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Forty-Four Years of Polish Archaeoastronomical Research in Latin America

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Abstract

Since the late 1980s, there has been a considerable growth in the number of Polish contributions to the Latin American archaeoastronomy. Much of this interest in archaeoastronomy is an outcome of the scientific activities of Professor Andrzej Wiercinski who in the 1970s was fascinated with the claims for sophisticated Megalithic astronomy advocated by early British archaeoastronomers. The paper provides a brief description of the greatest Polish achievements in the field of Latin American archaeoastronomy.

Keywords: history of archaeoastronomy, Latin American archaeoastronomy

Introduction

Decades of research work done by generations of Americanists have shown that indigenous populations in prehispanic America developed complex astronomies and calendars. However, since most of the Native American societies have left us no written record, the evidence for their astronomical skills has been mainly derived from the study of the alignments of archaeological remains to the rising and setting points of the heavenly bodies. A large number of monuments studied proved convincing arguments for the deliberate incorporation of celestial alignments into monumental architecture, identifying archaeological sites as locations where prehispanic elites erected enormous monuments that embodied astronomical knowledge. Since the 1970s, this kind of research has gradually been separated from the mainstream anthropology and archaeology and has developed under the general rubric of archaeoastronomy.

In 1974–1975 Professor Andrzej Wiercinski published a short paper on his discovery of a standardized megalithic yard in the measurements of the Sun Pyramid at Teotihuacan, thus revealing intricate astronomical knowledge encoded in the pyramid's dimensions. According to my knowledge, his paper is the first Polish contribution to the Latin American archaeoastronomy. This publication preceded the foundation of the Polish Society for Latin American Studies (PTSL) for nearly four years meaning that Polish archaeoastronomical research in Latin America is a little bit older than the existence of the Society. Therefore, celebrating the 40th anniversary of PTSL may also be an excellent opportunity to revise and reassess the achievements of Polish contributions to Latin American archaeoastronomy. My aim is then to provide a short historical overview of the most outstanding results in this field. A second purpose is to provide, through the bibliography, more details about the research activity of Polish archaeoastronomers in Latin America.

A few words on archaeoastronomy

The term "archaeoastronomy" reached a broader academic audience post-1970s and originally denoted prehistoric astronomy, how ancient peoples perceived, understood and made use of their knowledge of celestial phenomena. Associated with the discovery of the astronomical nature of Stonehenge, archaeoastronomy arose through the particular interests of astrophysicists and historians of astronomy who compared non-Western forms of engagement with the celestial phenomena to modern astrophysics considering prehistoric observation spots as prototypes of modern observatories and the specialists commissioned to make the necessary observations, as the archetypes of modern scientists. Within such an approach, all material remains associated with specialized astronomical knowledge (rock-art

sites, megaliths, pyramids, temples, churches, calendrical devices) became regarded as proofs of the scientific advancement of their builders or makers. Mathematical and geometrical properties found in monumental architecture, as well as alignments indicating celestial horizontal events, were perceived as features indicative of astronomical knowledge of their designers and builders. While some of these claims have been viewed with scepticism, particularly by archaeologists, many other scholars argued that relatively precise and complex astronomical and calendrical systems of knowledge as found in archaeological evidence required considerable development of cognitive skills of prehistoric skywatchers. This image eventually led to the idea that the ancient Mayan and Aztec cultures represented theocracies ruled by wise priests and astronomers (Berthelot 1949: 354–68; Thompson 1954).

Since celestial phenomena have the potential to denote time intervals involving astronomical observations through architectural alignments, the measurement of time often stands in pair with the development of indigenous measuring systems. The use of units of length was recognized by Alexander Thom (1962, 1964) who was one of the first to propose that the megalithic structures (stone rings and rows) in the British Isles were set out in terms of a standard measuring unit, the so-called megalithic yard of 0.829 m.

Andrzej Wierciński (1930–2003)

In keeping with the processualist paradigm, Andrzej Wierciński (1983) advocated his functional theory of culture and cultural evolution. The emergence of megalithic monuments in Western Europe was an important index of the astrobiological worldview, which, according to Wiercinski, constituted the common core for ideologies and religions of the great civilizations of the Antiquity. The builders and users of megaliths were imagined as individuals possessing more profound knowledge based on an understanding of celestial movements which in later stages constituted theocratic elites. The accumulation of a complex astronomical knowledge paired with the increase of celestial symbolism that permeated both ideology and religion paved the way to the rise of theocracies with their full-time high-ranking astronomer-priests living in ceremonial centres, supported by the agricultural population settled in the country.

Professor Wierciński found such an astrobiological worldview in the architecture of Teotihuacan, the largest and highly planned city in the Mexican Highland. Even today, its rectangular street-grid seems to evoke the sense of an ordered harmony which finds its roots in the rotating heavens. The idea that the urban arrangement served to correlate celestial and terrestrial realms in order to present them as mutually corresponding parts of the cosmos has led Wierciński to study the possible ideological-cosmological factors that could have determined its unique layout. He

assumed that the city's major monuments, the Pyramid of the Sun, the Pyramid of the Moon and the Pyramid of the Feathered Serpent (Quetzalcoatl), could have embodied the concept of the cosmic mountain.

From the perceived similarities of the skeletal remains at Olmec sites in Mexico to those of the Western African megalithic cultures, Wierciński hypothetically proposed that the ideological base influenced ancient Mesoamerican cultures stemmed from the megalithic cultures of Western Europe and Africa already associated by him with the idea of astrobiology. Since the megalithic builders in Western Europe and Africa used a measurement unit equivalent to 82.9 cm, building on Thom's research, Wierciński (1974–5; 1976, 1977, 1980) subsequently argued that the Teotihuacanos, the successors of the Olmecs, employed the same unit of measurement. Then, converting the features of the Pyramid of the Sun into the multiples of the megalithic yard, Wiercinski was able to demonstrate that their dimensions encoded various calendrical cycles as well as the synodic periods of visible planets. This information allowed Wierciński to conclude that like in the Middle East, also Teotihuacan pyramids were architectonic expressions of the archetype of the cosmic mountain, symbolically linking the Earth and the skies.

One of the important effects of Wierciński's research was the growing awareness of astronomical alignments encoded in prehistoric monuments and, consequently, the development of archaeoastronomy in Poland.

Elżbieta Siarkiewicz (1941–2018)

Elżbieta Siarkiewicz showed the importance of the Aztec (Mexica) *tonalpohualli* cycle for the computation of time and astronomy. The *tonalpohualli* has been defined as a mantic-divinatory counting system that operated complementarily with the vague year of 365 days.

Most calendar systems are based on the periodicity of the astronomical events, mainly on the motions of Sun (year), Moon (month), and the rotation of Earth (day). However, the 260-day cycle, the combination of the integers of 13 and 20, has no direct links to astronomical cycles. Nevertheless, this 260-day cycle operated within the 365-day annual cycle, and therefore also had some calendrical function.

The variety of functions attributed to the *tonalpohualli* caused some conceptual chaos. The range of explications varies between the concepts of the *tonalpohualli* as a pure mantic-divinatory system independent of calendars and not designed to reckon the time and the idea of a cycle of days running without interruptions linked to some unspecified or unidentified natural or astronomical cycles. Without denying the existence of the mantic-divinatory function of the cycle of 260 days, Siarkiewicz (1995) proposed it was a kind of a tool that provided numerical codes

both to create temporal units (of 13, 20, 40, 52, 65, 78, 80, 91,… 260,… 360, 364, 365, 584 days) and to annotate different units of time (i.e. those initiating with particular days in a cycles of 13 days, 20 days and 365 days). She has also shown the usefulness of the greater cycles of 260, 364, 365 and 584 days to describe the movements of the celestial bodies and to predict recurrent phenomena in the sky. Furthermore, she has attempted to explain how the calculations of the solar (=tropical) year could be executed, developing a calendric-astronomical model that combined the Dresden Codex Venus and Eclipse tables with the computations of the tropical year.

Robert Marcin Sadowski (1947–2010)

As an astronomer, historian of astronomy and astrology, and a former student of Professor Włodzimierz Zonn, Robert M. Sadowski combined the knowledge of astrophysics with that of cultural anthropology. Invited by Professor Wiercinski to talk on ancient astronomy, he quickly became the regular attendant of professor's seminar, generously sharing his knowledge of astronomy necessary to verify anthropological interpretations.

In the decade of 1980, Sadowski was involved in Mariusz S. Ziolkowski project aiming to reconstruct the prehispanic Inca calendars. Sadowski's computations of celestial events allowed Ziolkowski to synchronize historical event with the astronomical ones in order to reconstruct the imperial calendar, used for the administration of Tawantinsuyu (consult Ziolkowski and Sadowski 1979, 1980, 1989). Sadowski was the original researcher, especially his later studies focused on the problems of the Hellenistic astrology and Arabian astronomy. His expert knowledge of the history of astrology was essential to infer the motives that could have guided Hernán Cortés to abandon Tenochtitlan in 1520 (Tomicki and Sadowski 1992). In those, "pre-computer days" Robert Sadowski' ability to date astronomical events retrieved from the historical, ethnohistorical and archaeological record was invaluable and certainly allowed Polish Latin Americanists to include archaeoastronomy to the standard research practices.

Arnold Lebeuf (b. 1946)

Arnold Lebeuf's interest in the study of astronomical and cosmological elements in ancient cultures was shaped by the topics discussed at the meetings "Astronomie et sciences humaines" organized from 1986 by Carlos Jaschek and Pierre Erny in the Astronomical Observatory and the University of Strasbourg. While in Poland, Lebeuf became a member of Professor Wiercinski's seminar. In the early 1990s, his research interest shifted towards the field of Latin American archaeoastronomy.

After the collaborative work with Mariusz S. Ziolkowski (Ziolkowski and Lebeuf 1992a, 1992b, 1993) and Stanislaw Iwaniszewski (Lebeuf and Iwaniszewski 1994) he developed a series of independent research projects. The study of the vertical shaft at Xochicalco led Lebeuf (1995) to associate lunar phenomena with spatial and calendrical interrelationships and to propose a complex lunar religious and observational framework for this seventh-century city-state (Lebeuf 1995). Based on his knowledge of the solar and lunar eclipses derived from his earlier research in Europe, Arnold Lebeuf looked upon the eclipse table of the Dresden Codex. Since the document reflects, the indigenous Mesoamerican eclipse theory associated with its peculiar calendrical framework, Lebeuf proposed that the development of the ancient cosmological system was moulded by the ability of Mesoamerican day keepers to predict or anticipate the dates of which solar and lunar eclipses might occur.

Mariusz S. Ziółkowski (b. 1953)

From the beginning of his carrier, Mariusz Ziolkowski centred his research interests on the reconstruction of the Inca metropolitan calendar. In the last decade, he focused on the identification of ancient Inca observatory stations purposely designed to yield very precise astronomical observations. Because of the lack of sufficient space, and because Professor Ziolkowski continuously makes significant contributions to the field, I feel it necessary not to enter in more details here. He certainly did not say the last word in the Andean archaeoastronomy.

Stanisław Iwaniszewski (b. 1953)

Stanislaw Iwaniszewski was instrumental in the development of cultural astronomy. He has also carried out archaeoastronomical investigations on various archaeological sites in Mexico and inferred the Maya lunar theory from the Lunar Series displayed on monuments.

Conclusions

Polish Latin American archaeoastronomy was born in the 1980s, just a few years before the political transformation of the country, to a large extent thanks to research activities of Professor Wiercinski who gathered and motivated a group of younger scholars. The intellectual fervour produced by seminar meetings resulted

in the creation of a small group of researchers searching for innovative and interdisciplinary solutions in the study of ancient societies. Their treated archaeoastronomy as:

a) a means to support data legitimizing phases in the cultural evolution of ancient societies (Wierciński);
b) a medium providing an absolute chronology to historical events or to verify historical statements (Ziolkowski and Sadowski, Tomicki and Sadowski). This approach defines archaeoastronomy as archaeometry;
c) a tool to infer the cognitive abilities associated with the celestial lore (Siarkiewicz, Lebeuf), archaeoastronomy as part of cognitive anthropology and archaeology;
d) part of landscape or skyscape archaeologies (Iwaniszewski);
e) part of a much wider thematic research field coined cultural astronomy (Iwaniszewski).

Unfortunately, the "generation gap" observed in many diverse fields of scientific investigation in Poland has also touched Latin American studies and raises concerns about the future development of this discipline in Poland. Current archaeoastronomy is no longer limited to the study of astronomical alignments, and its scope has moved out of the range of problems investigated in the 1980s and 1990s. So in order to be familiar with the current theory, it is necessary to create research centres in Poland. Otherwise, the presence of Polish scholars in Latin American archaeoastronomy will be marginalized.

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