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THE SKY FROM THE HIGH TERRACE: STUDY ON THE ORIENTATION OF THE ZIQQURAT IN ANCIENT MESOPOTAMIA

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ABSTRACT

The ziqqurat is the symbol of the Mesopotamian sacred architecture in the western thought. This monument, standardized at the end of the III millennium BC by the kings of the Third Dynasty of Ur, has changed during the history of Mesopotamia its shape and architecture, but remained till the end of the Neo-Babylonian Period in the I millennium BC the highest structure of the city. The ziqqurat is the only monument visible over the settlements wall with a strong visual impact around the urban and the countryside landscape. Despite its simple structural function, a high mud brick platform to sustain an upper temple, the ziqqurat appears in the Mesopotamian art and literature as a structure of primary importance, a connection between the earth, domain of the god Enlil, with the sky, domain of the god Anu. The ideological function to connect the earth and the sky was related also with the rituals performed in the high temples built above these monuments, usually linked with important seasonal royal rituals. The paper will analyze this particular aspect of ziqqurat, looking also to their orientations and to the changing in the relationship between these monuments and the urban landscape through the centuries.

KEYWORDS: Ziqqurat, high terrace, temple orientations, Mesopotamian architecture

1. INTRODUCTION

The ancient inhabitants of Mesopotamia lived in a wide agricultural land, crossed by the rivers Euphrates and Tigris and characterized by date palm trees and vegetation, and by several artificial water canals. Nowadays Iraq is mostly a desert, and the two large and ancient rivers run through few green areas and many sandy regions. Despite this strong climatic change, this region maintains its main landscape characteristic: an almost completely flat panorama, without mountains or reliefs covering the horizon in any direction, in particular in central and lower Mesopotamia. As a consequence, Sumerian culture in Lower Mesopotamia is one of the first cultures in the world to have a strong interest into the sky observation and registration of astronomical phenomena. The strong ideological link between sky and hearth was present also in the Mesopotamian religion and cosmology; the celestial vault also influenced the mind of Sumerians in urban planning. The only features covering part of the horizon were human constructions, especially when the urbanization process reached its mature phase and the Sumerian settlements became real cities with fortification walls and public buildings rising over the houses. Since the Ubaid Period (V millennium BC) some temples for the settlements were built over high terraces and this tradition continued in the Uruk Period (IV millennium BC), as the terrace of Anu and the White Temple (Fig. 1) in the city of Warka/Uruk testify (Eichmann, 2013: 118-122). The first reason for these terraces could obviously be to raise one special temple of the city over the other buildings and constructions in order to be seen over the settlement walls in the surrounding areas from a long distance away. However, a second reason could also be the creation of a high observation point to observe both the landscape surrounding the city and the sky.

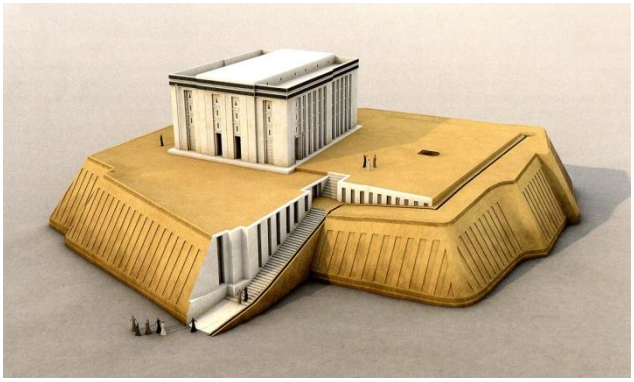

Fig. 1: Reconstruction of the Terrace of Anu, Uruk (from Crüsemann et al. [ed.], 2013: Abb. 16.4)

2. THE HIGH TEMPLES OF MESOPOTAMIA - ARCHITECTURE

From the Ur III Period, at the end of the III millennium BC, when Mesopotamia was no longer divided into small city-states, but was unified in the lower half by a royal dynasty with a single capital (Tell Muqayyar, the ancient city of Ur), high terraces, the well-known *ziqqurat*, were the typical architectural features of ancient Mesopotamian cities (Sauvage, 1998). The kings of Ur, who took a lot of care with mathematics, geometry and architecture, as testified in their cuneiform inscriptions, planned a canonic shape for the high terrace: the *ziqqurat* became a single monument, characterized by the rectangular plan, three main steps to the top, three staircases, one frontal and two lateral and orthogonal to the first; and oblique sides to sustain the heavy weight of tons of mud bricks (Fig. 2).

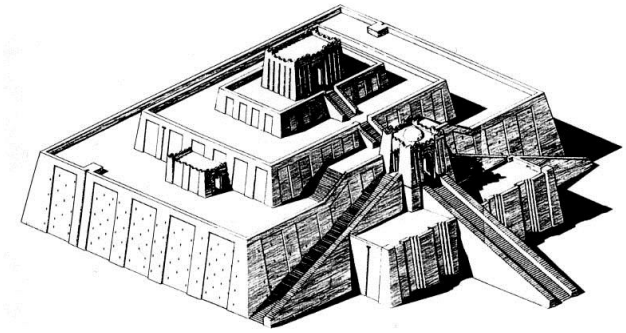

Fig. 2: C.L. Woolley's reconstruction of the Ziqqurat of Ur (from Matthiae 2000: 27).

Moreover, the urban space around the monument was planned in order to have large open spaces in which people could gather, that were fixed in two courtyards, one external and one internal, surrounded by sacred precincts provided with storage rooms. Each main city of the State of Ur was provided with a *ziqqurat*: Ur, Uruk, Eridu, Nippur, Larsa and probably other settlements had one temple-terrace. *Ziqqurat* had the same function of the ancient high terraces: in fact, they principally were a platform with the main temple of the city on the top. In this period, the link of the *ziqqurat* with the Sumerian cosmology and religious ideology is fully testified by the cuneiform tablets speaking about these monuments (George, 1993).

Indeed, texts describing the mythological origin of the world specifically refer to the birth of the city as a distinctive human action, inspired by gods, and point to the bound connection between sky and earth. The *Sumerian King List*, a Sumerian textual composition with different versions (actually two are precisely dated the time of the Third Dynasty of Ur and the Old Babylonian Period), precisely states that kingship descended from heaven to earth (Jacobsen,

1939; Michalowski, 1983; Steinkeller, 2003; Marchesi, 2010): we might infer that this descending movement is conversely reflected in the ascending structure of the high terraces and *ziqqurats* in ancient Mesopotamia. It seems as if human beings wanted to reach the primordial origin of their power and legitimacy in ruling the land again. Moreover, this heaven-earth relationship is in fact pointed out in the name Sumerians and later also other people (as for example, the Babylonians in the first millennium BC) gave the *ziqqurats*: what they usually emphasize is the architectural characteristic of the *ziqqurat* of being a foundation platform (sometimes a tower) that precisely links heaven and earth, the two opposing elements that seem to describe the boundaries of ancient Mesopotamian cosmogony (George, 1993; Montero-Fenollós, 2013).

In the following Old-Babylonian Period, during the II millennium BC, the change of the ethnic groups between the inhabitants of ancient Mesopotamia did not affect the importance and function of the *ziqqurat*. These high monuments continued to be restored and also constructed in new cities. Each important religious city of Mesopotamia also had its own *ziqqurat* in this period. The general plan of the *ziqqurat* itself did not change, but the urban landscape around the monument was modified. Large courtyards were no longer built around the *ziqqurat*: conversely, only a single *temenos* was usually built against the *ziqqurat* sides (see e.g. Larsa or Tell Rimah; Crawford 2007: 84-89). Moreover, large temples were built at the base of the high terrace, sometimes with the *sancta sanctorum* and the niche for the deity's simulacrum directly inserted into the brickwork of the *ziqqurat* itself. This would be the main characteristic of the *ziqqurat* constructed and restored in the Amorrean states of Mesopotamia: later, it would also be adopted in Assyria during the formation phase of the northern Mesopotamian state (see e.g. the *ziqqurat* of Kar Tukulti-Ninurta; Matthiae, 1997: 23-24). In this second typology of *ziqqurat*, the temples at the base always follow the same orientation of the high terrace.

3. ZIQQURAT ORIENTATIONS

Concerning the orientation of the *ziqqurat*, the first important thing to establish is the direction. In fact, the orientation of a temple is usually taken from the main entrance, as for a tomb, outward, if door sockets or standing stones in their original position are still visible; in other cases, a preserved wall alignment, following the main direction of the building, could be useful to estimate the original orientation of the temple (Ruggles 2015). From cuneiform tablets, but mostly thanks to some iconographic ancient representations of these monuments, we know that the high temple built over the *ziqqurat* had the main entrance in the same direction of the main staircase of the terrace (George [ed.], 2011: 153-169) (Fig. 3).

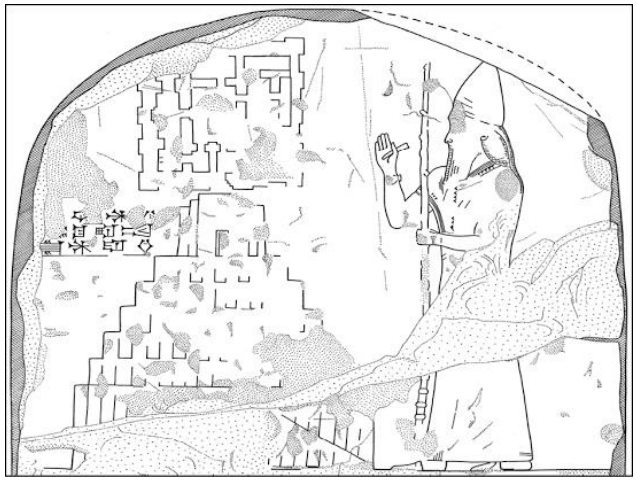

Fig. 3: Relief of a Neo-Babylonian king, showing the Ziqqurat of Babylon (Oslo, Collection Schøyen; from André-Salvini 2008: 229).

In order to take the orientation we used the frontal staircase, usually the most visible feature of a *ziqqurat*, easily preserved despite of the crumbling of the mud bricks. We measured the orientation on topographical maps of the original excavations, compared with satellite images, taking three measurements in connection with the frontal staircase and the two lateral sides of the *ziqqurat*. Only in one case was it possible to directly measure the orientation of the *ziqqurat* staircase at the city of Ur in the field. Looking in particular at the *ziqqurat* of the Ur III and Old-Babylonian periods, between the III and II millennium BC, it is possible to note a general tendency to point the main staircase of the platform to the East (usually Northeast or Southeast), but with consistent differences of many degrees between them. In this preliminary study we concentrated on two *ziqqurat* in particular (Ur and Larsa), suggesting some clear astronomical orientations.

3.1 The ziqqurat of Ur

Ur was particularly important in the Neo-Sumerian Period as the capital of a large political state, unifying Lower Mesopotamia. It was located near the Southern seacoast and had a maritime harbor: trade and commercial routes to the East (Iran and India) enriched the cultural panorama of the city. Ur was the city of the moon god, Nanna/Sin, one of the most important gods in the Sumerian pantheon. Nanna was the son of the divine royal couple Enlil and Ninlin; he and his wife Ningal generated the Sun-god Utu/Shamash and Inanna/Ishtar, the goddess identified with Venus. Therefore, in Mesopotamian mythology, the Moon was the older deity

of the Celestial Triad, including the Sun and Venus, together with the three most brilliant celestial bodies in the sky (Black & Green, 1992: 135). As already noted by César González-García (2015), the main frontal staircase of the *ziqqurat* of Ur is oriented toward 55.6°, according to the satellite image available on Google Earth. We compared the orientation with the original topographical map of Ur, giving a direction of 56.5°, and with an on-field orientation of 56.0°, measured during the first excavation campaign at Tell Zurghul (Nadali & Polcaro, 2015), the ancient Sumerian city of Nigin, in February 2015 (Figs. 4-5). The average measurement is so 56.0°, corresponding to a Latitude of 30° North in the III millennium BC at the Major Lunar Standstill North.

Fig. 4: The Ziqqurat of Ur, from North (photo by the authors).

We do not know if it was considered an important data for cultic activities also at Ur in the III-II millennium BC, but some considerations about the Major Lunar Standstill must be done here: in fact, each 18.6 years the Moon appears farther North (or South) from the most extreme solar positions. So, as César González-García (2015) pointed out, "*this means that in the years around a major standstill, once each month the moon could be clearly seen far away from the area where solar events may happen at the horizon*". The extreme position of the Moon at Major Lunar Standstill is thus a place where the Sun never rises or sets. This characteristic must have been crucial in a city where the cult of the Moon god, father of the Sun god, was the most important deity. Cuneiform texts and calendars of the III Dynasty of Ur show that the periodical changes and movements of the Moon in the Sky were accurately observed (Cohen, 1993: 125-160). For example, at Ur, like in other Sumerian cities, two *akitu* (the most important religious celebrations in Mesopotamia, related to the beginning of the New Year and to a periodical renovation of the nature) were celebrated, one at the Spring Equinox and another at the Autumn Equinox (Cohen, 1993: 400-453; Sallaberger, 1993: 179-190). At Ur, differently from other cities, the second one was the most important (Sallaberger, 1993: 183-190), because it was celebrated in the period when the Moon prevailed over the Sun, when the night became longer than the day. Moreover, the changes of the Moon in the sky were considered as effective movements or actions of the god Nanna, both in the mythological sphere and in the real world. So, the *akitu* of the Autumn Equinox started with the new Moon, while the waxing Moon represented the approaching travel of the deity to his city; as the Moon became larger, Nanna seemed to be closer, exactly like the statue of the god that, each day of the *akitu* ritual, was carried closer to the city, up to its final arrival in the city at the time of the full Moon (Cohen, 1993: 402). This means that such an important and rare moment like the Major Lunar Standstill, surely already known and observed by the Sumerian astronomers of Ur who were particularly interested in the movements of the Moon in the sky, must have had an ideological meaning related to the religious belief and the mythology of the deity. The Moon god Nanna is mentioned in the texts as crossing the sky in his bright ship, represented by the sickle. In the religious Sumerian ideology, the Major Lunar Standstill must be correlated to a specific place in the cosmos, perhaps the place of Nanna's birth, where the Moon appears in the celestial vault. So, in this hypothesis, the choice of the orientation of the main temple of Ur to the Major Lunar Standstill may be related more to an ideological and religious intent rather than a calendric purpose, as it precisely points to and looks at the place of birth of the great deity of the city, where he comes back two or three times in each generation.

Figura 5: Measurement of the frontal staircase of the Ziqqurat (photo by the authors).

Moreover, it cannot be excluded that the Major Lunar Standstill could be considered as a moment in which some important ritual or cult must be performed at Ur. It is also possible that a coincidence of the Major Lunar Standstill with a particular moment of the year, in which a major festivity occurs, could

be considered to be very important from a religious point of view and so it could reasonably explain this orientation. Using the software Solex V11.0, we calculated that a Major Lunar Standstill North occurred in the second year of reign of Ur-Namma (2110-2093 B.C.), the founder of the Third Dynasty of Ur and the probable builder of the *ziqqurat*, on the 2nd November 2108 B.C. The following MLS North occurred in the third year of reign of Shulgi (2093-2045 B.C.), son of Ur-Namma, on 29th March 2090 B.C., very close to the Spring Equinox.

In conclusion, the lunar orientation of the *ziqqurat* of Ur can be explained through the mythology of the Sumerian Moon god, his importance at Ur in the period in which the high terrace was built, and finally, thanks to the numerous sacred festivities of that city particularly at the end of the III millennium BC, that are significantly linked to the movements and changes of the Moon in the sky.

3.2 The ziqqurat of Larsa

Interestingly, another *ziqqurat* of Southern Mesopotamia seems to have an astronomical orientation: the high terrace of the city of Larsa, connected to the Ebabbar, one of the most important temples dedicated to the Sumerian Sun god, Utu (Matthiae, 2000: 73-75). The sacred complex is dated to the Old-Babylonian Period, during the first half of the II millennium BC, but perhaps its first construction goes back to the III Dynasty of Ur. We took the measurements for this monument on the topographical plan of the sanctuary, characterized by many courtyard and structures clearly aligned, pointing to 59.8° ± 2°. Unfortunately, the Ebabbar of Larsa, excavated during the 1970s and 1980s has not been restored and the heavy looting and destruction suffered by the site during the second Gulf War seriously affected the temple. It is in fact mostly invisible in the satellite images of Google Earth. While waiting for a better situation to take more precise measurements, it is possible to advance a hypothesis on the orientation of the Ebabbar complex of the god Utu to the Summer Soltice, 61° at the Larsa Latitude of 31° North. The Summer Solstice was quoted in the Mul.Apin astronomical text, collecting sky observation dating back to the II millennium BC, and it was therefore well-known at the time when the *ziqqurat* of Larsa was probably built (Hunger & Pingree, 1989). In the Old-Babylonian calendars of Mesopotamia the month of the Summer Solstice was the time of many festivities linked to the dead and the funerary ideology, but it is not apparently quoted as a day of a particular solar festivity (Cohen, 1993). Therefore, also in this case, we do not have a calendric orientation, but an astronomical one linked to the mythology of the god venerated in that temple. In fact, the day of the Summer Solstice could be easily considered as the moment of the triumph of Utu, when the daylight prevails over the darkness of the night, i.e. the moment of the maximum power of the Sun god, his longest daily sky travel. In the Sumerian and Akkadian hymns to Utu, the Sun God is named as the "*brightener of gloom, illuminator of shadow, penetrator of darkness, illuminator of the wide world*" (Foster, 1993: 543); moreover, the hymn also points to the importance of the place and moment of the rising of the Sun, both on earth and in the netherworld, "*Your radiance spreads out like a net over the world, you brighten the gloom of the distant mountains. Gods and netherworld gods rejoiced when you appeared*" (Foster, 1993: 537).

3. CONCLUSIONS

In conclusion, this preliminary study on the orientation of the *ziqqurat* of the Moon god Nanna at Ur and the Sun god Utu at Larsa has shown that both buildings are related to particular astronomical orientations that reflect the mythology of these deities. Further studies and analyses will also encompass field measurements in other archaeological sites of Southern Mesopotamia with high terrace temples, in order to test and map the hypothesis. In fact, the prevalent orientation of the *ziqqurat* to the East, at least in the Ur III Period, can be thus related to specific setting or helical rising of celestial bodies connected with the deity venerated in the high temple, usually the same patron of the city.

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