The Annual of the British School at Athens, **110**(1), 2015, pp. 203–212 © The Council, British School at Athens, 2015
doi:10.1017/S0068245415000027

ON THE ARCHITECTURE OF THE TOUMBA BUILDING AT LEFKANDI

by Georg Herdt

The building at Toumba, Lefkandi, stands unique in its time and place. The remains of this monument are significant in terms of size and elaboration, and also on account of the way it has been reconstructed and interpreted as the ancestor of the Greek peripteral temple. The primary concern of this article is the structural evaluation of the architectural remains. In part due to the scant nature of the archaeological evidence behind the widely accepted reconstruction, the latter can be seen to have several structural shortcomings. In reassessing the structure several factors are considered, including the state of technology at the time of construction, the characteristics of the building materials employed, and the way they respond to the strains of load and the forces of nature. The process of reconciling such factors with the documented remnants of the building directs us towards a different reconstruction. It thus emerges that the building at Toumba is an implausible ancestor of Greek peripteroi, and an alternative solution without the iconic pre-peristasis is proposed here.

THE BUILDING AT TOUMBA

Excavations in the 1980s on a low hill near the village of Lefkandi on Euboea exposed the remains of a large structure of the early Geometric period (Popham *et al.* 1993). It was soon evident that the building was exceptional for its period in several respects, chiefly in terms of purpose, of size and of typology. The discovery of two burial pits, located roughly in the middle of the building, containing significant remains showed that here was no simple residence. It is thought that at the end of its existence it came into connection with some kind of Heroic burial (Popham *et al.* 1993, 99–101; see also Pakkanen, J. and P. 2000; Kistler and Ulf 2005). For the first half of the tenth century BC the building is very large, with a width of approximately 10 m and a length of 45 m terminating in an apsidal curve towards the west. This far outstrips any structure known in Greece of that period. Also unique is the exterior aspect of the building as it was reconstructed (Fig. 1), namely with a covered perimeter walkway or 'veranda' held up on a circuit of wooden posts (Coulton 1993, 58).

This feature is of special interest to any student of western architecture given that centuries later the *peristasis* or external colonnade would become the hallmark of the Greek temple. J.J. Coulton, the architectural authority for the site, did consider alternatives such as a fence, but due to an 'alignment' of the two different series of posts (on the inside and on the outside of the building) his preference became the 'veranda' and this was the solution shown in the final excavation report (Coulton 1993, 45). This reconstruction quickly became widely accepted, finding its way into articles and textbooks covering Greek architectural development (Gruben 2001, 26–7). Indeed, the Toumba building became the 'predecessor of the Greek temple' (Pakkanen J. and P. 2000, 242; Lippolis, Livadiotti and Rocco 2007, 46), and hence the potential missing architectural link from the Dark Ages to Archaic Greece. Yet to date not a single other building is known which for a certainty incorporated a *peristasis* before the seventh century BC, while those that do, in later periods, did not have rectangular posts.

There is a limit to the effectiveness of any line of argumentation based on parallels given the paucity of well-documented structures in the Geometric period and the dangers of extrapolating any generalised pattern of buildings, especially if assumptions of possible evolutionary developments are involved (Wilson Jones 2014, chapter 2). This paper aims to open up the problem by concentrating on issues of structure, including those relating to the cultural environment of construction and particularly to plausibility in terms of materials and statics, *i.e.* the physical ability to be built and resist loads. For the building at Toumba several aspects of its reconstruction are problematic from this perspective, and at least one of them requires reconsideration given the impact it has on the overall design.

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

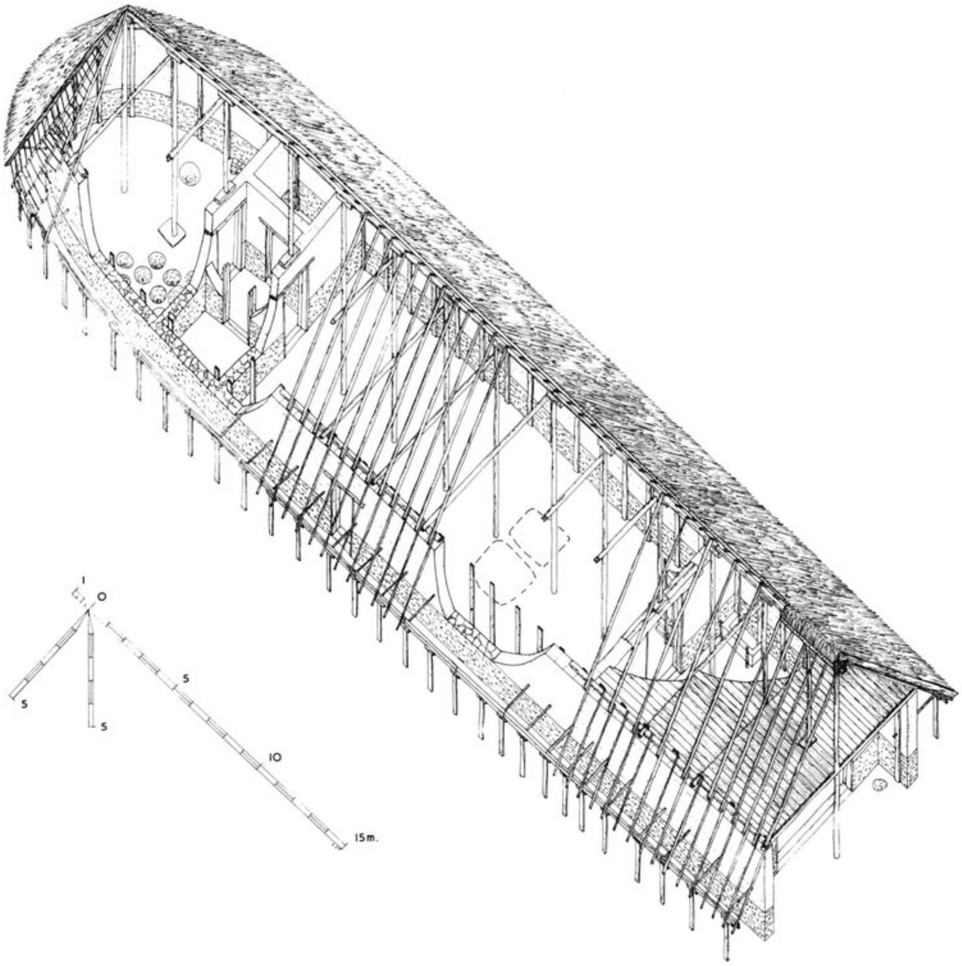

Fig. 1. Restoration of the building according to J.J. Coulton.

THE ARCHAEOLOGICAL SITUATION

It is necessary first to review the evidence on which Coulton's reconstruction was based. The bulk of buildings dating to the Geometric period were made of perishable materials and do not survive. Materials of a more durable nature, to some extent mud-brick and of course any stone that was used for walls and foundations, provide the prime source of evidence. It is generally the outline in plan that can be most safely ascertained. At Toumba several parts of the substructure remain intact and were duly recorded (Fig. 2). The lower parts consisted of a stone socle that still measures about 1.15–1.30 m high and about 0.60 m wide at the bottom, tapering significantly to approximately 0.50 m towards the top (Coulton 1993, 37). At three locations several courses, or layers, of the upper part of the wall executed in dried mud-brick can be traced, with four layers extant in one place (Fig. 3). Each layer measures approximately 0.10–0.12 m in height and each is clearly separated by a pale mud mortar (Coulton 1993, 38).

Wooden elements

Under certain conditions the original existence of timber elements can be ascertained despite the loss of the material itself, as is the case at Toumba courtesy of imprints in the ground of where the wood used to be. The most extensive surviving evidence of timber concerns the perimeter array of rectangular posts. The condition of the pits allowed for the restitution of the posts that

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

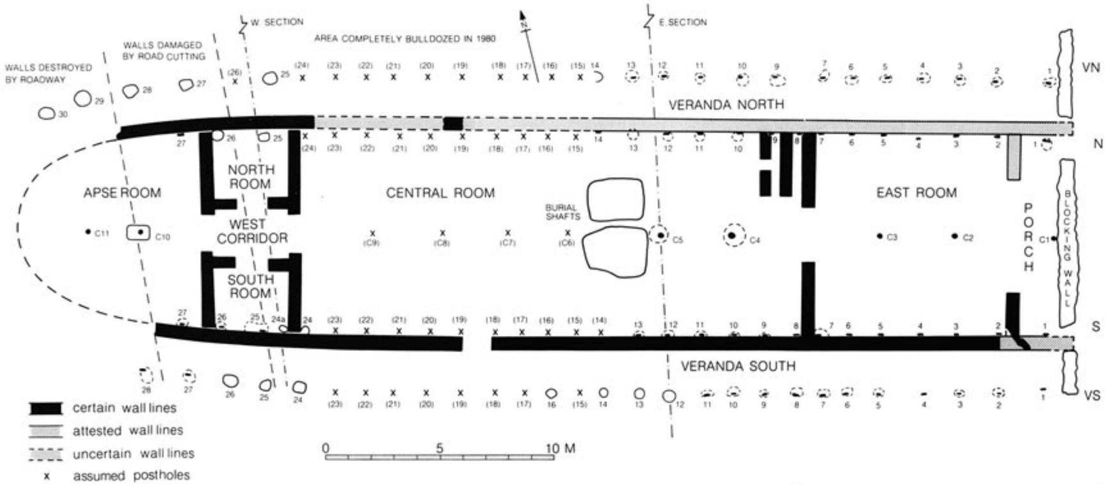

Fig. 2. Schematic plan of the Protogeometric building showing the areas of damage, section lines and the numbering of the postholes according to J.J. Coulton.

once filled them: rectangular in shape, varying from 0.20 to 0.30 m in length and from 0.06 to 0.10 m in width (Coulton 1993, 38). In one position there is also a clue to the posts' height above ground. Enveloped by a mud-brick ramp, a vertical slot indicates 'that the veranda posts were at least 1.20 m high' (Coulton 1993, 45).

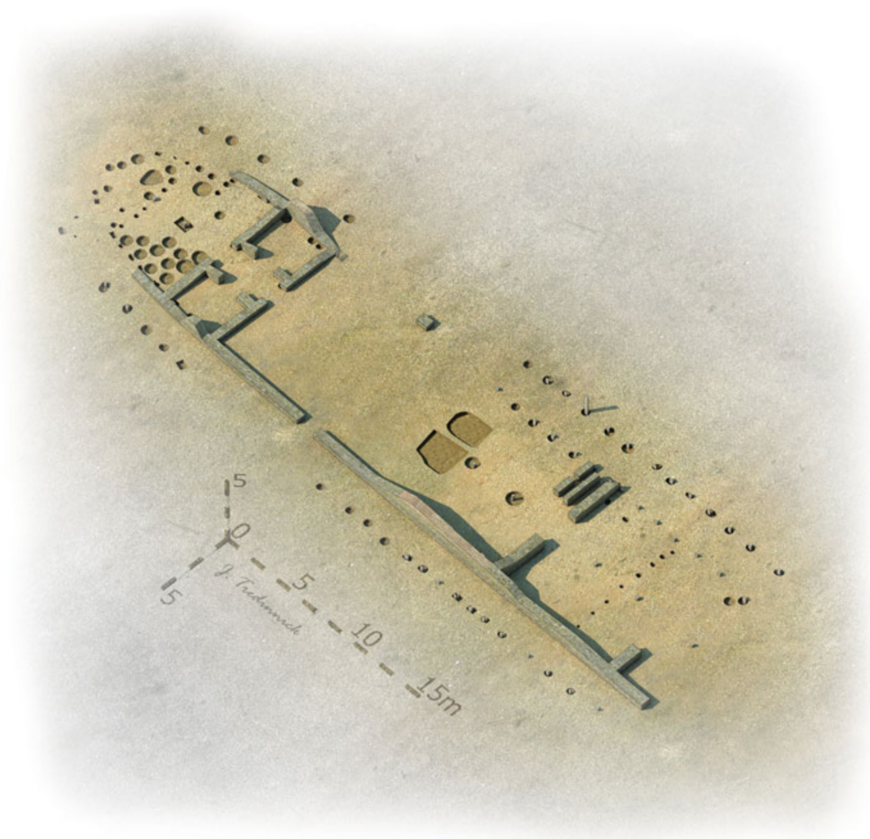

Fig. 3. Bird's-eye view showing the building's surviving components.

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

The arrangement of rectangular wooden supports, interpreted as a 'veranda', was not the only array of postholes discovered at the site; a similar series was found along the inside face of the walls of the building. The two series of rectangular postholes were of roughly similar depth (0.60 m) and seemed to relate to each other; this required interpretation (Coulton 1988, 59; 1993, table 2). The 'veranda' posts were interpreted as supports for a roof, with horizontal connections to the series along the inside of the walls (Coulton 1993, 45). The rough correspondence in the alignment of the two sets of posts was one of the factors that led Coulton to reconstruct a kind of *peristasis* in the first place. Aside from the postholes being deep enough to stabilise a vertical post of moderate height, it is also evident that the wall stood before the pits were dug, as they do not extend under the wall. Yet the reason for their existence is unclear, not least because there is no valid structural interpretation, as the wall is solid enough to fulfil any structural duties by itself (Coulton 1993, 47). Except for the organic remains of timber inside the pits, nothing remains to indicate the posts' height above ground (with the sole exception in the ramp, as mentioned). In fact, the wooden imprint of the posts seems to survive only inside the pits – below ground level (Coulton 1993, 39–41, plate 37). This could represent a vital clue, bearing in mind that it is thought that the lifespan of the building was limited and that its demise was not, or does not seem to have been, due to fire or hostilities. It is possible that the structure was only intended to be temporary; however, it had a roof as attested by the excavators (Coulton 1993, 44). This being so, it certainly had to be capable of standing, even if only for a short while.

A separate line of supports ran along the spine of the building. Of this alignment seven pits remain intact, and the former organic material inside the pits left an imprint of their shape showing that these posts were circular and around 1.40–1.45 m in depth (Coulton 1993, 41, table 2). According to Coulton their diameter varies from 0.18 (C4) to approximately 0.25 m (C11).[1] Given their size and spacing, of about 3.50 m, these spinal posts are consistent with the central supports for a roof. They must have been the longest wooden components in the building, since they needed to reach from the bottom of their pits to the ridge beam. Originally there would have been more than seven and Coulton suggests a total of eleven (Coulton 1993, 42).

THE RECONSTRUCTION

As previously discussed, for a building of this age there is far more certainty in reconstructing the plan than the elevation. Coulton's reconstruction is not the only possibility that can be deduced from the archaeological evidence. In fact, an alternative reconstruction can be proposed, a reconstruction that is more likely in terms of statics and more in tune with the technological achievements of its period.

The current reconstruction

Coulton's proposal premises the height of the building on two constraints: a roof pitch of 45° and the height of the 'veranda' posts. The degree of the pitch cannot of course be proven, but on the basis of vernacular traditions using thatch this is a reasonable working assumption. The rafters extend from the top of the 'veranda' posts in a straight line to the ridge. Given indications of a doorway in the southern flank, Coulton defines the minimum height of these posts to be 1.50 m,

[1] The main roof-supporting posts are referred to by the excavators as C1–C11. While only the imprint of the lower diameter of seven posts remained in the ground, the remaining four are reconstructed accordingly (Coulton 1993, 41, 63).

Post No.	**C1**	**C2**	**C3**	**C4**	**C5**	**C10**	**C11**
Ø (metres)	0.20	0.20–0.25	0.22	0.18	0.22	0.23	0.25 (E–W) × 0.24 (N–S)*

*The figures given for C11 represent its actual dimensions, equating to a diameter of *c.*0.25 m, as stated in the text.

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

enough so that people could 'pass under the eaves' (Coulton 1993, 45). The pitch of 45° dictated that the mud-brick topping of the wall should reach about 4 m in height to meet the roofline (Fig. 4). Yet it seems a little optimistic for a mud-brick wall that lacks any lateral support over a length of approximately 22 m to rise to a height of 4 m, given a width at the bottom, above the stone socle, of 0.5 m. As improbable as this seems, the critical structural issue for the height of the building concerns the wooden posts of the spine. By following the slope of the roof the main posts bearing the ridge must have had a height above the ground of 8.40 m (Coulton 1993, 41). Since these posts extended into pits approximately 1.40 m deep, their total length must have been about 9.80 m (Coulton 1993, 46 and table 1).

The problem with the spine

Statical calculations to aid architects and engineers in practice were certainly not employed in antiquity, but they can be of service today as a way of checking structural viability. In a manner not dissimilar to their application in contemporary design, calculations can yield guidelines for the size and proportions of architectural members (Herdt *et al.* 2014). Based on the pitch and the materials used, the weight of the roof can be estimated; calculation can then define the minimum diameter needed for wooden supports to support the load imposed. Following Coulton's suggestion of a pitch of 45° indicates that a minimum diameter of 0.12 m is required for the post in order to be able to bear the roof.[2] Apart from their capacity to bear load in compression, the supports should also be tested for their resistance to buckling, and it is in fact this that shows that the diameter at the middle of the posts should not fall below 0.12 m.[3] The resistance to buckling depends significantly on the length of the supports, and a longer post has naturally a greater risk of failing than a shorter one. A further factor which has to be considered is wind; however, it is safe to assume for this construction that the horizontal load from wind would be carried entirely by the walls.[4] As mentioned earlier, thanks to the careful excavation of the pits, the diameter at the bottom of the supports is evidenced as ranging from 0.18 to 0.25 m, thus significantly limiting the proportions of the material available for construction.

A building of this period would presumably use trees that grew in nearby forests.[5] Following delivery to the site, the trunks were then stripped of their bark and placed into foundation pits, with soil backfilled so as to hold them in position until the building was completed. Coulton's reconstruction envisages the supports at the spine reaching nearly 10 m in height; we should bear in mind that they would taper and yet need to exceed the structurally appropriate minimum diameter at the top. Finding trees with an upper diameter of 0.12 m or more is certainly possible with a lower diameter of 0.25 m; however, given the natural taper associated with tree trunks this seems hardly possible for a support with a lower diameter of just 0.18 m, the size attested for post

[2] Each support of the spine carries approximately 15 square metres of thatched roof in plan. Following contemporary weight estimations for thatch (0.7 kN/m²), and assuming the angle of the roof to be set to 45°, produces a load for each support of approximately 2 tons, or 21 kN. Circular elements of timber require a minimal diameter of approximately 0.12 m to resist such a load. The angle of 45° for the roof is an estimate; in fact, it is very shallow for thatch, and an increase of the angle affects the load implied on the posts significantly. I would like to thank Prof. Richard Harris (University of Bath) for his help and expertise in executing the calculations.

[3] In order to assess this sensitivity, the structure is tested according to the Euler buckling capacity:

$$P_{euler} = \pi^2 EI \Big/ l_{eff^2}$$

In view of the small diameter of post C4 it is safe to assume that the tree used was young. The value used for E is therefore a C16 grade of 8000 N/mm².

[4] The spinal posts are placed into deep foundation pits to secure their stability. Any wooden component of this length would bend if exposed to wind; therefore the force is transmitted to the walls, which have to be able to resist.

[5] The taper of trees varies depending on their surroundings. When they grow solitarily, trees tend to taper in a stronger manner than when growing in a forest (Eissing 2011, 1–16). Farming trees specifically for the purposes of construction, which allows for even more slender proportions, is a relatively modern concept.

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

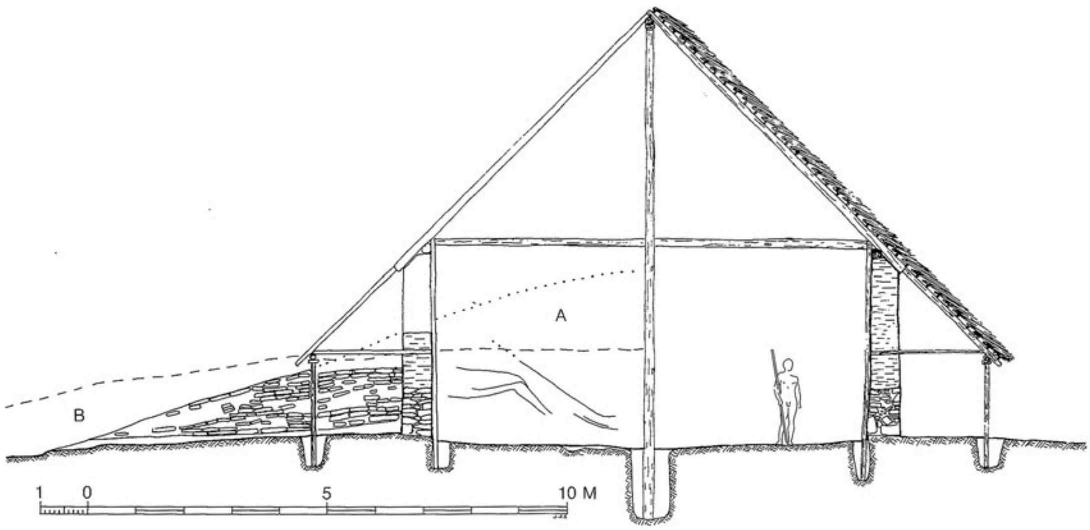

Fig. 4. Section through the building according to Coulton, with a human scale added by the author.

C4.[6] This tree must have grown perfectly straight to offer a margin for safety or for balancing growth irregularities. The existence of such a tree in a warm climate such as the Greek island of Euboea is unlikely, but a tree matching the required characteristics might have been imported. Whether such an expensive enterprise is appropriate for its time and cultural context is questionable and it seems more probable to presume the use of local materials. Taking these factors into account suggests a lower height for the ridge supports, and therefore for the building as a whole.

An alternative reconstruction

In fact, not only does a height of approximately 7.50 m for the central supports (of which 6 m remain above ground level) increase the stability of the posts, but due to the lower walls the resistance to wind pressure is also significantly higher.[7] Moreover, trees that range between 0.18 and 0.25 m at the bottom are more likely to reach a structurally appropriate diameter at the top.[8] Maintaining Coulton's suggested pitch of 45° reduces the wall height to 1.40 or 1.30 m depending on the ground level. This has implications for the whole design of the building. Extending the rafters as far as the 'veranda' becomes geometrically impossible, so the reconstruction proposed here instead terminates the rafters on top of the walls (Fig. 5). Consequently, the interpretation of the outer posts in terms of a circuit of roof supports becomes problematic.

The building that stood at the site must have had a lower height than previously proposed; however, this does not necessarily result in the abolition of the 'veranda'. This special feature could still have been included, either as a horizontal construction or with a very shallow pitch. In any event the structural need for the wall posts remains open to debate. Coulton concludes that the inner-wall posts were needed 'to stabilise the veranda' via a horizontal link (Coulton

6 All the posts needed for the spine require a length of approximately 10 m. The most structurally challenging position is the post of extreme slenderness (C4) with the documented diameter of 0.18 m at the bottom.

7 The resistance against buckling of a post with 7.5 m length is almost doubled if compared to a post with a length of 10 m.

8 Due to the lower height of the building the tree needed is able to taper within reason. According to the characteristics of post C4, an approximately 7.5 m-long tree would need a taper of 0.8 cm/m rising, instead of 0.6 cm/m for a tree of approximately 10 m length. This brief calculation showing the taper needed is a theoretical construct as it considers a perfectly vertical wooden member without a tolerance for imperfection and growth irregularities. In fact, an overall increase of the diameter is advised, but this action would result in an even more slender ratio. In general the smaller the taper of a tree, the less likely the availability.

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

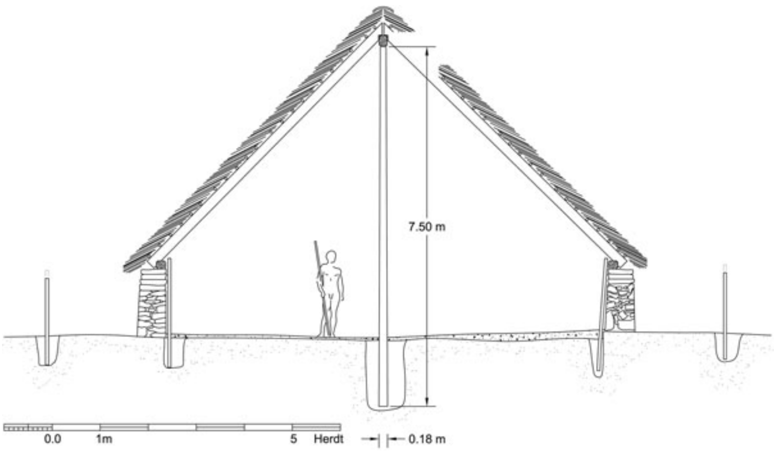

Fig. 5. Section through the building at the position of support C4 of the lowest height possible.

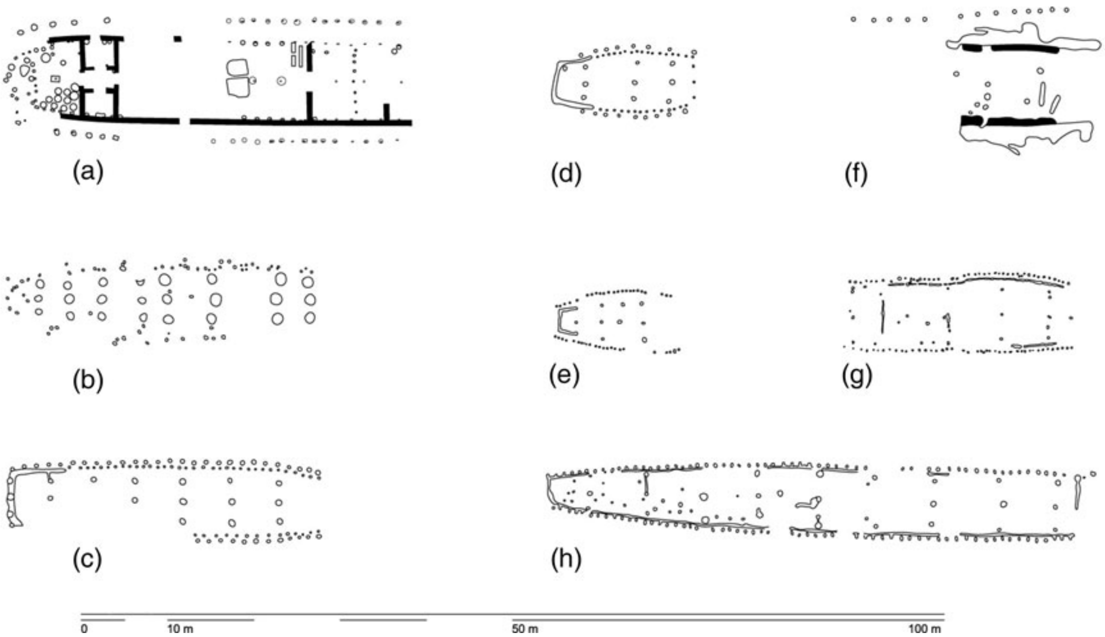

Fig. 6. The plan of the building at Lefkandi (a) as compared to a variety of European Longhouses. (b) Missy-sur-Aisne; (c) Zwenkau-Harth; (d) Zwenkau-Harth; (e) Hienheim; (f) Enkingen; (g) Wolfenbüttel; (h) Bochum-Hiltrop. Of note is the apsidal end of 6*b* (Missy-sur-Aisne) and the row of fence posts at 6*f* (Enkingen).

1993, 47). This would have been effected by wooden members connecting the posts on the inside of the wall with those of the exterior. Yet arguably the wall would have stabilised the external posts and the 'veranda', thus making the inner-wall posts effectively unnecessary. Aware of the structural difficulty imposed, he offered another two alternatives for the purpose of the inner-wall posts: either to 'increase the stability of the walls' (though he questions whether that would be needed for a wall of the documented dimensions), or to 'stabilise the wall plate and prevent it from being pushed outwards' (Coulton 1993, 47). Neither solution requires the rows of posts to be connected structurally and therefore does not necessitate the presence of the 'veranda'; in

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

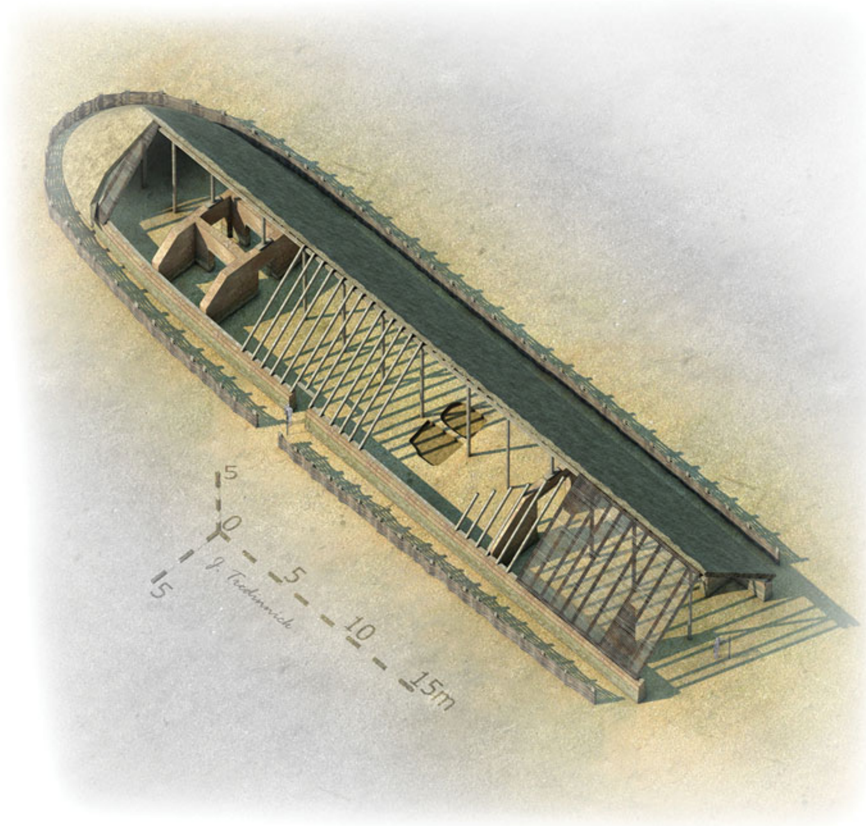

Fig. 7. Alternative reconstruction of the Toumba building showing a fence instead of a 'veranda'.

consequence, Coulton suggested that the pits on the outside could also be envisaged as supports for a fence. As he goes on to say, it is only due to the similarity of the spacing of the outer and inner row of pits that it is suggested both were built at the same time and for the same structure (Coulton 1993, 45).

A building of elongated design formed by (or surrounded by) a row of posts (or postholes) is a recurring phenomenon, and similar solutions can be found over a wide chronological and geographical range. Buildings of this type can be identified in many locations across Europe, and due to their shape are generally referred to as 'Longhouses' (Bogucki and Grygiel 1993, Hampel 1989, Lüning 1982, 2009, 2012). A general problem with Longhouses is that they are not well preserved, due to the perishable materials used, and typically only a series of postholes survive. Their existence may be consistent both with wooden supports for the roofs and with the structural elements of walls, constituted of wattle and daub (Fig. 6*e*). Some Longhouses show more than one row of postholes (not unlike the situation at Toumba). One interpretation for this phenomenon is that the wall is placed between both rows of pits, with the posts originally retaining it (Fig. 6*b*,*c*). This applies only if the rows are not too far apart, compatible with the width of the wall. Otherwise an outer row of postholes could receive a fence.[9] A fence is also a possibility for buildings that display an outer row of postholes and, instead of a second, an elongated pit forming the wall's foundation (Fig. 6*f*–*h*).[10] The point of the present contribution is not to inscribe the Toumba building firmly in the typology of the Longhouse, given the lack

[9] In some cases the pits for the outer row of postholes are not as deep as for the inner. This indicates a difference in their structural purpose, namely that the outer row received less weight than the other (Hampel 1989, 8).

[10] Fig. 6*f* (Enkingen) is especially noteworthy: the remains of the elongated building show that the solid walls are flanked by an array of circular (?) postholes which then are part of a fence. Lüning 1987, 33.

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

of knowledge of this tradition in Greece around 1000 BC. Yet the possibility is worthy of consideration that it had more in common with this kind of structure than with a putative lineage of early Greek temples with proto-peristyles.

CONCLUSION

Structural calculations indicate that the capability of the wooden posts along the spine of the Toumba building is not consistent with a tall structure. The diameter of post C4 in particular, and to a lesser extent the width of the mud-brick walls, leads to a reconstruction with a lower and narrower roof. As a consequence, a simple linear roof could not have included the 'veranda' as previously assumed. Perhaps another kind of perimeter ambulatory could be envisaged with a much lower roof pitch, though this is pure conjecture and without parallel. Alternatively, the building was surrounded by a fence that delineated the perimeter (Fig. 7). As long as this building remains as unique in its time and place as the current state of knowledge suggests, there can be no certainty, just a balance of probabilities. At the very least there must now pertain a lower probability that the Toumba building was a predecessor of the Greek temple with *peristasis*. The origin of the monumental and ornamental colonnades used for Greek temples centuries later remains to be found.

ACKNOWLEDGEMENTS

I thank Richard Harris, Mark Wilson Jones, Paul Shepherd, Paul Richens and John Tredinnick for their time and advice in discussing the structural matters. I am also indebted to J.J. Coulton for cordial exchanges on the subject.

Georg.Herdt@classics.ox.ac.uk

REFERENCES

Bogucki, P. and Grygiel, R. 1993. 'First farmers of central Europe: A survey article', *Journal of Field Archaeology* 20.4, 399–426.

Coulton, J.J. 1988. 'Post holes and post bases', *Mediterranean Archaeology* 1, 58–65.

Coulton, J.J. 1993. 'Section 4: The Toumba building: Description and analysis of the architecture', in Popham *et al.* (eds.) 1993, 33–70.

Eissing, T. 2011. 'Eignung und Verwendung von Hölzern als Bauholz: Behandlung und Lagerung, Transport' in Kienlin, A. v. (ed.), *Holztragwerke der Antike* (Byzaz 11; Istanbul), 1–16.

Gruben, G. 2001. *Griechische Tempel und Heiligtümer* (Munich).

Hampel, A. 1989. *Die Hausentwicklung im Mittelneolithikum Zentraleuropas* (Bonn).

Herdt, G., Erkal, A., D'Ayala, D. and Wilson Jones, M. 2014. 'Structural assessment of ancient building components, the temple of Artemis at Corfu', in Earl, G., Sly, T., Chrysanthi, A., Murrieta-Flores, P., Papadopoulos, C., Romanowska, I. and Wheatley, D. (eds), *Archaeology in the Digital Era Volume II, e-papers from the 40th Conference on Computer Applications and Quantitative Methods in Archaeology; Southampton, 26–30 March 2012* (Amsterdam) 130–7.

Kistler, E. and Ulf, C. 2005. 'Athenische 'Big Men' – ein 'Chief' in Lefkandi?', in Brandt, B., Gassner, V. and Ladstätter, S. (eds.), *Synergia. Festschrift Friedrich Krinzinger* (Vienna), 271–7.

Lippolis, E., Livadiotti, M. and Rocco, G. 2007. *Architettura greca: storia e monumenti del mondo della polis dale origini al V secolo* (Milan).

Lüning, J. 1982. 'Siedlung und Siedlungslandschaft in bandkeramischer und Roessener Zeit', *Offa* 39, 9–33.

Lüning, J. 1987. 'Ausgrabungen zur ältesten Bandkeramik im Nördlinger Ries, Schwaben', *Das Archäologische Jahr in Bayern* 1987, 32–4.

Lüning, J. 2009. 'Bandkeramische Kultanlagen', in Zeeb-Lanz, A. (ed.), *Krisen-Kulturwandel-Kontinuitäten. Zum Ende der Baukeramik in Mitteleuropa. Beiträge der Internationalen Tagung in Herxheim bei Landau* (Rahden), 129–90.

Lüning, J. 2012. 'Bandkeramische Hofplätze und Erbregeln', in Kienlin, T. L. and Zimmermann, A. (eds.), *Beyond Elites: Alternatives to Hierarchical*

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press

Systems in Modelling Social Formations. International Conference at the Ruhr-Universität Bochum, Germany, October 22–24 (Bonn), 197–201.
Pakkanen, J. and P. 2000. 'The Toumba building at Lefkandi. Some methodological reflections on its plan and function', *Annual of the British School at Athens* 95, 239–52.
Popham, M.R., Calligas, P.G., Sackett, L.H, Coulton, J. and Catling, H.W. 1993. *Lefkandi II. The Protogeometric Building at Toumba. Part 2: The Excavation, Architecture and Finds* (British School at Athens Supp. Vol. 23; London).
Wilson Jones, M. 2014. *Origins of Classical Architecture* (London and New Haven).

Η αρχιτεκτονική του κτηρίου της Τούμπας στο Λευκαντί

Το κτήριο στην Τούμπα, στο Λευκαντί, είναι μοναδικό εξαιτίας της χρονολόγησης και την τοποθεσίας του. Τα υπολείμματα του μνημείου είναι σημαντικά εξαιτίας του μεγέθους και της περίτεχνης κατασκευής, και επίσης εξαιτίας του τρόπου που έχει ανασυσταθεί και ερμηνευθεί ως προστάδιο του ελληνικού περίπτερου ναού. Πρωταρχικό μέλημα αυτού του άρθρου είναι η δομική αποτίμηση των αρχιτεκτονικών υπολειμμάτων. Η εν λόγω αποτίμηση ίσως αποδειχθεί ότι εμπεριέχει ορισμένες δομικές ελλείψεις, εν μέρει εξαιτίας της σπανιότητας των αρχαιολογικών ενδείξεων που υπόκεινται της γενικώς αποδεκτής ανασύστασης. Κατά τη δομική επαναποτίμηση, πλήθος παραγόντων λαμβάνεται υπ' όψιν, συμπεριλαμβανομένων το επίπεδο τη τεχνολογίας κατά την εποχή της δόμησης, τα χαρακτηριστικά των δομικών υλικών που χρησιμοποιήθηκαν, και τον τρόπο που αυτά τα δομικά υλικά ανταποκρίνονται στις παραμορφώσεις εκ των φορτίων και των δυνάμεων της φύσης. Η απόπειρα συμβιβασμού τέτοιων ποικίλων παραγόντων με τα τεκμηριωμένα υπολείμματα του κτηρίου μας οδηγεί σε μία δεύτερη ανακατασκευή. Ως εκ τούτου, προκύπτει το συμπέρασμα ότι το κτήριο στην Τούμπα δεν είναι πιθανό προστάδιο των ελληνικών περίπτερων ναών, και στο εν λόγω άρθρο προτείνεται μία εναλλακτική λύση που δεν περιλαμβάνει την εμβληματική προ-περίστασιν.

https://doi.org/10.1017/S0068245415000027 Published online by Cambridge University Press