

TRADITIONAL BUILDING TECHNIQUES OF THE HELLENISTIC PERIOD IN THE Khabur Valley, Syria: The Cases of Tell Halaf and Tell Beydar

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Abstract

The present paper aims to provide an overview of the building materials and techniques employed by the communities that settled in Khabur Valley, Syria during the Hellenistic period. The research was conducted under the recently established collaboration between the Tell Beydar Archeological Project and Syro-German Excavations at Tell Halaf. It focuses on a region in the dry plains of Northern Mesopotamia that reveals how the local communities, facing scarce natural resources, were able to adapt to the strict environmental setting while relying exclusively on earthen architecture. Construction shows the use of both rammed-earth and adobe, either together in different parts of the same building, or independently and related to specific functions. Finally, the analysis of the building techniques of this region could shed some light on the degree of interplay between the local and Hellenistic influences.

1. INTRODUCTION

Tell Halaf and Tell Beydar are situated in northeastern Syria at the headwaters of the Khabur River, in the northern part of Mesopotamia. Tell Beydar, mostly known as a reference for studies of the 3rd millennium BC, due to the presence of a large fortified city with several temples, palaces and the oldest written texts of northern Mesopotamia. It is also the site where a significant community was established during the Hellenistic period. Recent archeological campaigns have exposed a great variety of buildings, ranging from a complex palatial structure, revealing careful planning and high construction standards inspired in the ancient Mesopotamian tradition, to small and perishable architectural units that seem to have been improvised and poorly maintained (Lopes, Cabral, Tomé, Vaz, and Costa, 2011).

Tell Halaf is one of the oldest settlements in northern Mesopotamia, with occupation levels of the Neolithic Period (6th-5th millennium BC), the Iron Age (1st millennium BC) and the Hellenistic period (3rd-1st century BC). The site gained prominence with the appearance of a large number of sculptures that decorated the palace of the Aramaean prince Kapara (ca. 925 BC). The statues were excavated by the German diplomat and scholar Max Freiherr von Oppenheim, during his campaigns of 1899, 1911-13 and 1929 (Baghdo, Martin, and Novák, 2009, pp. 7-8). Besides the large number of basalt sculptures, extensive adobe structures, which are an example

of traditional architecture in Mesopotamia, came to light in the area of the citadel (Martin, 2009, pp.13-26). The adobe architecture of this site can be observed from the Neolithic to the Hellenistic period.

The Hellenistic adobe architecture, in particular, is of great interest because it has not been explored in detail in the region, and as a whole and has been largely neglected by researchers. For this reason, it is considered that it is of worth to investigate traditions and building techniques of the Hellenistic period in the Khabur region (Katzy, 2015, pp. 27-28).

This paper was based on a cooperation between the Euro-Syrian Excavations at Tell Beydar, a joint mission of the European Centre for Upper Mesopotamian Studies and the General Directorate of Antiquities and Museums of Damascus, in cooperation with the University of Coimbra, and the Syro-German Excavations at Tell Halaf, a joint mission of the General Directorate of Antiquities and Museums of Damascus and the State Museum of Berlin, in cooperation with the Eberhard-Karls-University of Tübingen, Ludwig-Maximilians-University of Munich and the Martin-Luther-University of Halle (Katzy, 2015, pp.42-48; Katzy, 2012, pp.185-193).



Fig.1 Northern Mesopotamia and Khabur Valley (credits: Elisabeth Katzy, 2011)

2. THE USE OF CLAY IN THE TRADITIONAL BUILDING TECHNIQUES OF THE Khabur Valley FROM THE NEOLITHIC TO THE END OF THE ANCIENT NEAR-EASTERN EMPIRES

Building in the Ancient Near East has always meant building with local available, naturally occurring materials. The design of the resulting architecture was therefore, heavily influenced by the available materials. One of the oldest building materials known is earth. It was in the Khabur Valley - as elsewhere in Mesopotamia – by far the most important and most widely used material (Schmid 2009; Miglus, 1999; Moorey, 1994).

The advantages of clay lie in its capacity as a ready-made, strong adhesive and cohesive blend, which is inexpensive and available nearly everywhere. Its suitability as a building material depends on whether it is argil-rich, argil-lean, argil-meager or a silty or sandy-clay. The quality may be influenced and improved by tempering with sand or gravel, as well as by the addition of fibrous materials like chaff. However, cohesive earthen materials, such as clay, solidify only by drying. Therefore, it achieves a lower hardness than other materials that have undergone chemical or physical processes (Minke, 2004).

In the ancient Near East, air-dried and fired bricks were made from earth. Rammed-earth was used to make floors, walls, ceilings and roofs. Earth also served as a mortar and as a plaster. Especially in walls and roofs, the favorable climatic attributes of the earth came into play. By its ability to absorb moisture, earth has a balancing effect on the indoor climate, which is perceived as pleasant, because the perception of warmth depends on the relationship between relative humidity and temperature. Another positive effect is the thermal absorbability, meaning the ability to delay the passing on of external temperature fluctuations to the interior space. This is a great advantage in areas with large day-night variations in

air temperature. In addition, earth has a high fire-resistance, acts to detoxify bacteria-enriched air and is compatible with lime and wood (Moorey, 1994).

2.1 Adobes

In the form of unburned bricks, earth was used in Mesopotamia for the construction of foundations, rising brickwork, vaults and a variety of installations. Earth used for production was quarried in the area, as well as probably partially taken from previous buildings. The earth was tempered to different degrees, with sand, gravel and chaff to achieve greater stability and to reduce the degree of shrinkage during the drying process of the bricks. The bricks were produced in rectangular wooden molds and dried in the air until they reached their full stability. When the walls were laid up, the bricks of one layer were set in a way that the perpendicular joints were shifted to those of the subjacent layer by half a brick's length (Miglus, 1999; Moorey, 1994).

2.2 Fired bricks

Fired bricks were used when high resistance of the material was required, whether due to increased mechanical stress or due to exposure to water. Usually this was the case for courtyard pavements, drainage gutters, wet-room floors and thresholds. In buildings of the Neo-Assyrian period, they are also frequently observed in the base area of the brickwork. A great resistance to weather and moisture, and an increased viability characterizes fired bricks. These features are provided by firing them at temperatures of 900 to 1400°C. To stem the shrinkage of the clay during drying and firing, dimensionally stable temper materials, such as sand, must be added (Miglus, 1999).

2.3 Mortar and plaster

Earth was also used as mortar and plaster. The manufacture of mortar is similar to the raw mixture used for bricks. It is only the smaller amount of chaff and the finer grain of the mineral aggregates that is different. If the mortar was used for plastering the walls, we have to differentiate between single-layered plaster on the one hand and multi-layered plaster composed of one or several layers of floated and finish coats. The amount of chaff in single-layered plaster and floating is similar to mortar, while the grading curve of the mineral supplements usually ran finer. Finish coats are made even more fine-grained and contain very little, or often, no chaff at all (Miglus, 1999; Moorey, 1994).

2.4 Rammed-earth

Most of the ground floors were also made of rammed-earth – apart from the supporting structure of flat slabs – and probably also the assembly of most of the ceilings and roofs. Typically, the floors were laid in the form of irregular heavy portions of rammed-earth and, occasionally, the rammed-earth

was tempered with chaff or straw. Alternatively, the natural soil or the building waste of previous buildings was simply leveled and covered with a thin layer of fresh clay. Ceilings and roofs normally consisted of a wooden supporting structure, a layer of reeds, palm leaves or twigs to provide a compact surface, and a clay puddle up to 50-cm thick (Miglus, 1999; Moorey, 1994).

3. THE DEVELOPMENT OF ADOBE MASONRY

The best indicators for the development of techniques in earthen architecture are the forms of the bricks, the masonry bonds and the varieties of foundations. The oldest known buildings made from adobes in the Khabur Valley are from Tell Bouqras, which lies on the west side of the Euphrates, 5 km south of the mouth of the Khabur and dates to the 7th millennium BC, the transition period from Pre-Pottery to Pottery Neolithic. Continuous longitudinal walls determine the spatial structure of the houses. Despite variations in the floor plan, a basic rectangular shape, which consists of three rooms and three adjacent cells, can be observed. The walls were built without foundations on the leveled ground. The floors in the interior were raised by infill of rubble, up to 50 cm. The walls were made with bricks of different sizes, but the most commonly occurring shape was 54 by 27 by 7 cm, placed in alternating layers of stretcher and bonder bricks.

In an approximately 800-sqm trench on the northern slope of the citadel of Tell Halaf, several tholoi of the Halaf period were uncovered. Among other things, Rundbau 5 dates to the middle of the 6th millennium BC, has an inner diameter of about 7 m and features a rectangular annex to the south. All the walls of the building stand on a 4 to 5-cm thick lime floor, which also forms the floor of the building. The walls of the tholos have a thickness of 60 cm, and those of the dromos, 40 cm. In exceptional cases, joints can be recognized on the carefully constructed adobe walls, which is why the exact dimensions of the earth bricks could not be determined. At a later wall, which dates to the end of the Halaf period, however, a format of 30 by 25 by 5 cm was ascertained (Becker, 2012, pp. 11-20). This was a very common shape at this time, as a comparison with Tell Sabi Abyad shows, which lies further to the west at the Balikh River.

Little is known about the architecture of the 5th and 4th millennium BC in the Khabur region. Therefore, we jump straight into the 3rd millennium. As can be seen in Tell Mozan, for example, the domestic architecture of the Early Bronze Age is marked by small rooms and slender, mostly one-brick wide walls. The usual brick dimensions of this time in Tell Mozan were 15 by 15, 40 by 15, 40 by 25 and 50 by 40 cm. Deep foundations are very rarely observed at this time. The adobe walls of the houses in Tell Bderi are thus found in most cases, directly on the natural soil, and only sometimes were they slightly cut into the ground or erected on the stumps of older walls. Walls were usually built in a masonry bond with adobes of rectangular shape. However, this was not done consistently,

because the brick sizes sometimes vary even within a single wall. Bricks were found with shapes of 40 by 30, to 50 by 52 cm (Koliński, 1996).

At this point, it is worth mentioning three places at the southern tip of the Khabur Delta. In Tell Djassa al-Gharbi, a private house measuring 7.50 by 5.25 m was uncovered. The walls use the brickwork of an older building as its foundation. The main walls of the later house are made from adobes measuring 48 by 32 cm. The partition walls use smaller adobes of 32 by 12-15 cm. All walls were laid in alternating stretcher and bonder layers. In Tell Abu Hafur, House 2 was built in a very similar technique. In Tell Rad Shaqrah, adobes of 48 by 32 cm size were also found. Therefore, it can be mentioned that in general, very different brick forms and construction techniques characterize the 3rd millennium BC.

During the Middle Bronze Age, the first half of the 2nd millennium BC, the workmanship of the masonry bonds can predominantly be described as good, even though it sometimes varies from case to case. The sort and quality of foundations differ from case to case, but usually the walls stand on adobe foundations that have mostly the same width, as the walls. In Tell Shagar Bazar, rectangular forms, like 37 by 17 by 9 cm or 38 by 30 by 8.5 cm, were preferred for the bricks, but there were also square bricks with 38 cm in length. In Tell Mohammed Diyab, square bricks of similar size – 37 by 37 by 7 to 8 cm and 39 by 39 by 9 cm – were found. In Tell Mozan, the rooms are larger and the walls stronger than in the Early Bronze Age. Another innovation in the domestic architecture of northern Mesopotamia, which can be found there, were foundations made from rammed-earth (Pfälzner, 2001).

During the second half of the 2nd millennium BC, the Hurritian and Middle-Assyrian periods, adobes were used in foundations and in walls, and were exclusively square. In Tell Brak, for example, bricks in the shape of 39 by 39 by 10 cm were used. Therefore, they were slightly larger than usual at this time in northern Mesopotamia. While in the other regions of Assyria, foundations were now more frequently made from stone, foundations in the Khabur region were often still made from rammed-earth like in Tell Brak, or from great adobe terraces, like in Tell Bderi.

A view of the Neo-Assyrian period shows a previously observed tendency to a standardization of shape and size of adobes. However, along the Khabur, besides square bricks with the typical Assyrian linear dimension of 37 cm, larger bricks were also used. Thus, in the Rote Haus in Tell Sheikh Hamad, bricks with linear dimensions between 39 and 41 cm, and a height of about 13 cm, were found. Square bricks measuring 40 by 40 by 10 cm were found in the so-called Hilani in Tell Fakhariyah. Also in Tell Sheikh Hamad, several vaults could be identified; the vault bricks have the same shape as the wall bricks but with only 9 cm thickness, they are much flatter and lighter. Such special vault bricks are known in northern Mesopotamia since the 2nd millennium BC. All walls of this period are more or less built with a regular masonry bond, standing on adobe foundations, which mostly reaches down to bedrock.



Fig.2 Tell Beydar: adobe and rammed-earth walls in Field C (credits: Ricardo Cabral, 2010)

4. CONSTRUCTION COMPONENTS OF THE HELLENISTIC PERIOD IN THE Khabur

Tell Halaf during the Hellenistic period, is part of a very long architectural tradition developed on the site, since the Neolithic period onwards (Katzy, 2015, pp. 25-28). Tell Beydar remained largely unoccupied from the 3rd millennium BC, and the contrast between the different architectures is quite clear.

The building techniques, in general, are common to many sites in and outside of Upper Mesopotamia, with foundations, and sometimes baseboards made of stone, and walls constructed with adobes, rammed-earth, or both. Although adobe masonry still predominates over rammed-earth, recent research has shown that the use of rammed-earth was not limited to repairs, as it was also used in the ground floors of large, multi-roomed buildings in Tell Beydar. Interestingly, the use of rammed-earth masonry is absent in Tell Halaf.

4.1 Building materials

As is common in most regions that nowadays rely on earthen architecture, building materials had, during this period, mostly a local or regional provenance. Indeed, apart from the wooden beams that were used in some of the flat-roofed buildings, every other material that was used for construction could be easily collected on site or in the near vicinity. In the case of Tell Beydar, for instance, the earthen material seems to have been extracted depending on the kind of soil required, either from the site itself or from the nearby Wadi Awaj, which provided clay-rich alluvial deposits. Reeds or canes, even if they do not appear in the archeological record, were certainly used for

roofing, as they also can be found along the wadi margins.

Basalt, an integral part of many walls and foundations, could have easily been obtained a few kilometers to the west of Tell Beydar, as there are several naturally occurring outcrops on Ard es-Sheik, a plateau formed by quaternary basalt. The use of basalt, even if mostly restricted to foundations, baseboards and wall corners, can also be found in bases for posts, hinge stones for doors, and several other objects. Wood, on the other hand, would probably have to be brought from a farther location, such as the mountains of Jebel Sinjar or Jebel Abd-el-Asis, or even on the margins of the Euphrates, where suitable trees could also be found (Martín Galán, 2003a). The local scarcity would have made it the most valued resource. This would also result in a high degree of reuse and recycling of the wooden components (either in new construction or for combustion), which, in turn, could explain its relatively low level of representation in the archeological record of the region.

4.2 Adobe masonry

The standard adobe at Tell Beydar is square and can vary between 42-43-cm sides to larger 44-45-cm sides, in some occasions. Both types have a height of about 12 cm. In Tell Halaf, however, the rising masonry in adobe is significantly smaller (35 x 35 cm or 37 x 37 cm, and 8 cm in height) and is made of relatively fine clay, without the addition of straw, and sometimes with small stones or ceramics. In Tell Beydar, there are two different kinds of adobes – grey and reddish – according to the clay of which they are made. The clay used for the grey adobes would have been extracted from the surface of the site and, therefore, containing large quantities of ashes and organic material from human activities. These adobes seem to be more resilient to the weather conditions than the reddish-clay adobes. The clay for these adobes could have been obtained from the margins of the nearby Wadi Awaj, being more plastic in nature and easier to work with. Both of these bricks were often combined in the same wall, a technique that has also been observed in 3rd millennium BC architecture. The Hellenistic adobes are, in general, of poor quality when compared to those of previous periods. Furthermore, the remains of the buildings are frequently located just beneath the surface, a fact that also contributes to its degradation.

Walls are made by combining whole bricks with half bricks that are a rectangular shape with a small side of 20-22 cm. While in Tell Halaf, walls often consisted of two or three rows of bricks, 75-110-cm wide, there is a greater variability in terms of wall width in Tell Beydar, with walls ranging from one-brick wide to four-bricks wide (reaching a width of 1.80 m) in the Hellenistic Palace (Martín Galán, 2003b), the largest building of this period on the site. All walls were built with a regular masonry bond.

4.3 Rammed-earth masonry

The rammed-earth technique, not yet demonstrated in Tell Halaf, is used in Tell Beydar for several purposes. Indeed, in recent years, several large multi-roomed buildings entirely made of rammed-earth have been unearthed. The walls of these buildings are made of extremely compact rammed-earth of grey color with widths ranging 60 to 90 cm. So far, it has been very difficult to discern the length of the lifts used. Rammed-earth was also commonly used for small dividing walls and repairs.

A combination of rammed-earth and adobes has also been shown in a few walls. In this case, the adobe courses were laid on top of the rammed-earth, with a thick layer of ashy mortar in between. The uniformity of the preserved height of other rammed-earth walls suggests that this combined technique was more frequent than previously thought.

4.4 Foundations

The use of foundations is limited to some of the buildings, usually the thick-walled ones. In some cases, as in small walls, partitions or fence walls, these are erected directly on top of the ground. In other cases, such as in Tell Halaf, the foundations of two buildings have been erected directly on top of the partially leveled building structures belonging to the Neo-Assyrian period (Katz, 2015, pp. 29-31).

Foundations could have been made with dry-stone basalt or limestone with the stones combined with earthen mortar, or with adobes only. While the first type of foundation is very rare in the case of Tell Beydar, in the second type of foundation, a more common technique, large uncut stones were laid out in consecutive horizontal rows spaced at 20 cm and rising, in some cases, about 50 cm or more above the ground level. The stones are usually positioned in pairs. The earthen mortar is typically very similar to the rammed-earth blocks used for walls and is frequently mixed with a few pottery shards and small pebbles. When bricks were used, these were placed in a more irregular and less careful way than in the upper part of wall, usually making this type of foundation slightly wider than the wall itself. The depth of the foundations varies considerably, from about 20 cm to almost 2 m (in the case of what seems to have been a large terrace wall that was built on the southern slope of Tell Beydar).

4.5 Wall coatings

For the plastering of the walls, earth plaster, wet clay, or white lime plaster (or whitewash) were used. The manufacturing of earth plaster is similar to that of the raw mixture used for the bricks; both have the same ingredients but the earth used in the plaster was sieved and refined, making it smoother and easier to apply.



Fig.3 Tell Halaf, buildings CH1 (left) and CH2 (right) (credits: Elisabeth Katz, 2010)

4.6 Floors

Floors could be composed of simple rammed-earth surfaces, rammed-earth with small pebbles, and white lime plaster. These floors are often superimposed with new floors, forming a floor succession that steadily rises in height above the ground level. Door thresholds are sometimes paved with a flat basalt or limestone or with adobes. This type of door entrance is comparable to entrances of buildings of the Neo-Assyrian period at Tell Halaf and in the whole Khabur region.

5. CONCLUSION

By the end of the 1990s, there was little interest in the Hellenistic period of the Khabur Valley and, therefore, of the Hellenistic architecture in the region. Only with the increasing excavation activity and employment of new excavation methods (as opposed to the excavations that took place in the beginning of the 20th century, where only more ancient materials were collected), more and more Hellenistic material can be distinguished, such as ceramics, small finds, and also Hellenistic architecture. A major problem of Hellenistic architecture is the often very poor conservation conditions in which they are found.

In this sense, the recent excavations at Tell Halaf and Tell Beydar allow, for the first time, a systematic study of the Hellenistic period with architectural and archeological material that was previously neglected. The presented examples of the architecture from these sites show that the Hellenistic buildings were erected entirely in the local Mesopotamian tradition, thus with no connections to the Greek-Hellenistic building tradition, neither in material, nor in construction.



Fig.4 Tell Halaf (credits: Elisabeth Katsy, 2010)

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