Archaeoastronomy in the Ancient Americas

Anthony F. Aveni

Since its popular resurgence in the 1960s, the interdisciplinary field of archaeoastronomy, which seeks evidence from the written as well as the unwritten record to shed light on the nature and practice of astronomy and timekeeping in ancient civilizations, has made ever-increasing significant use of the archaeological record. This essay briefly touches on the origin and history of these developments, discusses the methodology of archaeoastronomy, and assesses its contributions via the discussion of selected case studies at sites in North, South, and Mesoamerica. Specifically, archaeology contributes significantly to clarifying the role of sky events in site planning. The rigorous repetition of axial alignments of sites and individual oddly shaped and/or oriented structures can be related to alterations in the calendar often initiated by cross-cultural contact. Together with evidence acquired from other forms of the ancient record, archaeology also helps clarify the relationship between functional and symbolic astronomical knowledge. In state-level societies, it offers graphic evidence that structures that served as chronographic markers also functioned as performative stages for seasonally timed rituals mandated by cosmic connections claimed by the rulership.

KEY WORDS: archaeoastronomy; archaeology; architecture; orientation (alignment).

HISTORICAL AND THEORETICAL PERSPECTIVE

Most ancient civilizations paid some attention to what goes on in the sky. The periodic cycles of the sun, moon, and planets are the most pristine, predictable, and consequently, the most reliable natural phenomena on which to anchor the counting of the days and the making of the calendar. Celestial observation served to order and formalize the time to plant, to anticipate the monsoon, and, given the tension of anticipation concerning what the future might hold, to fix the ritual celebration of seminal seasonal events such as the first rain and the harvest.

1Department of Physics & Astronomy and Sociology & Anthropology, Colgate University, 13 Oak Drive, Hamilton, New York 13346; e-mail: aaveni@mail.colgate.edu.
Because of their stability, the moving lights that traversed the heavens often came to be regarded as ancestor gods. By carefully charting their movements, people would come to know the habits of the cosmic deities, the better to enter into a dialog with them in order to seek omens regarding the course of war, crop yields, even personal affairs. Thus the sky served as a text capable of revealing vital information to diviners skilled at asking the appropriate questions and invoking the proper debt payment. Little wonder that celestial objects appear frequently in oral and written mythologies that tell the story of creation and the descent of humanity and the lineage of the storyteller from the sky (cf. e.g., Freidel et al., 1993; Heidel, 1942; Wasilewska, 2000).

The most reliable evidence attesting to the practice of astronomy in past civilizations comes from the written record, but oral histories, iconography, and the planning and orientation of specialized architecture constitute unwritten texts that supply valuable data regarding the nature and uses of a precise knowledge of the sky. Archaeoastronomy is the study of the practice of astronomy using both the written and unwritten records. It is the interdisciplinary field where these supply lines of information converge and in which the archaeological record has come to play a major role.

Considered historically, archaeoastronomy began as a meeting ground for at least three established disciplines that deal with ancient astronomy:

1. **Astroarchaeology** (Hawkins, 1966) is the now obsolete name given to a field methodology for retrieving astronomical information from the study of alignments associated with ancient architecture and the landscape.

2. **History of astronomy**, a discipline well rooted in the sciences, usually engages only the written record. It is concerned with the acquisition of precise knowledge by the ancient circum-Mediterranean cultures from which modern western science was derived (Crowe and Dowd, 1999).

3. **Ethnoastronomy** is a branch of cultural anthropology that draws its evidence from the ethnohistorical record and ethnographic studies of contemporary cultures. It seeks to develop an understanding of cultural behavior as gleaned from indigenous perceptions of events in the heavens (Fabian, 2001; Farrer and Williamson, 1992).

The involvement of archaeology in archaeoastronomical studies has a curious history of its own. Since ancient civilizations expended considerable effort paying tribute to celestial deities, one should not be surprised to find that, in many instances, astronomical principles played a role in the design of the places where they worshipped their gods. When astronomer Gerald Hawkins wrote his popular *Stonehenge Decoded* (Hawkins, 1964), he rekindled an idea made popular at the end of the nineteenth century by Sir Norman Lockyer (1964) and others (e.g., Somerville, 1927). Hawkins hypothesized that the famous megaliths that had stood for 5000 years on the Salisbury Plain of southern England constituted a calendar in...