A forest or a jungle of columns? An aspect of architecture in the Kerma and Kushite periods

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Amongst the wide range of building types known in the Middle Nile, dating to the Kerma and Kushite periods, is a small group that share one particular characteristic: a plethora of columnar supports within them. If each of these supported a timber post or column carried up to roof height, the interior spaces provided will have been a 'jungle' for which it is difficult to suggest a function. The posts and columns would be so closely set that even passing through the interior spaces will have been impeded and any practical use of the enclosed spaces would be rendered impossible. In this article the buildings with this characteristic internal layout are described, the interpretation of the architectural features as suggested by their excavators are noted, and an alternative reconstruction of their architecture is offered.

Buildings with multiple columnar supports

Multiple columnar supports within rooms were first noted along the Middle Nile by Francis Llewellyn Griffith during his excavations of the so-called Treasury at Sanam Abu Dom in 1913 (Griffith 1922, 116-117). This building has subsequently been partly re-excavated by Irene Vincentelli, beginning in 2001 (Vincentelli 2001) and this work is ongoing.

The so-called Treasury consisted of two ranges of 17 rooms flanking a central colonnaded courtyard with a further room at its eastern end,[1] the whole building measuring *c.* 267 x 68m in size (Vincentelli 2001, 77; 2011, 270; 2015, 319). According to Griffith each room was 13.4m wide by at least 20.5m in length; Vincentelli noted that on average they were 14 x 21m in size. The building had been much destroyed by erosion but Chambers 6 and 7[2] were partly preserved to a height of 500mm. The best-preserved doorway had a flight of three steps leading up to it, to a height of about 350mm, with a vertical drop from the top step into the room.[3] All walls were of mud brick with columnar supports of sandstone. Internal walls were lined with 100mm thick slabs of white sandstone. Griffith considered that in Chambers 6 and 7, located in the south range of rooms, there had originally been 12 circular stone columns about 800mm in diameter. An additional 64 columns, of much smaller diameter (*c.* 450mm), were added into the building (Figure 1). According to Griffith floors were of mud, possibly sealed by a thin layer of white cement, but

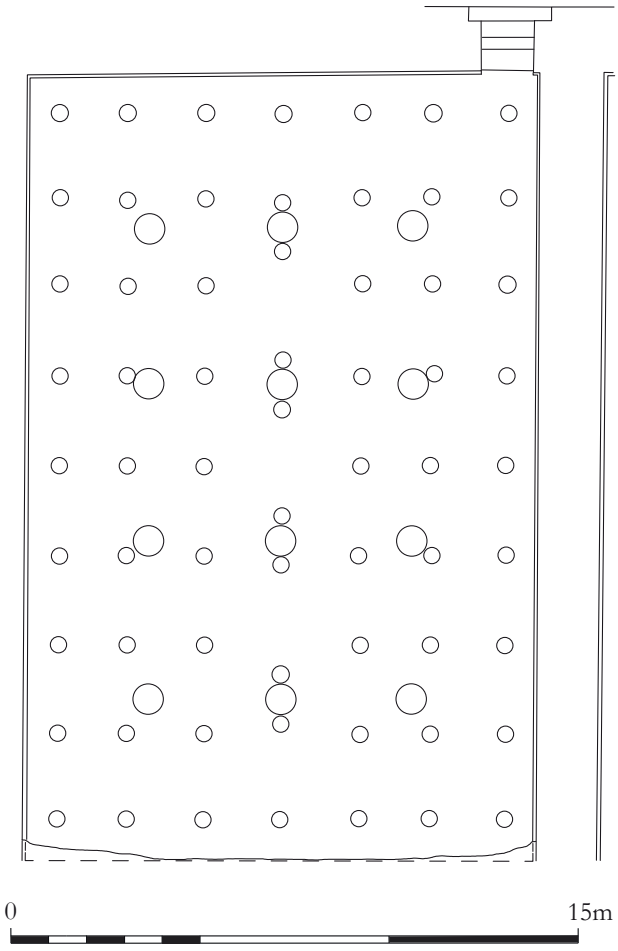

Figure 1. Sanam Abu Dom. Chamber 6 in the Treasury - scale 1:200 (after Griffith 1922, pl. L).

Vincentelli's excavations indicate that floors were of well-laid but irregular sandstone slabs.

Also of interest here is the building immediately to the west of the Treasury, designated SA.C 400, excavated by Vincentelli. In most of its rooms are two rows of columns spaced at intervals of approximately 2.67m centre to centre. One room, however, has many more columns of varying diameters. The two central rows of columns are set 300mm into the floor and are held in position by radiating bricks.

In 1963-64 William Y. Adams excavated the later Meroitic remains on the Island of Meinarti at the Second Cataract. One of the structures within that settlement, which Adams considered to be an administrative building, Building XLVIII, also had multiple columnar supports within it (Adams 2000, 35, fig. 8, pl. 3a). Only the lowermost courses of the outer walls of this building survived, and the inner walls were only represented by their foundations (Plate 1, Figure 2). Adams describes them thus: 'These foundations were of an unusual nature: they were clusters of large and roughly shaped sandstone blocks, set in straight rows at intervals of between 100 and 120cm from one another'. He noted that the groups, of from two to six stones, were equally spaced along both the north-south and east-west axes of the building (Plate 2). The

[1] Another room has recently been discovered at the western end of the building (pers. comm. I. Vincentelli).

[2] Vincentelli's Rooms 106 S and 105 S respectively.

[3] As it appears that, as in the temple (see Howley 2018, 82), Griffith's excavations never penetrated to the original floor level, this drop must have been somewhat in excess of 350mm.

Plate 1. Meinarti - general view across Building XLVIII with the columnar supports visible in the lower centre and right (photo: courtesy SARS Adams Archive).

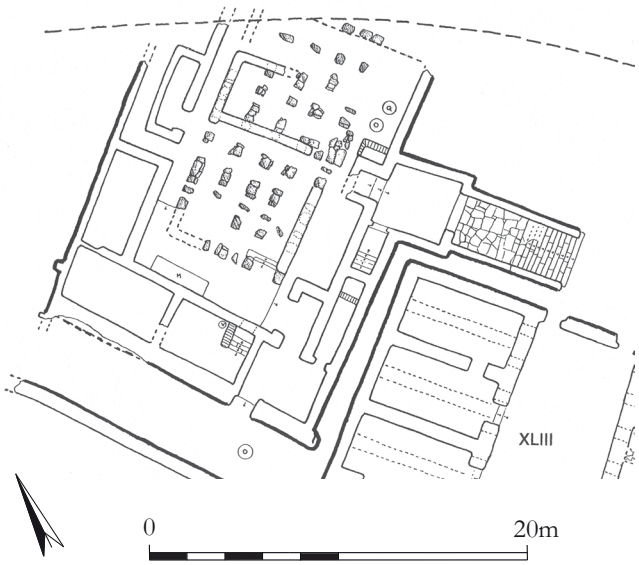

Figure 2. Meinarti - Plan of Building XLVIII - scale 1:400 (after Adams 2000, fig. 10).

Plate 2. Meinarti - detail of the stone clusters in Building XLVIII (photo: courtesy SARS Adams Archive).

flight of steps leading up to the building reached a level above that of the internal floor surface (pers. comm. W. Y. Adams).

In the same winter Jean Vercoutter, excavating within the Egyptian Middle Kingdom fortress at Mirgissa, uncovered the plan of a long, narrow building, the southernmost room of which contained large numbers of columnar supports.[4] The room, measuring approximately 18 x 10m, has five rows of regularly spaced sandstone columns each a frustum approximately 300mm high, their bases set 40mm below the surface of the mud-brick paved floor. Most of the columns have an upper diameter of 300-350mm but, in the second and fourth rows, alternate columns are larger, 640-750mm in diameter at the top (Gratien *et al.* in press).

Most recently the excavations directed by Charles Bonnet at Dokki Gel have uncovered the remains of very substantial buildings with vast numbers of columnar supports within. The largest of those investigated so far has been called Palace A. It is a massive oval building 55 x 46m in size with mud-brick walls 4m thick and entered by two doorways flanked by towers. Within are an estimated 1,400 columns, each around 800mm in diameter and with foundations 1m-1.5m deep (Bonnet 2015, 2-3; Bonnet pers. comm.). The columns are spaced approximately 900mm apart centre-to-centre. Internally, there was apparently a central corridor running from the western entrance with two corridors running north from it, with what is interpreted as a raised dais for a throne at their northern ends against the inner face of the building's external wall.

Interpretations of the observed structural features

The plethora of columnar supports within these buildings has been cause for comment.

Sanam Abu Dom – Griffith thought that the 64 smaller-diameter columns in Chambers 6 and 7 had been added into the building when it became evident to the Kushites that the original columns were insufficient for the load they had to carry, the ceiling of wooden beams supporting a layer of mud bricks (Griffith 1922, 116-117; Vincentelli 2015, 320). Vincentelli suggests that the columns, being of different diameters and, therefore, probably of different heights, may have supported a roof on different levels, to allow for clearstory lighting, or more likely that the small columns supported shelving for storage (Vincentelli 2015, 320). Her comment 'The sheer number of columns would have prevented any kind of activity within the rooms' (Vincentelli 2015, 321) is particularly pertinent in the context of this paper.

In Building SA.C 400 in the room with multiple rows of columns, Vincentelli suggested that the columns surrounded by the brick foundations alone were the load-bearing supports for the roof, the other columns simply set into the

[4] This building is only now being brought to publication and the author is extremely grateful to Brigitte Gratien for drawing his attention to it and providing details of its plan and construction.

floor neither attaining much height nor being load bearing (Vincentelli 2015, 322).

Meinarti – Adams suggested that the groups of stones may well have supported columns rather than walls although he does note that elsewhere in the building similar groups of stones were overlain by walls. That these walls may be additions to the original structure was not considered.

Dokki Gel – Bonnet has suggested that each of the internal supports, in Palace A and other buildings of its type, was a mud-brick column carried up to roof level and has sought to understand the function of the internal spaces to fit in with this interpretation. He assumes that these buildings had a ceremonial function and notes that the only parallels available come from the recent past where a profusion of internal roof supports is sometimes termed 'sacred forest'. He suggests that this design 'might be due to the architects desire to give his monuments a symbolic meaning by adding several hundreds of supports' with reference to the Kasubi Tombs in Uganda (Bonnet 2018, 67).

In all the cases noted above the buildings and the columnar supports only survived to a very limited degrees above the original ground surface. All interpretations of the upper parts of these buildings are thus conjecture, with no conclusive evidence either for, or against, the interpretations offered. They are based on the assumption that the interpretation offered is either the only one which can be entertained or, at the very least, is the most probable.

Given that this is the case, in this paper an alternative interpretation is offered for a number of these buildings which, at least in its favour, draws on some contemporary evidence to offer what is an equally valid, and the author would suggest a rather more plausible, interpretation of these buildings. It remains to be seen whether in the future any form of evidence to support one interpretation over another can be found.

Kerma period store buildings in the Northern Dongola Reach

From 1993 to 1997, during the Sudan Archaeological Research Society's survey on the eastern bank of the Nile in the Northern Dongola Reach, a large number of structures dating to the Kerma period were observed containing multiple columnar supports within them (Figure 3), formed of closely-spaced rows of stone blocks (Welsby 2001, 577, 581, fig. 14.3).

The largest of these was designated Site P4. First noticed in passing by Charles Bonnet, who published a photograph of it in 1990 (Bonnet 1990, 21, pl. 13), it was totally excavated by the SARS team in 1997 (Plate 3). The building was roughly square, 10.8-11.06m north-south by probably 11m east-west – the eastern wall has been undermined by wind erosion and has collapsed down the slope. The external walls were of large and irregular ferruginous sandstone blocks with smaller blocks filling the interstices. No traces of mud mortar remained. The walls were only one block thick, survived to a

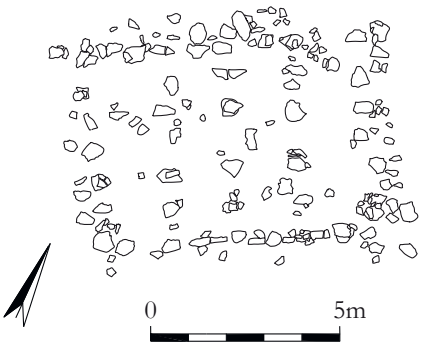

Figure 3. Site P5 - building with three rows of stones internally - scale 1:200 (after Welsby 2001, fig. 3.78).

Plate 3. Site P4 - general view during excavation looking south (photo: courtesy SARS NDRS Archive).

maximum height of three 'courses', and presumably formed a socle for the superstructure of mud brick, *jalous*, wattle and daub or timber. No evidence for the location of doorways remained. Internally there were seven rows of stones, each row on average 1.2m apart. Within each row the spacing of stones was irregular. Most of the stones were ferruginous sandstone but with some of white sandstone. An attempt had clearly been made to form a level surface for the top of the stones in each row, approximately 300mm above the ground surface, with up to three stones of varying sizes being used to attain this (Plate 4) (Welsby 2001, 203-205).

When first investigated, the excavator suggested that many of the supports were designed to support a raised floor of timber, there being many more blocks than would be needed

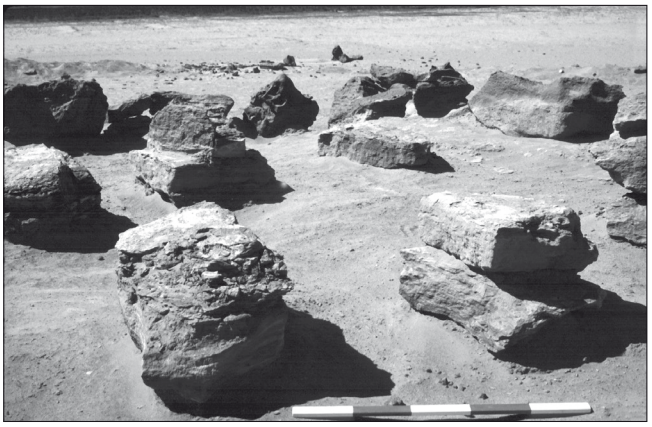

Plate 4. Site P4 - detail of the internal rows of stones (photo: courtesy SARS NDRS Archive).

as post-pads to support columnar roof supports (Welsby 1997, 8; 2001, 581), a suggestion which found little support at the time.

This interpretation was, however, confirmed some years later during excavations of the Kerma period settlement at Gism el-Arba 2, lying 42km to the north-north west of Site P4 (Gratien *et al.* 2003; Marchi 2017). In that settlement 11 buildings of the same type as that at Site P4 were excavated, ranging in size from approximately 2.1m square (Str. 158) to 4.8-4.3 x 6m (Str. 2). The building designated Str. 85 was particularly well preserved. It had two rows of stones internally which, according to the excavators, were designed to support a floor raised *c.* 400mm above the ground surface, the floor resting on a wooden frame and made up of planks, logs or half-logs. Traces of some of these timbers remained, confirming this interpretation of the structural arrangements observed. The stone threshold in the doorway was higher than the floor of the 'basement' as one would expect. It was suggested that the walls, resting on the stone socle, were probably timber-framed wattle and daub construction with a timber roof. From the collapsed remains of Str. 157 it was suggested that the walls attained a height of not more than 3m.

The evidence from Gism el-Arba and Site P4 indicates that in the Kerma period buildings were constructed with raised timber floors supported on post-pads constructed of stone.[5] At Site P4 the post-pads attained a height of 300mm, at Gism el-Arba 400mm. On these would had been placed the timber joists supporting the floor boards. The building at Site P4 was a substantial structure measuring internally *c.* 10.5 x 10m. That is too great a space to have been spanned by unsupported roof timbers, so it follows that some of the columnar supports not only were overlain by floor joists but also supported vertical timber posts. How many posts were required is uncertain but an estimate can be made by looking at other contemporary buildings. At Kerma Bonnet noted that in early buildings the roof spans were around 3m while in later buildings this had increased to about 5m: '*Le tout était recouvert par une couche plus ou moins épaisse de terre argileuse d'un poids certain, ce qui limitait la portée á environ 3 m pour les batiments ancien et 5 m pour les plus récents. La longueur des poutres* étant *relativement modeste, une rangée de supports alignés dans l'axe permettait d'élargir les pièces*.' (Bonnet 2014, 14). In many buildings excavated in the town posts were inserted to support roofs, the maximum unsupported span being frequently in the range of 3.1-3.25m.[6] Taking 3.25m as a typical length for an unsupported roof beam during the *Kerma Classique* one might suggest that in the building at P4 there were nine roof supports and Figure 4 provides a reconstruction of what the interior of the building may have looked like in plan. In Figure 5 a hypothetical reconstruction of the building is offered. It is clear that in the region to the south of Kerma there were considerable numbers of buildings with raised floors, in the settlements designated M12 and M13 (Plate 5), 5km and 6.3km to the south of P4, there may have been 16 and 18 buildings of this type (Welsby 2001, 94, 96, figs 3.60 and 3.61).

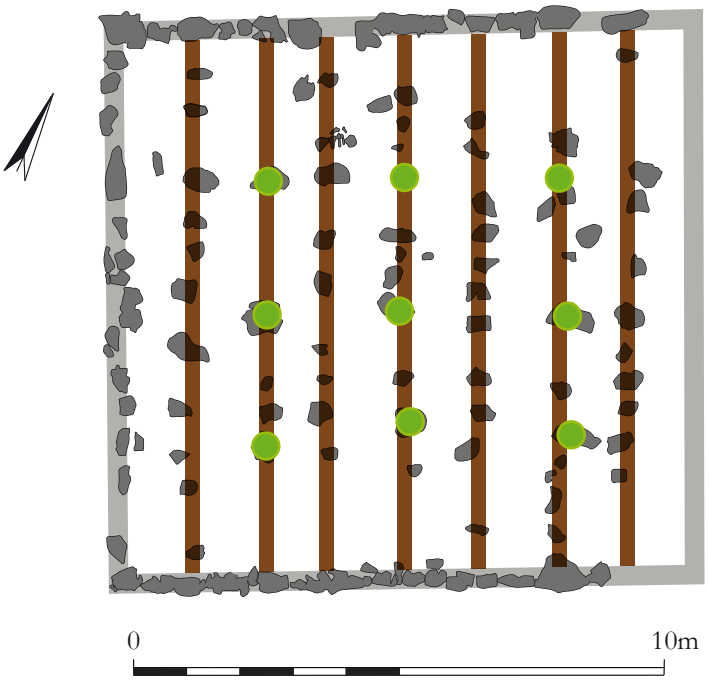

Figure 4. Site P4 – plan of the remains with a suggested reconstruction of the raised floor timbers and location of the timber posts supporting the roof - scale 1:150.

A raised floor offers significant advantages when storing perishable goods, such as agricultural produce, which are particularly at risk from damage from dampness and from attack by insects and animals, especially rodents. The provision of a raised floor to mitigate these problems was used in a number of periods and is still employed today in Sudan as, for example, in the granary shown in Plate 6 in the Nuba Mountains and the placing of sacks of beans on branches supported on stone blocks, in the hamlet of ed-Doma at the Fourth Cataract (Plate 7). Very similar structural solutions to what we can observe in the Kerma buildings are found in the Roman period where granaries in forts had floors

Plate 5. The Kerma settlement, site M13, on the right bank of the Alfreda Nile palaeochannel. The remains of the many store buildings can be clearly seen (photo: courtesy SARS Welsby Archive).

[5] For undated structures with similar architectural features in Kordofan see Gratien 2013, pls 68a, 70c and 83a; in the Fourth Cataract MDASP Type RF01 see Borcowski and Welsby 2012, 26 and pl. 314.
[6] Data derived from the plans published in Bonnet 2014.

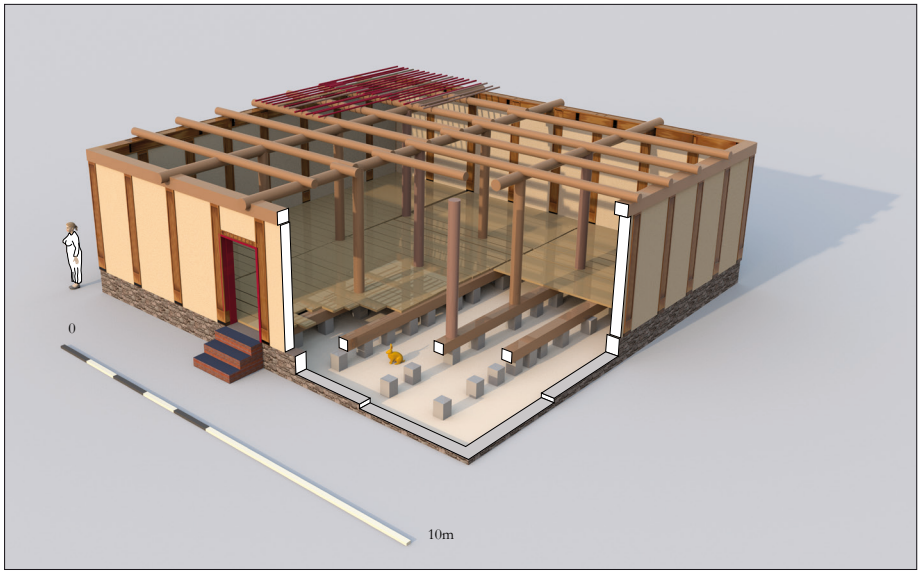

Figure 5. Site P4 - hypothetical reconstruction of the building with its raised floor and timber framed construction.

either raised on low sleeper walls or on individual stone pillars as the example in the fort at Housesteads on Hadrian's Wall in Britain illustrated in Plate 8.[7]

In light of the evidence from the Kerma period buildings in the Northern Dongola Reach, a re-interpretation of the storage buildings at Sanam Abu Dom is possible with a considerable degree of confidence. Taking Griffith's Chambers 6 and 7 in the Treasury, the presence of the 64 smaller diameter columns and, in particular, the curious

Plate 6. A granary with raised floor in the Nuba Mountains photographed in 1986 (photo: courtesy SARS Welsby Archive).

Plate 7. Storage of sacks of beans on raised timbers supported on stone blocks at ed-Doma, photographed in 2005 (photo: I. Welsby Sjöström).

Plate 8. A granary with raised floor supports of stone in the Roman fort at Housesteads on Hadrian's Wall built in the early 2nd century AD.

[7] Although raised floors offer advantages for the storage of goods they may also have been used in other buildings where it was deemed desirable to have the internal floor level well above ground level. This may have been the case, for example, in the so-called administrative building at Meinarti. Another building, with a raised floor supported on vaults, is known elsewhere in the settlement. Adams suggested that this was a market compound but on the evidence found it could equally well be a storage facility (see Adams 2000, 36).

arrangement of pairs of small columns abutting the large columns on each room's central axis, makes perfect sense as supports for the horizontal timber girders of a raised floor as reconstructed in Figures 6-8. In all the chambers investigated to date in the Treasury there is (what appears at first sight to be) an odd arrangement of two small columnar supports immediately adjacent to each of the larger diameter columns along the central axis. If the smaller columns are to aid the load-bearing main columns their placement immediately adjacent to them is curious as is the fact that it is only the columns along the central axis that are 'strengthened' in this way. With the provision of a raised floor it appears that the Kushite builders sought to have one girder down the central long axis of each room. These could not be set into sockets cut into the columns without seriously weakening them. Hence the small columns were placed to support the ends of the girders against the face of the main columns. The north-south girders were spaced at intervals of approximately 1.8m and 2.07m and it is, therefore, likely that east-west joists were laid over these, set closer together, to support the wooden flooring as shown in the reconstruction drawings.

That such a raised floor existed is proved by an observation made by Griffith himself who noted that 'Each [chamber] was provided with a doorway in the spinal wall, W. 125 [cm], the best preserved showing three shallow steps up on to it

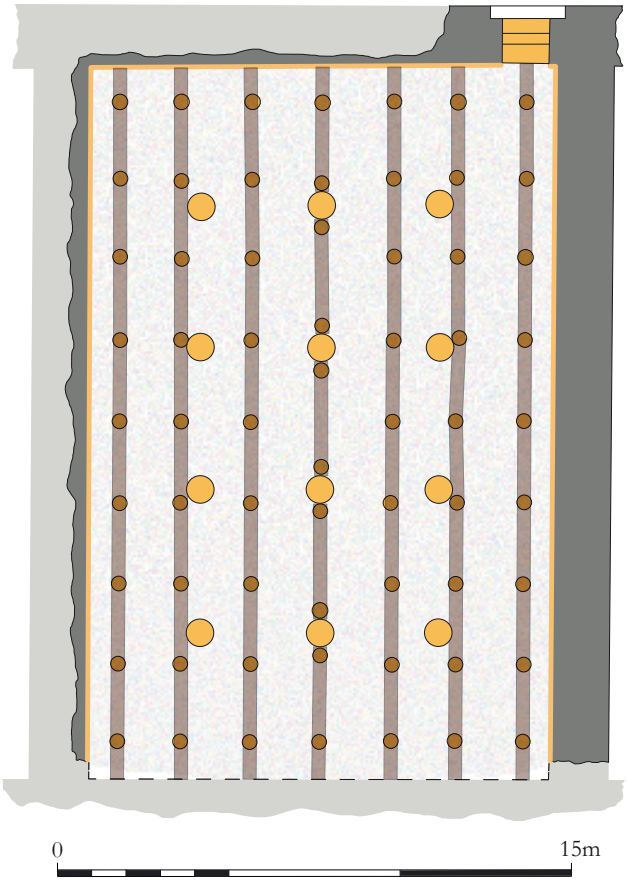

Figure 6. Sanam Abu Dom. Chamber 6 in the Treasury, suggested arrangement of timber girders to support the joists of the raised floor - scale 1:200 (base plan: after Griffith 1922, pl. L).

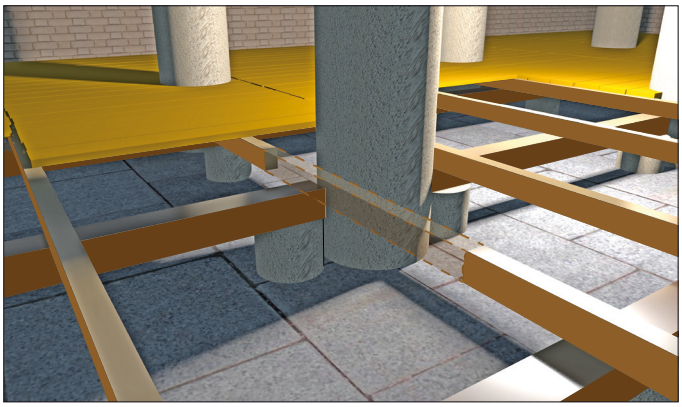

Figure 7. Sanam Abu Dom. Chamber 6 in the Treasury, hypothetical arrangement of girders resting on the dwarf columns, the joists and floorboards, with detail of the relationship adjacent to the central row of roof-supporting columns.

……. These stairs rose to about 35 [cm], apparently with a clean drop on the other side into the corresponding northern chamber (but this needs verification).' (Griffith 1922, 116).[8] Clearly the stairs gave access up from the courtyard to the raised floor inside the chamber at a height of at least 350mm above the ground surface within. The high quality construction of this building is reflected in the provision of a stone paving to the sub-floor and the revetting of the interior walls in stone, to further protect the chamber from the ingress of pests. The large columns will have supported the roof, limiting the span of the beams to about 3.5m. A slightly shorter span is to be found in SA.C 400, while at Kawa in the early Kushite store, Building F1, rooms 3.2m wide were spanned by timbers set in the walls while rooms 4.1m wide had central roof supports added.

Little can be said of the building at Meinarti which, after initially being identified as a temple, was then identified as perhaps an administrative building. Adams did note 'Moreover in at least some cases the spaces between the stone block groups had been bridged across with unshaped timbers, of which only the charred remains were preserved' (Adams 2000, 35). Here again we have evidence for the timber beams supporting a raised floor. As in the Treasury at Sanam the steps into the building are designed to give access onto the raised floor.

Given that in the buildings discussed in detail above, in the Northern Dongola Reach, at Gism el-Arba, at Sanam Abu Dom and at Meinarti, multiple internal supports appear to be connected with raised timber floors, what of the evidence from Kerma, more particularly from Dokki Gel?

It is noteworthy that while there are innumerable buildings which can reasonably be identified as store rooms throughout the hinterland of Kerma to the south of the metropolis, no

[8] Professor Vincentelli has raised a number of issues resulting from her investigation of the Treasury which, while not categorically disproving this suggestion, require careful consideration. These will be discussed in detail by her in the final publication of the excavations, which is in preparation.

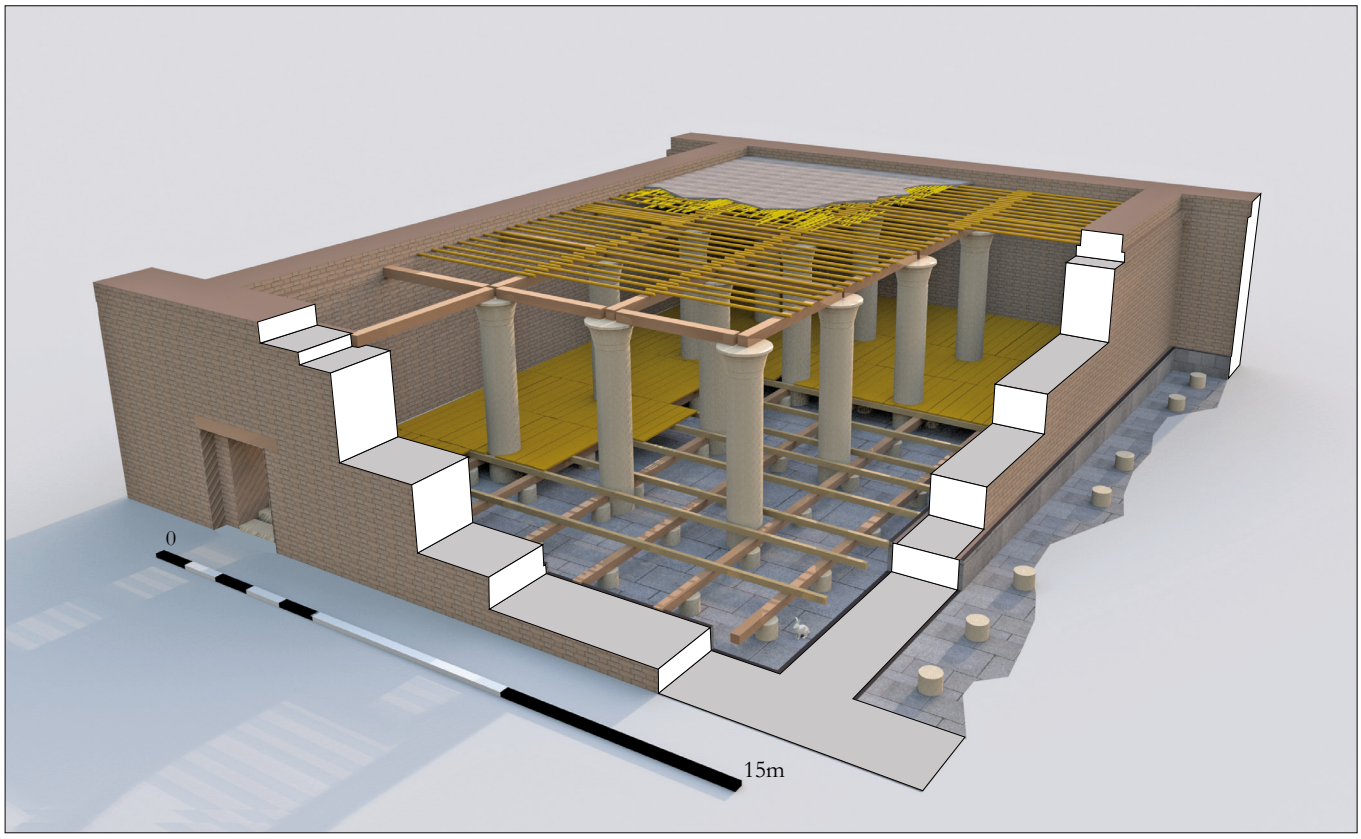

Figure 8. Sanam Abu Dom. Chamber 6 in the Treasury, hypothetical reconstruction of the room.

buildings of identical construction are known at Kerma. One multi-roomed structure, Building M281, has been identified as a magazine; it is a rectilinear mud building dating late in the Kerma period and thought to be associated with the western gateway giving access to and from the city (Bonnet 2014, 125-6). At Kerma storage facilities for agricultural produce at all periods appear to be circular in plan (for a detailed discussion see Marchi 2017).

At Dokki Gel, as noted above, many massive buildings have been discovered, the characteristic feature of which is the vast number of internal columnar supports. If each of these columns were roof supports then this raises significant issues as to how the internal space may have been used. Each columnar support is about 800mm in diameter and is set about 900mm apart centre-to-centre from its neighbour. Carried to roof height as columns, visibility in the building would be reduced to a matter of metres. The excavator is firmly of the opinion that, as at least those columnar supports investigated in detail have very deep foundations, they must have been carried up to roof level forming what would indeed be a 'jungle of columns'. He suggests that this type of building conforms to an entirely different architectural tradition to that found along the Middle Nile either before or after the *Kerma Classique* period. A detailed publication of these buildings at Dokki Gel is underway and will provide an in-depth discussion of this unusual architecture and reconstructions of the buildings of this type.

Leaving Dokki Gel aside, multiple square, rectangular or circular supports set close together within buildings dating to the Kerma and Kushite periods, and perhaps also of Pharaonic date, are in some cases proven to be associated with raised timber floors. Whether all buildings with this architectural feature had floors of this type remains an attractive, but all too frequently, owing to the vagaries of preservation, an unproven and unprovable hypothesis.

Acknowledgements

I would particularly like to thank Dr Brigitte Gratien for her comments on this paper and bringing to my attention the unpublished building at Mirgissa, also the late Prof. William Y. Adams for comments on Meinarti and Dr Jeffrey Spencer who provided information on relevant Egyptian architectural practices.

Professors Charles Bonnet and Irene Vincentelli made a number of valuable comments on an earlier draft of this article and drew the author's attention to problematic issues some of which remain unresolved.

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