

PROFILING CLASSIC MAYA SKYWATCHERS

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RESUMEN

El artículo estudia el entorno social y cultural dentro del cual actuaron los sacerdotes-astrónomos mayas en el período Clásico (250 – 900 d.C.).

ABSTRACT

The paper examines the social and cultural context within which Maya priest-astronomers acted during the Classic Period (AD 250 – 900).

Key Words: archaeoastronomy

1. INTRODUCTION

It has been long assumed that the observations of the sky were performed by the specialized Mayan priests-astronomers (Morley, 1946: 170-174, 262-265; Thompson, 1954: 55, 70, 79, 137-159). The priesthood and the peasantry were believed to form two basic components of Maya society during the whole Classic Period (250 – 900): the farmers lived in dispersed villages around the ceremonial centers and the priests resided in buildings in close proximity to the temples, pyramids and ceremonial places. While the farmers practiced slash-and-burn agriculture depending on the rain season and on certain occasions visited monumental centers to witness the rituals performed by the priesthood, the priests observed the heavens to inform the farmers about the periods suitable for agricultural labors (e.g. Morley, 1946: 144-146). According to this model, the theocratic aristocracy interpreted the events perceived in the sky to the rest of the society developing very specific philosophy of time and keeping the deeper knowledge about the cosmos, including the expertise in the prediction of certain celestial events (Thompson 1952). To accomplish their goals, the priests erected architectural complexes called “observatories” which served to fix alignments to the sun at solstices and equinoxes. This model emphasized the priests-astronomers as being predominantly engaged in philosophical and scientific speculations, in activities similar to those performed by Western scientists and thinkers, while the commoners were generally considered a peaceful people.

This model of Maya society, developed by J. Eric Thompson, Sylvanus G. Morley and others between the 1930s and 1950s, allowed the scholars to treat

ancient astronomical observations in terms of activities of modern astronomers. Not only were Classic Maya priest-astronomers considered as more or less accurate equivalents of modern astronomers, but also their observations of the sky were regarded as activities performed more or less in the same manner as astronomers make their observations in the present (Blom, 1924; Morley, 1920: 132-134, 143; Ricketson, 1928).

In the last quarter of the twentieth century, this model of Classic Maya society fell out of favor and modern studies proved it was wrong (Webster, 2006). Modern theories have given new accounts of the Maya indicating there were multiple subdivisions within the major social classes (Hammond 1991) or even suggesting the emergence of some sort of the middle class (Chase and Chase, 1992: 314-315). During the Late Classic Period the Maya social structure became much more complex, exhibiting various levels of minor governors ruling over the smaller entities in name of the chief ruler. Associated with the demographic growth, the growing number of elites during this period fostered the competition between royal families and many new non-royal elites (Houston and Stuart 2001) leading to the rapid development of Late Classic hierarchies, ranks and noble titles (Houston and Inomata 2009: 171-172). Some scholars even suggest that during this period the category of priests did not develop into a separate class because most religious rituals were performed by royal and non-royal group members (Beliaev 2004: 127). As the above-mentioned model of priestly astronomers is quite outdated, it is necessary to revisit the social and cultural context in which Maya astronomical observations were performed and recorded. Throughout this article I am using the term “skywatchers” (first popularized by

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A.F. Aveni (1980) to denote Maya astronomical and calendar specialists in a more neutral way.

The Maya cities were places where intense political, economic, administrative and ritual activities took place. Archaeological and epigraphic sources proved that Maya cities were densely populated, governed by the divine rulers, elite lineages, state bureaucracy, and that the rulers often controlled numerous smaller centers, villages and hamlets creating major polities often contending for power. The royal courts located within the complex multi-room monumental arrangements, often called "palaces", were composed of numerous offices and individuals pertaining to noble lineages. The cities were also populated by the incipient middle class (lesser officials, lower ranking priests, traders, soldiers, artisans) and the commoners (farmers, servants, slaves) who constituted around ninety percent of society (see Foster, 2005: 123-125). These different kinds of offices were often performed by the same person (Miller & Martin, 2004: 121). The rapid development of Maya polities fostered the emergence of a complex state bureaucracy, and many new offices were created to suit the demands of the royal court (Foster, 2005: 136-137). The development and growing complexity of Classic Maya religious and public ceremonial practices also required specialized knowledge in writing, calendar, numerology and celestial lore leading to the growth, in number, of skilled specialists, diviners, day-keepers and skywatchers, though it is possible that different kinds of practices could have been performed by the same person (Miller and Martin 2004: 121).

Archaeological data suggest that Maya rulers and their families lived in royal palace complexes, usually more elaborately built than other buildings, while other noble clans and individual officials inhabited residences located near to palaces (Inomata 2001). Maya royal courts consisted of numerous officials engaged in political, religious, administrative and economic activities (Inomata 2001; McAnany and Plank 2001), and, as Johnston (2001) has pointed out, its internal structure and cohesion depended on the ability of their elite members to produce efficient political ideology through the control of ritual ceremonies.

Archaeoastronomical studies also modified our views on the use of astronomical alignments encoded in monumental Maya architecture. Archaeoastronomers have argued that architectural alignments encoded in the most important buildings at each site, describes by archaeologists as temples, palaces, plazas or ballgames, enabled the use of horizon solar observational calendars composed of calendrically

meaningful intervals, formed by the multiples of 13 and 20 days that were thought to be meaningful in the context of Maya subsistence activities (Aveni and Hartung 1986; Aveni et al. 2003; Šprajc 2010, 2011). By means of architectural alignments Maya skywatchers tried to understand the cosmos and obtain the predictive power over recurrent events. The astronomically aligned buildings were both the ceremonial and civic ones implying that skywatchers were closely related to royal courts and ritual practices.

The astronomical and calendrical content of Classic Maya inscriptions and Postclassic codices clearly denotes that calendrical and astronomical specialists did indeed exist. Their content also reveals that celestial observers were also trained in calendrics, numerology, divination, mythology, religion, history, genealogy, and politics. More specifically, skywatching was part of an intellectual tradition including divination, calculation, interpretation, and prognostication (Grube 2002) and its primary goal was to commensurate celestial cycles and terrestrial rhythms with the ritual *tzolk'in* calendar to create predictive tools focusing on everyday events in the lives of the Maya elite. Astronomical texts reflect the concepts and concern of an educated elite rather than those of the commoners.

2. MAYA CONCEPTS OF WATCHING, OBSERVING, LOOKING AT, ETC.

As the ancient astronomy dependent on direct naked-eye observations of the sky, the focus should be centered on the Maya concepts of vision. The Maya glyph representing an eyeball is read *il*, meaning "to see", or "to look at". Houston et al. (2006: 172) observe that this glyph appears also in the Lunar Series (Glyph D) meaning that the first lunar crescent observed in the western sky just after the sunset was perceived either as the Moon's "holy sight", or as "the god sees".

The depiction of a stargazer from the Mendoza Codex (63r) is well-known to all students of Nahua astronomy (Figure 1). Drawing on important insights offered by Houston and Taube (2000: 281) it may be supposed that eyeballs linked by a dotted line and pointing in the direction of the celestial firmament denote distant gazing. A later addition to this idea asserts that the eyeball and dotted line represented looking at distant objects "removed from the immediate area of an individual" (Houston et al. 2006: 164). This may suggest that the Maya stargazers learned to remove the practice of seeing the skies from the realm of all other activities taking place



Fig. 1. A skywatcher in the Codex Mendoza (simplified).



Fig. 2. A priest-astronomer in the Madrid Codex (simplified).

in their surroundings. Not only was the practice of skywatching conceptually distinct from other kinds of seeing, but also was embodied in the skywatchers' bodily movements – all images of the individuals with their heads turned up are automatically classified as representing “astronomers” (compare Early Classic vessels K1118, K1280, K5799 with the image of an priest-astronomer from the Madrid Codex 34).

However, the image of a Maya stargazer from the Madrid Codex (34) differs from that of the Mendoza Codex in that the former shows an observer's eye being extruded though still being connected by the orbit through a stalk (Figure 2). In this connection, Houston and Taube observed that extruded eyeballs were associated with the concept of “creative-seeing”, that is, with the acts that equaled seeing with knowing. Looking at, seeing, watching were not only simple sensory or physiological activities, according to the Maya they were also connected to intellectual or cognitive processes (Houston and Taube, 2000: 281-287). This may suggest that the Madrid Codex skywatcher did not simply look at the sky, he attempted to understand what he was actually observing.

Way animated entities may sometimes display extruded eyeballs (Houston and Taube 2000: 281-283, Fig. 16; Houston et al. 2006: 166-169, Fig. 4.26; Stuart 2005: 163) The depictions of the night sky also show the star signs as being extruded from the sky. The night sky which was closely related to the underworld, was also populated with various way animated entities, some of them were depicted as grotesque stellar beings, while other represented constellations (Chinchilla Mazariegos 2005). When Maya skywatchers observed the heavens, they did

not perceive them from the detached perspective of distancing astronomers, on the contrary, they looked at celestial gods, deified ancestors and animated entities that were engaged with people's lives in various particular ways. Solar and lunar eclipses were seen as manifestations of the sun and moon deities, Venus heliacal rise male deities were seen as spearing other beings, and celestial constellations were imagined as animals.

3. THE MAYA SCRIBAL CLASS AND PRIESTS-ASTRONOMERS

For the ancient Maya, calendrical computations and historical-mythological genealogical narrations were intertwined. The inscriptions placed on different classes of monuments show that the Maya used multiple calendar cycles of varying duration (Long Count, Calendar Round, cycles of 819, 7 or 9 days, etc.) to give structure and order to all important events in their lives like: birth, accession to office, marriage, war, death, public and private rituals, period ending ceremonies, etc. Those inscriptions bear very little astronomical information, which is mostly reduced to the Lunar Series. The images shown on various monuments display the figures of the rulers together with other members of royal and non-royal elites. Astronomical motifs are greatly limited to the depiction of a skyband (with solar, lunar, planetary (?) and starry symbols), solar and lunar cartouches representing a heavenly location, and various figures (human, animal and grotesque) to which the star sign *ek'* is attached.

This evidence makes it clear that the scribal personnel was involved in numerological and calendrical

cal activities participating in a web of relationships that were political and religious at once. This overlapping of political and religious activities may suggest that: 1) these two aspects of the elite life were inseparable and 2) that some elite members were also scribes and sculptors (Reents-Budet 1994: 55-59; Closs 1992; Houston 2000: 150; Houston and Inomata 2009: 257-264). Since some of the scribes signed their works, we know they belonged to elite groups (Miller and Simon, 2004: 121) and at least some members of the elite were able to read and write. Scribal workplaces were often located close to the elite centers at several Late Classic sites (e.g. Structure M8-10 at Aguateca, Inomata 1997, Fig 14; Group 9N-8 at Copán, Fash 1991: 160-162, and the Osario at Chichén Itzá, Houston 2000: 150), and by the placement of scribal tombs in the elite centers (Reents-Budet 2004: 56-57). This archaeological, iconographic and epigraphic record indicates that the art of literacy and the production of religious-mythological knowledge was controlled by the local elite.

Contrary to the figures of scribes, painters or sculptures, depicted on various Classic codex vessels, images of diviners or calendrical specialists (see for example Kerr no. 1196, 5721, and 6020) are relatively rare. In Mesoamerica the calendars and numerology were chronologically prior to and independent of writing, so it is possible they were shaped by two slightly different intellectual traditions (Houston 2000: 148-149). In consequence, it is not quite clear whether skywatching and calendar keeping were part of the same scribal tradition.

However, the content of the surviving pre-Columbian Maya codices suggests that divination, calendar computations and celestial observations were overlapped with writing and painting activities. Their specialized content consisted of various astronomical tables (the synodic cycles of Venus and Mars, eclipses, seasonal tables) that were probably compiled in the Late Classic period (Bricker and Bricker 1992) by highly trained officials. Various astronomical ritual and divinatory almanacs which lack the dates in the Long Count system, were probably added by priestly diviners. This implies that decisions regarding the inclusion of those specialized pages into a new painted codex should have been taken by astronomical and divinatory specialists rather than by specialized codex painters.

In Late Postclassical Yucatan calendar priests were called *ah k'ino'ob* (sing. *aj k'in*, "he of days", "diviner"). They officiated at public ceremonies within particular towns and acted as prophets or di-

viners (Thompson 2006: 213; Sharer 2003: 481). The *aj k'* in title occurs in a few Classic texts and according to Beliaev (2004: 128) may refer to calendar specialists who likely acted as artists, or scribes. There is a strong parallel (Zender 2004) between this title and that of *aj k'uhuun* "he of the holy paper", "he who keeps" (Jackson and Stuart 2001: 217, 222-224), "he who worships", "worshipper" (Zender 2004: 189-195) which was associated with record keeping and writing and with the worship and propitiation of gods during the Late Classic period. Among his other functions were genealogical narratives, historical records, tribute accounts and teaching activities, as well as, ritual ceremonies performed in the court chapels (Zender 2004: 371-372). Though these offices look very similar and show significant overlapping of functions, they nevertheless differ in respect to time-keeping or calendar activities.

Another known title of the Classic Maya elite was that of *ti' sak hu'n*, "speaker of the head-band" (Zender 2004: 210-221; Houston and Inomata 2009: 174) defined as an oracular or prophetic specialist, identified with the Colonial Yucatec *chi'ilan*. As officiants of calendrical cycles, these specialists could have functioned as calendrical diviners.

Obviously, the scribes who survived the Maya Collapse maintained some sort of continuity between the scribal traditions in the Classic and Postclassic times (Closs, 1992: 19). From Diego de Landa (2003: 57) we know that Maya priesthood was controlled by ruling families. The priestly duties were inherited. For example, the position of the *ahau can mai* (the "Serpent Lord Mai", the High Priest Mai) was hereditary. In particular, this priest was responsible for the teaching (or training) and examining of "the children of the other priests and of the second sons of the lords" of the Maya script, and of the calendrical and astronomical knowledge (described as "their sciences" by de Landa). Kinship relations were also important in determining the priestly and scribal offices (Closs, 1992: 19-21). However, the structure and organization of the religious and ritual officers in Late Classic Maya society is still not well understood.

Drawing on the information provided by Diego de Landa and on the text placed on a Late Classic painted vessel (K 6020) Closs (1992) inferred the priestly (scribal) and political (military) duties might have been inherited during the Classic Period. Landa's description of the education of "the second sons of the lords", guided Closs to suggest that the elite class consisted of two different sub-classes: the rulers, political and military leaders and their rel-

atives, and the scribes, the specialists in calendars, divination and ceremonies and their relatives. The text placed on K6020 indicates there was a close relationship between the two sub-classes, the sons of the scribes could hold political offices and the sons of the ruling nobles were educated as scribes. Also Gerardo Aldana (2007) who investigated the role of Kan B'ahlam's scientific patronage in the development of k'awiilian astronomy in Palenque arrived at similar conclusion. Be as it may be, through family ties, both the priests and scribes were related to other family members who attained the political, administrative and military offices. Like all classes of ritual specialists and priests, the hypothetical priests-astronomers were embedded in political, administrative, social and religious networks of their epoch.

Recently, epigraphers and archaeologists have observed the substantial increment in number of elite titles between (450) 600 and 800 (Zender 2004: 387-391; Houston and Stuart 2001; Jackson 2005; Houston and Inomata 2009: 171-172; Biró 2011). It seems reasonable to assume that the number of individuals specializing in calendrical divination and celestial observation also grew leading to the creation of corporate groups. This may be illustrated by the scene painted on K 1196 which displays Pawah-tuun, a Maya god of scribes, as being teaching young (ch'ok) aj k'uhuun disciplines (Kerr 1989:67). The title ch'ok ("young", "heir") appears as a title for sculptors (Beliaev 2004: 123-124). Though this title may well refer to the sons of the ruling lord (Houston and Inomata 2009: 189), it is also possible that it defines ranks of scribes or sculptors. This evidence for ranks among scribes is supported by the famous mural painting of Structure 10K-2 at Xultun, where various figures of taaj scribal-priests are depicted, some of them are described as holding an itz'in (younger brother) or sakun (senior) titles (Saturno et al. 2015). As the text place of the east wall contains numerological and astronomical notations (Saturno et al. 2012), it may be concluded that by the end of the Classic period calendar and astronomical specialists were organized in a sort of a corporate or ranked group.

Military aggression and the fate of captured scribes seem to be tightly bound. The various warfare actions recorded by the Maya suggest a significant variation of military activities. Johnston (2001) has commented that capture events (those termed as chu:k'aj, "to capture") might be welcomed since not only they resulted in the weakening or the subjugation of the neighbor polity, especially when its chief ruler were the captured, but also when among

the captives were the official courtly scribes. Examining a mural from Bonampak which displayed a few half-naked and bound captured scribes, Johnston noticed that their fingers were broken and bleeding, suggesting they were tortured. Their abilities to write hieroglyphic texts legitimating the political rights of the defeated rulers were thus destroyed forever. The loss of the capacity of producing public monuments reaffirming political aspirations of rulers diminished their authority and the possibility to receive any support from other noble families to govern over the commoners and to conduct the affairs at the city-state level. The rulers were well aware that their success required the very detailed knowledge of the Universe, which inter alia involved the control of days, of climatic-environmental events and of the movements in the sky. Even if Johnston arguments are inconclusive, like Aldana (2007) he recognizes the powerful role the scribal class played within a Classic Maya polity, especially in linking tzolk'in cycles, planetary motions, birthdates of the mythical rulers, with the dates of important dynastic events.

Such a view situates the Maya priest-astronomers within their own societies. The Maya skywatchers were actively engaged in perceiving and classifying of the objects and events in the sky, in negotiating their representations, in predicting and constructing algorithms for computing the dates of some recurrent cycles, etc. to be finally able to produce a list of powerful statements allowing the rulers to assert (and maintain) their power.

4. POLITY SIZE AND THE NUMBER OF PRIESTS-ASTRONOMERS AT UAXACTUN

In assessing the importance that the priest-astronomers played in Maya society, it is interesting to estimate the number of individuals acting per generation. Drawing on ethnohistorical and epigraphic data and on the spatial arrangements of ceremonial centers and cities, archaeologists long time ago attempted to infer the size of particular city-states or polities (Rice and Culbert, 1990). Population reconstructions for the overall peak population at Classic Period Uaxactun suggest that there were approximately 6,000 inhabitants (5936 inhabitants, Rice and Culbert, 1990:21) living in the residential area of 16 km². Like other important centers, Uaxactun reached population maximum during the Late Classic; in the Early Classic its population was below 50% of this maximum (compare Rice and Culbert, 1990: 23). The Uaxactun inhabitants lived unevenly dispersed, about 2,044 individuals resided in the core zone and 3,892 individuals lived in the rural

TABLE 1
ESTIMATIONS OF THE NUMBER OF PRIEST-ASTRONOMERS/GENERATION AT CLASSIC PERIOD UAXACTUN

Period (1)	Residents		Proportion (2) versus (3)	Nuclear families (5.6 persons) in palaces	Scribes in total	Estimated number of tzolk'in specialists and skywatchers
	Palace-like structures (2)	Central area + periphery (3)				
Early Classic [Tzakol] (250-550)	84			15	7.5	3-4
Late Classic [Tepeu] (550-889)	189	5,936	3.18%	33.8	16.9	8-9

periphery (Rice and Culbert, 1990: Tables 1.1 and 1.2; Puleston, 1974). Adams (1974) who computed the number of elite residents in all Classic palaces at Uaxactun (derived from sleeping space in structures A-5, A-9, A-18, B-1, B-13, B-25, D-20 and F-14) arrived at 184 elite members and estimated they constituted less than 2% of the whole population. However, most current studies assume the elite group constituted up to 10 % of the population (combined primary and secondary elites). Contrarily to other population studies, Adams utilizes the average of 6.3 persons per household, instead of the common estimations between 5.4 and 5.6 residents/dwelling (Rice and Culbert, 1990: 18). So his figure is lowered to 164 residents. In addition to the palaces studied by Adams, structures A-6, A-7, A-8, and A-12 are included (Valdés, 2005), estimated to be inhabited by a maximum of 23-25 residents, giving the maximum of 189 palace residents. Many elite residences at Uaxactun were built after Tzakol 2 (378 AD), when the city was conquered by Tikal, we may assume that its number was roughly duplicated during the Late Classic Period following the tendencies of non-elite population (see Table 1).

Adopting the model of two elite sub-classes proposed by Closs (1992), it results that some of the noble families produced political and military leaders, while others supplied state bureaucrats. The population proportions between the two classes are not known, so I assume they were evenly divided. I also assume that only a half of the scribes in each generation were trained either in tzolk'in or in the skywatching. The numbers provided in Table 1 indicate there were approximately 3-4 individuals/generation during the Early Classic and 8-9 individuals/generation in the Late Classic whom we can call either tzolk'in specialists or priest-astronomers. As suggested by Houston (2000: 152), very few Late Classic

sculptors were active for more than 20 years, so they had to start training "at a relatively young age". In a similar vein, might have been taught abilities such as writing, painting and reading. However, the periodic nature of astronomical phenomena distinguishes this kind of activity from other scribal, sculpting, or artistic practices in that it requires the combination of observational and computational abilities. The cyclical nature of astronomical phenomena makes them amenable to the recognition of periodic patterns. This implies that the training of a scribe who specialized in celestial observations, calendrics and divination should have taken a considerably longer time.

Rough estimations indicate there were about 1.5 priest-astronomers/thousand adult inhabitants living in Late Classic Uaxactun.

5. CONCLUSIONS

Classic Maya skywatchers participated in complex relationships that were political, religious, economic and divinatory at once. Even if some of those specialists specialized in celestial observations, they also functioned as religious functionaries, diviners and day-keepers, prophets and advisers, teachers and keepers of traditional knowledge, tribute accounts, and so on. Inscriptions and codices were manufactured by specialized classes of sculptors and scribes who were trained in special workplaces, suggesting that celestial divination could have been part of the scribal tradition. Such a view situates Maya celestial observers within their own societies.

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