the vernacular flat and thatch roofs could have been assembled as the materials arrived on site; thus, only a minimal work area beyond the structure itself was needed and the construction could be contained as a single event.

With the tiles produced in batches, the construction process also became an extended event granting even more visibility to and public awareness of the project. A significant amount of materials and tiles in various states of finishing were likely conspicuous for weeks – if not months – at a time. The multi-stage production of the tiles, therefore, would have augmented the time for production and increased the community's awareness. This, in turn, enhanced the monumentality of the tiled roofs by cementing the construction event in the social memory of the local community.

Conclusion

Although the EH and LH tiles shared such a public awareness, the impact of this social memory was likely felt differently in each of the two periods. Because anyone could have possibly participated in EH tile construction, the tiled roof may have served as a marker of communal participation, a symbol of social unity, or an object of conceivable aspiration. LH tiled roofs, in contrast, demanded even greater access to or coercion of specialist craftsmen (potters) and the means to divert their efforts away from pottery production for a longer period. As a result, LH tiled roofs are less likely to have represented the shared efforts of the local community and, instead, signified an elite act of conspicuous consumption or an exercise of socio-political power.

Notes

[1] I would like to thank the organizers of the session, E. Hasaki and M. Bentz, for inviting me to participate in this session, as well as the directors of the Mitrou (A. Van de Moortel, E. Zahou) and Eleon (B. Burke, B. Burns) excavations for allowing me to study the tiles. I also appreciate the helpful comments on the text from Kimberley van den Berg.

[2] Although many have been skeptical of the existence of roofing tiles in LH Greece due to the scarcity of examples (e.g. Blegen 1928, 34 f.; 1945, 41; Sapirstein 2008, 49–54), recent excavations at Eleon have revealed more than 700 tile fragments in a limited area demonstrating their use.

[3] Iakovidis 1990; Winter 1993; Sapirstein 2008, 1–8. 37–56; Jazwa 2018.

[4] Sapirstein 2008, 1; 2009, 197.

[5] With this, I do not mean that tiles are only found on the typical "monumental" buildings of each period but argue that the tiled roof itself was a monumental feature regardless of other qualities of the architecture.

[6] Jazwa 2018.

[7] Marzolff 2017, fig. 2.

[8] Iakovidis 1990.

[9] The identified construction methods for these assemblages are not unique but are shared with several (but not all) assemblages.

[10] Jazwa 2018.

[11] Pullen 1985, 279 suggests that pottery was produced at the household scale but admits that there is not enough evidence to understand craft specialization more broadly in the EH II period. Weiberg (2007, 70–74) also assumes a household level of craftsmanship.
[12] Küpper 1996, 107.
[13] For identification, see Roux – Courty 1998.
[14] Iakovidis 1990, 155 f.; Küpper 1996, 107.
[15] See Jazwa, forthcoming. The precise function of these trays is uncertain. Due to their coarse fabric, uneven firing, and utilitarian function, these objects were likely made by individual households.
[16] This considers that the cover tiles were formed on the wheel with two cover tiles equivalent to one 40–50 cm tall vessel.
[17] For an overview of energetic approaches, see Abrams – Bolland 1999.
[18] See e.g. Voutsaki et al. 2018.
[19] E.g. Darcque 2005, 123–129.
[20] Wiencke 2000, 279–310; Darcque 2005, 123–129.
[21] These were not the only structures in the EH and LH periods to be roofed with tiles; the use of these structures as the model for the energetic analysis is effective because the building forms were adopted at several sites and were among the largest buildings/building units in each period. In reality, the specific type of building used is not of great concern because the study is comparative, evaluating the relative scale of production. The pitch of 36.87˚ was also chosen for ease of calculations. Although the pitches of EH buildings were certainly shallower (20–30 degrees), Mycenaean pitched roofs have often been reconstructed as steeper than their EH counterparts.
[22] The latter value does not account for clay shrinkage when drying.
[23] All rates are taken from Harper 2016, unless otherwise noted.
[24] All work rates are presented as person-hours (“ph”), the number of hours it would take one person to accomplish this task.
[25] Wiencke 2000, 280. This thickness, 6.8 cm, does not differ greatly from LH examples, see Darcque 2005, 124–126.
[26] Following the formula provided in Harper 2016, 527 of 0.400 m^2/ph. Harper conducted energetic analyses with three significant Mycenaean building projects: the Treasury of Atreus, the Northeast Extension of the citadel wall, and the construction of buildings at Korfos-Kalamianos.
[27] This value is based on the average amount of time to heat a kiln, fire the load, and cool the kiln and the number of batches that could be fired at once. The latter considers the average size of documented kilns in each period (EH: 1.6 m diam.; LH: 2 m diam.) and the number of tiles that could fit in this surface area (EH: 960 tiles, 9 batches; LH: 144 pan and 308 cover tiles, 14 batches, after Hasaki 2002).
[28] Because of the seasonality of the harvest, it is possible that thatch was the best option for houses that were built during the Autumn/Winter seasons – the unfired clay of the drying tiles and flat roofs risked destruction by a rainstorm if produced during the wet season.
[29] Moir – Letts 1999, 58 f.
[30] Rural Development Commission 1988.
[31] This accounts for the number and size of tiles, pitch of the roof, and space between tiles for drying.

Image Credits

Fig. 1. 2. 4–6: by the author. – Fig. 3: after Jazwa 2018, fig. 1. – Table 1: by the author.

References

Abrams – Bolland 1999
E.M. Abrams – T.W. Bolland, Architectural Energetics, Ancient Monuments, and Operations Management, Journal of Archaeological Method and Theory 6, 1999, 263–291.

Blegen 1928
C.W. Blegen, Zygouries: A Prehistoric Settlement in the Valley of Cleonae (Cambridge, MA 1928).

Blegen 1945
C.W. Blegen, The Roof of the Mycenaean Megaron, AJA 49, 1945, 35–44.

Darcque 2005
P. Darcque, L'habitat mycénien. Formes et fonctions de l'espace bâti en Grèce continentale à la fin du IIe millénaire avant J.-C. (Athens 2005).

Harper 2016
C.R. Harper, Laboring with the Economics of Mycenaean Architecture: Theories, Methods, and Explorations of Mycenaean Architectural Production (Ph.D. diss. Florida State University 2016).

Hasaki 2002
E. Hasaki, Ceramic Kilns in Ancient Greece: Technology and Organization of Ceramic Workshops (Ph.D. diss. University of Cincinnati 2002).

Iakovidis 1990
S. Iakovidis, Mycenaean Roofs: Form and Construction, in: P Darcque – R. Treuil (eds.), L'habitat Égéen préhistorique. Actes du la Table Ronde international organisée par le Centre National de la Recherche Scientifique, l'Université de Paris I et l'École française d'Athènes (Athènes, 23–25 juin 1987), BCH Suppl. 19 (Paris 1990) 146–160.

Jazwa 2018
K.A. Jazwa, The Construction of Early Helladic II Ceramic Roofing Tiles from Mitrou, Greece: Influence and Interaction, Mediterranean Archaeology and Archaeometry 18, 2018, 153–173.

Jazwa forthcoming
K.A. Jazwa, Utilitarian Trays from Mitrou: Introducing a New Artifact Class, in: Proceedings of the 5th Archaeological Meeting of Thessaly and Central Greece, 2012–2015, forthcoming.

Küpper 1996
M. Küpper, Mykenische Architektur. Material Bearbeitungstechnik, Konstruktion und Erscheinungsbild (Espelkamp 1996).

Marzolff 2017
P. Marzolff, Beobachtungen am ältesten keramischen Dachdecksystem, in: D. Kurapkat – U. Wulf-Rheidt (eds.), Werkspuren: Materialverarbeitung und handwerkliches Wissen im antiken Bauwesen. Internationales Kolloquium in Berlin vom 13.–16. Mai 2015 veranstaltet vom

Architekturreferat des DAI im Henry-Ford-Bau der Freien Universität Berlin (Regensburg 2017) 179–192.

Moir – Letts 1999

J. Moir – J. Letts, Thatch. Thatching in England 1790–1940 (English Heritage 1999).

Pullen 1985

D. J. Pullen, Social Organization in Early Bronze Age Greece (Ph.D. diss. Indiana University 1985)

Roux – Courty 1998

V. Roux – M.-A. Courty, Identification of Wheel-Fashioning Methods: Technological Analysis of 4th and 3rd Millennium BC Oriental Ceramics, JASc 25, 1998, 747–763.

Rural Development Commission 1988

Rural Development Commission, The Thatcher's Craft, Fourth edition (London 1988).

Sapirstein 2008

P. Sapirstein, The Emergence of Ceramic Roof Tiles in Archaic Greek Architecture (Ph.D. diss. Cornell University 2008).

Sapirstein 2009

P. Sapirstein, How the Corinthians Manufactured their First Roof Tiles, Hesperia 78, 2009, 195–229.

Voutsaki et al. 2018

S. Voutsaki – Y. Van den Beld – Y. De Raaf, Labour Mobilization and Architectural Energetics in the North Cemetery at Ayios Vasilios, Laconia, Greece, in: A. Brysbaert – A. M. Gutiérrez Garcia (eds.), Construction Economics of the Past (Athens 2018) 169–191.

Weiberg 2007

E. Weiberg, Thinking the Bronze Age. Life and Death in Early Helladic Greece (Uppsala 2007).

Wiencke 2000

M.H. Wiencke, Lerna. A Preclassical Site in the Argolid IV. The Architecture, Stratigraphy, and Pottery of Lerna III (Princeton 2000).

Winter 1993

N.A. Winter, Greek Architectural Terracottas from the Prehistoric to the End of the Archaic Period (Oxford 1993).