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# The Universe in a Cultural Context: An Essay

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Researchers who have made a study of past cultures' interest in and conception of the heavens have often treated the topic narrowly, rather than in the context of the entire culture. Archaeoastronomers, coming from many different disciplines, have explored the subject by trying to identify archaeological features such as architectural alignments and rock art in relationship to celestial events and processes. Anthropological archaeologists on the other hand, whose goal it is to understand the evolutionary trajectory of a past culture, often completely ignore the entire concept of cosmology and the role of celestial phenomena. This essay explores the reasons for the failure of anthropological archaeologists and archaeoastronomers to effectively utilize the results of each other's research, and offers suggestions for the integration of archaeoastronomy into more systemic cultural studies.

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## Introduction

It may seem like the height of hubris that we as anthropologists and not astronomers or physicists entitle our essay *The Universe in a Cultural Context*. Our basic premise, however, is that to truly comprehend a culture we must have some sense of its cosmology — the group's conception of themselves in relation to the heavens. Throughout the world, human social behavior is inextricably (and perhaps inexplicably) intertwined with its world view. We propose that the following questions are among the most appropriate if a researcher is to use an anthropological per-

spective for understanding behavior: What is a given culture's view of its place in the universe? How does that perception affect the character of their culture? And, how does the character of the culture affect their cosmology?

In order to make our points, we briefly review the nature of anthropological archaeology, and apologize to those of you for whom this may be "old hat". Because the study of archaeoastronomy is peopled by many who have their disciplinary home in any of a great number of academic departments, we provide a very brief history of the recent development of the discipline within which archaeoastronomy is attempting to carve a niche.

This commentary is not the result of research, nor of any specific observations about the relationship between culture or cultures and the heavens. Rather, we offer some general observations about the state of the study of archaeoastronomy within anthropology, and offer some suggestions that may help to better integrate archaeoastronomical studies into the most encompassing context, that of an entire culture. The reader will note that most of our illustrative examples are from the American Southwest. This is not because there are exceptionally good examples in this area, but simply because we know the literature better.

## **Culture as a System**

It is more than a little presumptuous of us to offer these comments because neither of us has ever done any research involving archaeoastronomy, and in the past might have been considered "non-believers." Over the last few years, however, we have realized that in order to understand the nature of a prehistoric culture it is important to view it in a truly systemic or holistic context—a view that treats the economic, technological, sociological, and ideological (including cosmology) realms as being in various degrees of harmony with one another. As anthropological archaeologists, we operate under the fundamental principle that culture, including cosmology, is writ large in the material record left behind by former inhabitants. This is, of course, an idealistic and unrealistic conception: none of us has ever been able to reconstruct even a small percentage of a past culture, but operationalizing the concept of culture as a system has brought us closer to the goal, and we continue to refine our means of accomplishing this.

The concept of culture as a system was the reigning paradigm in anthropological archaeology from the late 1960s to the mid 1980s. Conceptually, because culture can be viewed as a highly integrated system, many archaeologists believe that an understanding of one relatively easily derived aspect of a prehistoric society (usually technology or economy), allows inferences to be made about those components less amenable to archaeological reconstruction, such as religion.

One of the most striking examples of this is the difference in religious practice between Native Americans on the Plains and in the Pueblo Southwest. Most people are familiar with the stories of adolescent male Plains Indians searching for a personal guardian spirit during a vision quest. And many know about Pueblo katsina dances involving whole villages, the purpose of which is largely to bring rain for the crops. These divergent forms of religious behavior are predictable by knowing the nature of the two economies. For the hunting and gathering economy of the Great Plains where success is often dependent on the individual hunter's skill, the ide-

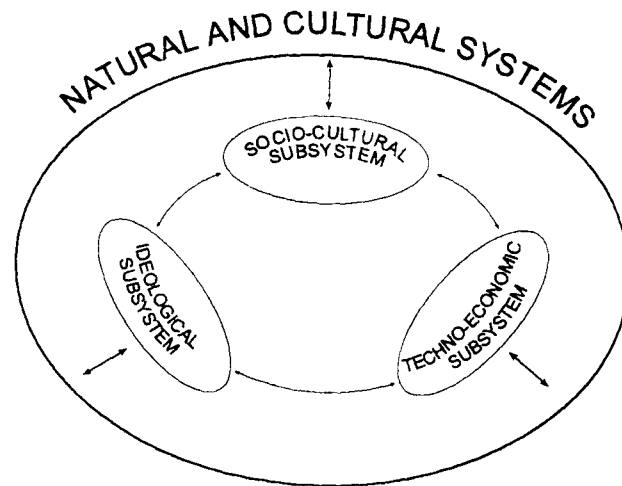


**Figure 1.** A culture depicted as a system with three sub-systems that interact with one another, with the natural environment, and with other cultural systems.

ological system focuses on the individual. For the farming Pueblos, rainfall benefits the entire village and therefore it is not surprising that the ideological sub-system reflects that group focus.

There has been, however, increasing criticism of the concept of culture as a system because not all cultures are tightly integrated (Trigger 1984). In other words, some components of the system may have various relationships of different intensity with other components of the same system. For example, Christians in the U.S. are often exhorted to extend their Christian fellowship beyond the one hour spent at church on Sunday, suggesting perhaps that religion is less integrated into Western culture than in some other cultures. This observation notwithstanding, herein we follow the archaeological convention of viewing culture as a system.

Figure 1 illustrates the interrelationship of the various components of any culture which conventionally are grouped under three headings. The ideological realm comprises a culture's system of beliefs and values, including religion and cosmology. The socio-cultural realm comprises a network of status and roles, kinship systems, and ways in which a culture's individuals relate to one another. The techno-economic realm comprises a culture's technology and that part of the economy that is used to wrest a living from the environment. These components make up the system and interact not only with the natural environment but with other cultural systems.

Most successful archaeological studies that endeavor to reconstruct a past culture, focus on the economy, technology, and the peoples' relationship to the environment—either because these may be the easiest parts of the culture to reconstruct, or because the investigator believes the economy and peoples' relationship to the environment were the primary factors that determined the character of a particular culture. The economy is relatively easy to reconstruct because we can excavate hoes, spear points, plant remains, and animal bones, and even determine diet from the chemical analysis of human skeletal remains. Additionally, tree ring analysis, geomorphology, macrobotanical studies, and other analytical techniques provide in-

dependent and accurate environmental records. Until very recently, however, the sociological sphere of culture, i.e., how people relate to one another, was considered less knowable archaeologically, the ideological realm even less so, and the culture's perspective of the heavens was virtually never mentioned.

There is no question that many archaeologists have exaggerated the importance of the role of environment and technology in culture change. Indeed, in many cases, we treated prehistoric peoples almost as a barometer reflecting environmental change. In other words, we tended to lose sight of some of those very things that made people human—their belief system and their social system.

This realization was brought home to one of us by Alfonso Ortiz, a cultural anthropologist and a member of San Juan Pueblo. He complained that archaeologists are too concerned with environment and economy, that the decisions of most Pueblo people are infused with ideology and social organization. He, of course, was right. His observation underscores the criticism of many Native Americans concerning the unidimensionality of archaeological reports and their general lack of relevance and interest for native peoples.

Furthermore, with our focus on economy and technology, we had also lost sight of one of the basic principles of systems research—that all the subsystems interact to form more than the sum of the parts. More crucial than the primacy of one subsystem over another, is the interaction of the sub-systems with one another and with the environment.

One of the most colorful and compelling examples of the integration of culture occurs in the Mexican town of Magdalena de Kino. A community of some 40,000 people, it lies about 60 miles south of the Arizona-Mexican border, in the state of Sonora. On the fourth of October each year, thousands of people from Arizona and northern Mexico gather to honor St. Francis Xavier, but it is somewhat confusing because this date is actually the saint day of a totally different saint, St. Francis of Assisi. It is further complicated by the fact that many of the pilgrims are really there to honor Father Kino who first missionized much of what is now northwestern Mexico and southern Arizona and who is buried in Magdalena. In any case, the roads are filled with pilgrims—Yaqui Indians, Mayos, Tohono O'odam from Arizona, and Mexicans—many of whom have walked for a week or more, some on their knees. They stand in long lines to kiss the reclining statue of St. Francis Xavier in the church.

Once that obligation is over, however, and often before, the fun begins. The town's huge plaza is filled with double and even triple lines of stalls with vendors selling toys, souvenirs, religious items, and folk medicines. There are outdoor temporary restaurants and bars, each with a special clientele—one bar, for example, is where the Yaquis drink. There is a carnival and even a large section of town for prostitutes who come in from all over northern and central Mexico. Sellers of cloth and plastic housewares hawk their goods from the back of vans using loudspeakers which compete with the lively, but noisy mariachi bands, marimbas from distant Chiapas, and harps from Vera Cruz. There are even Yaqui deer dancers, the origin of which is in pre-Spanish contact ritual.

So what is this event? Is it a religious experience of Spanish content, a prehispanic celebration, a mixture of both, a social event for the release of sexual tension, an opportunity to meet a potential spouse, an occasion to increase family solidarity, an opportunity to drink with your buddies, an economic opportunity, a chance to sell your wares, pick pockets, or make a deal on religious medals? The answer is, of course, it is all those things and more. That is how culture as a system works.

## Archaeology and the Problem of Ideology

In recent years some archaeologists have tried to redress the relative neglect of ideology in understanding past human behavior. One of the major advances in this effort was a School of American Research advanced seminar devoted to ideology and Pre-Columbian civilizations. The published proceedings (Demarest and Conrad 1992) include papers by eleven scholars, and while the effort to incorporate ideology into an understanding of New World civilizations should be applauded, as Rolf Sinclair (personal communication) has pointed out, astonishingly no terms associated with the heavens appear in the index—and this in a book devoted to the Andean and Mesoamerican civilizations whose knowledge of the heavens was without parallel in the world at that time.

It is clear that all cultures have a concept of the universe which includes the heavens and further, which is an integral part of any culture's world view. Western societies within the paradigms of the "big bang" theory and various religious constructs are no exception, of course. Despite this knowledge on the part of anthropological archaeologists, as we have noted, those aspects of a culture's world view that include the celestial have been largely ignored. Ignored, that is, by most, except for a growing band of archaeoastronomers. Herein lies the conundrum. While the broader scholarly discipline of anthropological archaeology has generally not dismissed, but more commonly ignored, the celestial realm of the group they are studying, many have also ignored the results of the research of archaeoastronomers. This latter neglect is, in part the result of archaeoastronomy being a specialty, requiring particular kinds of knowledge not normally found in anthropology departments. In addition, the pursuit of a prehistoric group's knowledge of astronomical phenomenon does not typically require excavation or large teams of investigators.

Archaeoastronomical study is often considered by non-archaeologists as a discrete and bounded sphere of study. This view, conceptually divorced from the idea of culture as a system, has encouraged researchers from many fields of study to make archaeoastronomy a second area of interest. On the other hand, a few archaeoastronomers have felt, usually unrealistically we believe, that a culture's cosmology equaled the sum of a culture, that is, that the entire population danced to the music of the spheres. We recall a conversation with a researcher who has done some very important work in Chaco Canyon archaeoastronomy. After we admitted that in the past archaeologists had placed too much emphasis on ecology when trying to explain the so-called "Chaco phenomenon," we asserted that the archaeoastronomer had erred in the opposite direction by explaining Chaco solely in terms of cosmology. The archaeoastronomer responded that it was necessary to exaggerate to counteract the prejudice of anthropologically trained archaeologists. We believe the time has now come for both camps to take more reasoned stances.

Do not misunderstand us. We are not criticizing these specialized interests in archaeoastronomy. Archaeology has a long tradition of valuable contributions made by avocational or part time students of the past. And archaeology would be a moribund science if we did not have the contributions of specialists ranging from radiocarbon determinations to models borrowed from theoretical evolutionary biologists. After all, it is no accident that the subtitle of this conference is *An Intersection of Disciplines*. Table 1 illustrates the diversity of disciplines and academic back-

grounds of individuals interested in archaeoastronomy, and in attendance at the Oxford V Conference.

**Table 1. Area of Interest or Academic Department as Listed by Those Registered at the Oxford V Conference on Archaeoastronomy**

| Dept/Interest       | N          | %            |
|---------------------|------------|--------------|
| Astronomy           | 42         | 35.3         |
| Anthropology        | 17         | 14.3         |
| Archaeology         | 17         | 14.3         |
| History             | 7          | 5.9          |
| Architecture        | 4          | 3.4          |
| Art                 | 4          | 3.4          |
| Physics             | 4          | 3.4          |
| Archaeoastronomy    | 2          | 1.7          |
| Mathematics         | 2          | 1.7          |
| Sociology           | 2          | 1.7          |
| Biology             | 1          | 0.8          |
| Chemistry           | 1          | 0.8          |
| Engineering         | 1          | 0.8          |
| Humanities          | 1          | 0.8          |
| Iberian Studies     | 1          | 0.8          |
| Language            | 1          | 0.8          |
| Medicine            | 1          | 0.8          |
| Near Eastern        | 1          | 0.8          |
| NPS Ranger          | 1          | 0.8          |
| Religion            | 1          | 0.8          |
| Students-Undeclared | 2          | 1.7          |
| Undeclared          | 6          | 5.0          |
| <b>TOTAL</b>        | <b>119</b> | <b>100.0</b> |

## **Integrating Archaeoastronomy and Archaeology — A Parallel Case**

The problem is as follows: although all cultures, both past and present, consider astronomical phenomena an integral part of their world view, most archaeologists reconstructing the past ignore this critical aspect despite the fact that it is a window into that culture's perspective of their cultural universe. On the other hand, those studies of a culture's perspective on astronomy tend to treat the subject as independent of the rest of the culture, or, less commonly, to make astronomical considerations virtually the entire focus of those prehistoric groups they consider.

In order to better understand the problem of the relationship between archaeoastronomy and anthropological archaeology, it is instructive to examine the changing relationship between Mayan epigraphic studies and Mayan archaeology. There are a number of interesting parallels between the two fields of study, and perhaps the Maya example offers some insights into possible solutions for the integration of astronomical studies into cultural reconstructions. The historical development of Mayan epigraphic studies, its early denigration by many Mayanists, its

gradual acceptance, and finally integration into anthropological studies is similar to archaeoastronomy and anthropological archaeology with one major difference—archaeoastronomy has not as yet been accepted and therefore not integrated into the main stream of archaeology.

Also, unlike archaeoastronomy in North America, Mayan epigraphic studies had an early start in Mesoamerican archaeology, largely because the glyphs were so obvious and were clearly some form of recording system. As early as 1841, with the publication of Stephens and Catherwood's *Incidents of Travels in Central America, Chiapas and Yucatan*, the general public became aware of the ruins and writings of the Maya. These discoveries caused a firestorm of interest in the Euro-American world.

Since the middle of the nineteenth century many scholars have added to our knowledge of the Maya and their writing system. But as the efforts at decipherment continued, the subject of the glyphs was either hotly debated or ignored, much as the astronomical symbols discovered relatively recently were in the Southwestern U. S. The best Southwestern example is that of the Sun Dagger petroglyph, a solar marker in Chaco Canyon. The majority view was that the Mayan glyphs recorded calendrical data only, although a few scholars maintained that they were also a record of events and social ranking.

The most influential Maya scholar of the 20th century, J. Eric S. Thompson, convinced that Mayan glyphs were concerned only with the passage of time, wrote so persuasively that his voice overrode those of other scholars who disagreed with him. Archaeoastronomers can understand this rejection of ideas at odds with the reigning views of the times. Gradually, however, the accumulated work with its carefully constructed logic of the great scholar Tatiana Proskouriakoff (Schele and Freidel 1990:47) finally convinced the field that the contents of the inscriptions did indeed concern the affairs of the elites.

Knowing that the contents of the inscriptions concerned more than calendrical data did not help the historical epigraphers understand how the Maya spelled their words. A major advance in decipherment came from a Russian, Yuri Knorozov, who in 1952, proposed that Maya writing was "a mixed system composed of full word signs combined with signs representing the sounds of syllables" (Schele and Freidel 1990:48). None of the renowned Mayanists accepted Knorozov's thesis of phoneticism, and only a few scholars were willing to consider that Knorozov might be right.

It was not until December of 1973 that the big breakthrough was made at small conference held in the village near the ruins of Palenque. At that conference, a new generation of epigraphers was initiated into the mysteries of glyphic decipherment. Blending Knorozov's phoneticism with Proskouriakoff's 'historical approach' a group of epigraphers in the next few years developed a highly successful collaborative approach and forged the last link—the axiom that the writing reflected spoken language and thus had word order which could be used to determine the function of glyphs (Schele and Freidel 1990:49).

While archaeologists came to appreciate the rich textual potential of glyphs, they were at a loss as how to incorporate the epigraphic findings into their general picture of Mayan society. Hammond and Willey, for example, in their major compendium on Mayan society, *Maya Archaeology and Ethnohistory* published in 1979, include epigraphic studies in all the major sections of their work, but an examination of the papers shows a failure to integrate the two approaches.

This divergence reflects the fact that the questions asked by the archaeologists and epigraphers lacked sufficient overlap to combine the two perspectives. An ex-

ample is an article entitled "The Representation of Underworld Processions in Maya Vase Painting: An Iconographic Study." The author (Quirarte in Hammond and Willey 1979) examined a number of Mayan vases related to death and the underworld, and discusses the procession scenes depicted on them. The discussion concentrated on the individuals in the processions and their identification in order to determine the significance and meaning of the themes portrayed. This certainly adds to our understanding of Mayan society, but as archaeologists conducting an analysis of Mayan culture as a system, or a settlement pattern study, or an economic study, we ask how do these data contribute and how can our studies benefit from them? It may well be that the way archaeologists have defined or identified archaeological data has limited the range of questions we ask and thus are self-limiting on what we include as data.

We believe that archaeoastronomical data suffer from the same syndrome as Mayan epigraphic studies. The questions asked and issues addressed by the archaeoastronomers tend to fall outside the self-defined parameters of what archaeologists consider to be significant and relevant. As with Mayan studies, the results of archaeoastronomy research have evolved largely independently from the broader context of archaeological investigations. Ways must be found to integrate the two spheres of inquiry so that they may complement one another, much like Mayan archaeological research and epigraphic studies have come to complement each other to produce a more complete understanding of Mayan society.

Keith Kintigh, an archaeologist, made an interesting comment on this problem in a short note, in "The Archaeoastronomy and Ethnohistory Newsletter" (1992). Kintigh acknowledged that most archaeoastronomical research had been ignored by archaeologists, and attributed this largely to the fact that most of the efforts of archaeoastronomers were outside the purview of mainstream archaeology, and instead fell into the category of "gosh, that's neat that a building is oriented to some celestial event or other." This was, he asserted, simple data collecting, about on the same level as stamp collecting.

But Kintigh was wrong on several counts. First, it is important to understand that in many parts of the world, such as in the American Southwest, the evidence for prehistoric astronomical recording is not as obvious as it is in the complex cultures of Mesoamerica. It is necessary to first document the existence of such data, before they can be interpreted and integrated into more general anthropological questions. After all, archaeology had to go through its period of data collection and lower level interpretation before it could address human behavior. Second, it is not so much the archaeoastronomers who have to shape their questions to fit the research framework of anthropological archaeologists, but the latter who must strive to incorporate the insights and knowledge derived by archaeoastronomers into the context of the culture they are trying to understand. After all, as we have said, there is probably no culture that does not include the heavens as a major part of their worldview, and to truly understand a culture it is necessary to comprehend some aspects of their cosmology.

Again the Mayanists provide a good example of the potential of expanding anthropological inquiry to include celestial data. As the results of epigraphic research have been published, more and more archaeologists have realized that the Maya inscriptions offer an important source of data about how the Maya thought about themselves. They are merging epigraphic and iconographic studies with archaeological projects designed to understand the nature of Mayan society. The classic

work which combines the efforts of an archaeologist and an epigrapher is *A Forest of Kings: The Untold Story of the Ancient Maya* by Linda Schele and David Freidel published in 1990.

In sum, there is a history of over 150 years of epigraphic and iconographic research conducted on the peripheries of Mayan archaeological research. It was not, however, until the 1980s and 1990s that archaeologists began to accept the contributions of epigraphers.

The problem, as we see it, centers on what questions are asked and how they are framed. While archaeologists now see that the glyphs from a site may provide a framework from within which we can structure archaeological inquiry, prior to their decipherment it was thought the glyphs might only provide chronological information or perhaps the names of rulers. This kind of information contributes little to economic theory, settlement patterns, demography, culture ecology, or other traditional topics of interest in anthropological archaeology. So archaeologists are now considering how to reframe questions to utilize these data, thereby providing a greater contribution to archaeological knowledge.

We might say that archaeoastronomers too have been laboring in the far reaches of mainstream anthropological archaeology, and that archaeologists have been remiss in not considering more carefully the accumulating body of astronomical knowledge and using that knowledge to restructure aspects of their inquiry into the nature of prehistoric society.

## Suggestions and Conclusions

This then is the challenge for those archaeologists who attempt to understand culture in a systemic or holistic fashion as well as for archaeoastronomers—how can we work together to complement one another's work?

First, anthropological archaeologists must be made aware of the potential contributions of archaeoastronomers. This paper does not enumerate these because other papers in this volume do so very effectively, and anyone reading this volume is not likely to need convincing. It is those who do not read this literature or attend these kinds of conferences that need some persuading. But on a more positive note, the seeds have been sown, and archaeological theory is increasingly susceptible to the incorporation of astronomical phenomenon because of the trend for the more inclusive study of ideological aspects of culture.

Another hopeful trend is that as archaeologists attempt to understand not only selected aspects of a culture, but as much of the culture as possible, the lone scholar has a less important role in archaeology. Understanding culture in a systemic way is an enormous task and requires teams of researchers (Gumerman 1989). The accumulating results of archaeoastronomical research suggest that in the study of many cultures the inclusion of an archaeoastronomer on the team would enhance understanding of that culture. This will require a willingness to interact and compromise on the parts of both archaeologists and archaeoastronomers cooperating on collaborative efforts.

There is also an untapped potential for understanding the relationship between people in the past and their concern with astronomical phenomena—that is, an ethnographic link between living peoples and their ancestors. In the American South-

west alone, there are numerous ethnic groups that have maintained their oral histories explaining the way the universe works based on cosmological principles. We should explore this potential.

Another final optimistic note: in contrast with our Maya example, the study of North American prehistory did not evolve contemporaneously with the archaeoastronomical studies, like the co-evolution of epigraphy and Mayan archaeology. Only recently, in many cases, have archaeologists been willing to accept the cosmological significance of archaeological remains. Much of the efforts of archaeoastronomers are still in the "Gee whiz—look at this," stage. It is necessary, of course, that data first be observed before they can be explained, but given the relatively late start of archaeoastronomy in North America, it seems obvious that the field is progressing from description to explanation, and therefore has a greater likelihood of being incorporated into a more comprehensive understanding of past cultures.

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