

# Ideological Lock-In and the Dynamics of Formative Religions in Mesoamerica

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## RESUMEN

Los modelos económicos que implican el aumento de ganancias y la inmovilización tecnológica, sugieren que las opciones tomadas por agentes sociales, las cuales conciernen a cambios tecnológicos, son profundamente influenciadas por tres factores: la innovación, los eventos casuales y el comportamiento en grupo. Las tecnologías tienden a inmovilizarse cuando la gente interactúa y adopta estrategias tecnológicas similares. Aunque estos modelos llaman la atención hacia la dinámica del comportamiento en grupo y en contextos únicos, las acciones de los miembros del grupo son homogeneizadas en procesos amplios. En este ensayo exploramos la tensión entre las decisiones del individuo y la dinámica del grupo. Esto se hace por medio de la exploración de las religiones del período Formativo, tanto en el área olmeca del Golfo como en las Tierras Bajas mayas. Los datos de estas regiones arqueológicas sugieren que hubo dos sistemas ideológicos competitivos, los cuales se desarrollaron e inmovilizaron mientras que las sociedades sedentarias y agrícolas emergían.

**Palabras clave:** Período Formativo, religión, Grupo E.

## ABSTRACT

Economic models of increasing returns and technological lock-in suggest that the choices social agents make concerning technological change are profoundly influenced by three factors; innovation, chance events, and herd behavior. Technologies tend to become locked-in as people interact and adopt similar technological strategies. Although these models draw attention to the dynamics of herd behavior in unique contexts, the agency of herd members is homogeni-

zed in broad-sweeping processes. In this paper, we explore the tension between individual choices and herd dynamics by exploring Gulf Coast lowland Olmec and lowland Maya Formative religions. Data from these adjacent archaeological regions suggest that two competing ideological systems were developed and became locked-in as sedentary agricultural societies emerged.

**Key words:** Formative Period, Religion, E-Group

## INTRODUCTION

In the late 1980s, American economist Brian Arthur (1989; see also Waldrop 1992) proposed a novel model of increasing returns that included a concept called technological lock-in. He argued that compelling expressions of new technologies can become «locked-in» to a cultural system by three factors; innovation, chance events, and herd behavior. First, an innovation in technology must occur. Often, after the initial development of an innovation, several competing varieties of this new technology are «offered» to potential consumers. Despite the fact that these varieties may vary in quality and performance, Arthur avoids the form versus function debate by implicitly assuming that the function and/or value of each technological variety is relatively equal, an assumption open to debate. Second, as social agents choose among the available competing varieties, «chance events» influence the adoption of one variety over others. An historically particular situation may even influence social agents to adopt inferior versions of a technology. Third, despite the fact that social agents make individual choices concerning their «brand» of technology, each agent is profoundly influenced by the social choices of other agents. This is often referred to as herd

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behavior (e.g., Banerjee 1992). For complex reasons, social agents often adopt varieties of technology already in use by people they are familiar with. Thus, a single variety can gain in popularity as its consumers, due to historically particular events, have a greater impact on the social choices of people they interact with. This variety *can* eventually become locked-in to a cultural system as increasing numbers of people adopt it and reinforce its use in an almost institutional manner. Of course this does not always occur as Arthur outlines. For example, there are many brands of cars on U.S. highways today. The social world is complex and many factors influence consumer decisions. Yet examples such as the widespread adoption of Levallois technology during the Upper Paleolithic are powerful reminders that the process Arthur singles out can occur.

Two questions arise from this work. First, can lock-in occur with other aspects of culture? Second, if so, are the social dynamics leading up to lock-in the similar to Arthur's model? Although applying modern economic models to prehistoric cultural contexts is bound to raise some eyebrows, we are taken with this sequence of innovation, historical chance, and emulation as a stimulating way of considering how early Southeastern Mesoamerican monumental architectural plans and certain correlative religious iconography became «locked in» as horizon styles of wide geographic acceptance and long temporal duration.

John Clark and Richard Hansen (in press) have recently debated whether Olmec civilization directly engendered social complexity in the Maya lowlands, or if the lowland Maya innovated core public practices and facilities on their own and were early Middle Formative rivals to the Olmec in matters of political ideology. Central to their debate is an architectural complex called the E-Group, after the original complex investigated at the Maya site of Uaxactun in Petén, Guatemala (Ricketson and Ricketson 1937). Without addressing the complex problem, raised by the work of Clark and Hansen, of how ethnicities are identified in the archaeological record, we regard the E-Group as a magical amplifying instrument of a very practical technology (c.f., Condominas 1986); the cultivation and harvesting of maize and other staple agricultural crops. We face three challenges, however, in understanding the dynamics of herd-behavior with the adoption of the E-Group as an «ideological technology.» First, we must show the connections between the architectural design of E-Groups and the magical intervention in the production of maize by people in po-

wer. Second, we need to demonstrate that the innovation of such magical and ritual means of production is a matter of culturally selecting and exalting certain religious metaphors taken from nature, an arbitrary and historically contingent process. Finally, we need to show that the dynamics of adopting such magical technology is an example of reinforcing existing social and cultural relations.

## E-GROUPS AND MAIZE

The earliest expression of Maya «ritual technology» in architecture that we can point to is the in-line triad building design that typifies E-Groups (Figure 1). E-Groups are typically comprised of a single square pyramidal platform on the western side of a plaza, with a longer, rectangular platform surmounted by three secondary buildings or platforms on the eastern side of the plaza (Aveni and Hartung 1989; Chase 1983; Chase and Chase 1995; Hansen 1992, 1998; Laporte and Fialko 1987, 1990, 1995; Ricketson and Ricketson 1937; Ruppert 1940). Ricketson and Ricketson (1937), in their study of the original E-Group at Uaxactun, determined that it could have served as a means of observing the progress of the dawning sun along the eastern horizon during the course of its annual cycle. Subsequent archaeoastronomy (Aveni and Hartung 1989) at other E-Groups shows that this association with the sun cycle is not consistently demonstrable everywhere. Nevertheless, the fact that this E-Group is

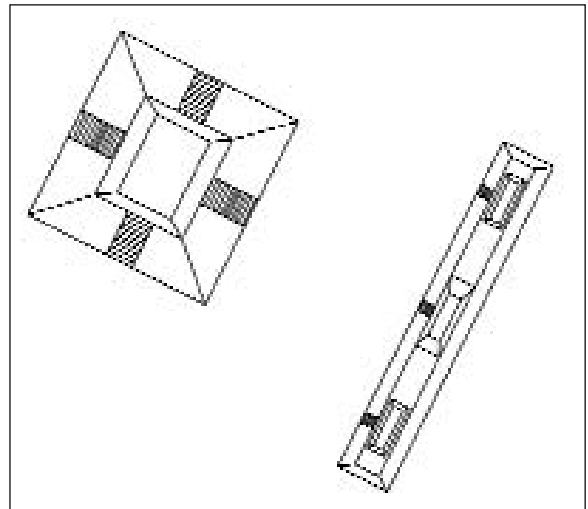


Figure 1. Schematic Drawing of an E-Group.

so associated is worth bearing in mind; architectural references to the sun cycle and to other heavenly bodies are a pervasive feature of Precolumbian architecture in southeastern Mesoamerica beginning in the Formative (Freidel *et al.* 1993; Reilly 1987, 1994) and the Maya of Uaxactun may have conflated solar symbolism with the E-Group for reasons yet unknown.

As Schele and Mathews (1998) recently detailed, the iconography on Structure E-IV-Sub, the famous Late Preclassic version of the western pyramid in the Uaxactun E-Group, exalts the Maize god on the middle tier of giant masks (Figure 2). These scholars propose that the pyramid, in this regard, symbolically represents the mountain of sustenance (see also Schele 1996). A famous Late Classic Maya expression of this mountain of sustenance concept is found under the feet of king Kan Balam II of Palenque on the Panel of the Foliated Cross. There, a Janus-Headed Mountain Monster carries in his eyes glyphs that gloss «first or green true mountain of maize». The mountain is splitting open, maize foliation and corn cobs are emerging, and the king above the mountain is dressed at the youthful Maize god following his resurrection. This image harkens to stories of the Maya Creation in which human beings are shaped from maize dough obtained from a maize plant inside a mountain (c.f. Tedlock 1985). There are numerous other examples

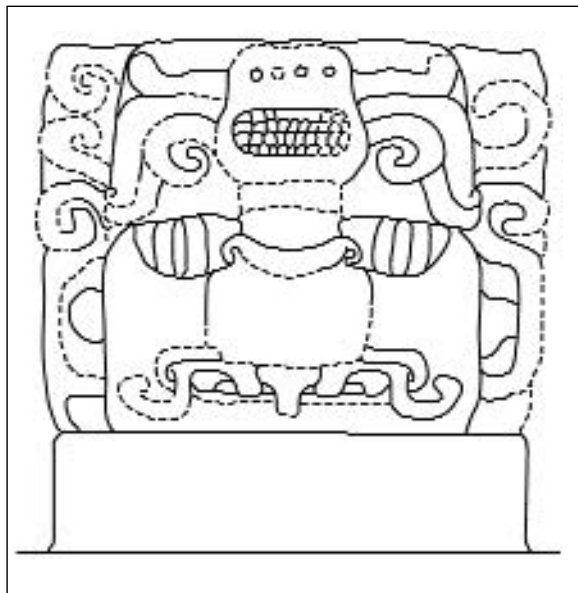


Figure 2. Mask of Maize God, Structure E-IV-Sub, Uaxactun, Guatemala.

of the Maya mountain monsters with maize foliation or the resurrected Maize god emerging from its head. While it is clear that the Maya had other important ideas about personified mountains, this association with maize was early and significant in the case of the E-Group at Uaxactun.

While other western pyramids of E-Groups do not lend themselves quite so easily to iconographic interpretation, the common plan of these buildings as symmetrically four-sided and often with radial stairways on all sides, evinces their significance as *Kan Witz*, where Kan means four. *Kan*, as Linda Schele and Peter Mathews (1998) point out, is a homophone with kan meaning snake. Snake mountain is another important kind of sacred place referring back to the Creation time for ancient Mesoamericans. *Kan*, however, is also a near homophone with *kaan*, meaning sky. Pyramids are obviously sky oriented buildings, but Maya pyramids in particular are associated in Classic period glyphic texts with a kind of sacred place called *kan*, or *chan*, *ch'een*, meaning sky cave, which David Stuart (2000) persuasively associates with the most important pyramids and their summit temple chambers. Freidel (2000) argued that this chain of important word associations can be extended to *kaan*, cordage, as in the umbilicus of birth, and *k'an* meaning yellow, precious, and, as a symbol called the *K'an* Cross, which can mark the birthplace of the Maize god.

One expression of this last idea is found on the aforementioned Panel of the Cross, where the magical maize plant representing the resurrection of king *K'inich Jahnab Pakal* the Great is emerging from such a *K'an* Cross. The *K'an* Cross is basically, in plan, the design of a radial four-sided pyramid. So the very design of the radial pyramid in general, and the western pyramid of the E-Group in particular, may express association with the resurrection of the Maize god.

The eastern platform of the E-Group complex, typically with its three surmounting platforms or buildings, lacks explicit iconographic decoration on the Uaxactun example, and our approach will again emphasize the significance of the design as in the last argument concerning the radial structure. As a design, the eastern structure constitutes an expression of an in-line triad, as contrasted with a triad of buildings or pyramids that comprise a triangular plan, as in the case of the Cross Group at Palenque. We propose that the in-line triad design is basically an expression of a very overt celestial pattern, the three belt stars of the constellation Orion. Floyd Lounsbury discerned the significance of the belt stars of Orion to the Maya

when he identified these as the three *Lamat* symbols on the back of a turtle painted on the capstones of a room in the famous painted palace at Bonampak, Chiapas. Mary Miller (1986) remarked on this representation of a constellation in her monograph on Bonampak, and Linda Schele reiterated the argument in *Maya Cosmos*. The association of the in-line triad of structures with the celestial turtle, called *Chak Ak* by the ancient Maya, is by means of the Maize god (Freidel *et al.* 1993). There are a number of images in the Classic corpus that depict the Maize god emerging as a youthful lord from a crack in a turtle carapace. We would argue that the in-line triad of the eastern range on the typical E-Group, like the radial pyramid on the western side, is a symbol of the birthplace of the Maize god. In its essence, then, we suggest that the E-Group is not so much a celestial observatory as it is a place for performing rituals commemorating the rebirth of the Maize god at the beginning of the present Creation. Indeed, there are several examples of the combining of the radial *K'an* Cross and the Celestial Turtle, such that the Maize god rises from a crack in the turtle carapace that is marked with the *K'an* Cross. One important Maya capital, Caracol, has an early E-Group at the far eastern edge of its distribution in the southern lowlands. Caracol's Emblem Glyph is *K'an tu Mak*, the *K'an* cross in the turtle carapace.

Moreover, the in-line triadic design in later Classic period Maya art can manifest Creation symbolism even without direct reference to the turtle. Linda Schele (1979) in her review of tripartite compositions at Palenque, laid the groundwork for the identification of the three places in that triad as the three stones of Creation, the Three-Stone place, another metaphor for the birthplace of the Maize god. The three stone-thrones of the Palenque tripartite compositions are, in turn, anchored into tripartite iconography found on Structure 29 at Cerros, a Late Preclassic ritual setting (Reese-Taylor 1996; Schele and Freidel 1990).

Archaeological support for the interpretation of the E-Group as a representation of the resurrection of the Maize God comes from a series of caches found in some of the eastern structures. Although only a few of the E-Groups in the Maya lowlands have been systematically investigated, Arlen Chase (1983) noted that many of the in-line triadic structures have lip to lip vessel caches containing severed heads. This systematic depositional pattern has been recently confirmed at Calakmul, a very important *Kan* place, by Ramón Carrasco (1999). The caches may represent First Father, the Maize God whose severed head was pla-

ced in the world tree after a fateful ballgame with the Lords of *Xibalba*, the underworld. In the Creation story, the sons of the Maize God resurrect their father through the turtle carapace. Although it is tempting to view the *cajetes* enclosing the severed heads as the two sides of the turtle carapace, the vessels are always monochrome and do not provide supporting iconographic evidence. A more convincing association with the Maize God are the severed heads themselves which reify First Father in many other iconographic and material contexts including those associated with the ballgame.

If we are on the right track, then the E-Group came into popularity in the Maya lowlands as a ritual theater for performing the rebirth of the Maize god, and the timing and spread of this architectural complex would register the innovation and diffusion of a new ritual technology for insuring agricultural prosperity in farming strategies focusing on maize production. One of the most important ways to insure prosperity in such farming regimes must have been the establishment of regional networks of communities who participated in trade markets and pilgrimage fairs. Maize cannot be effectively stored for more than a few years in the moist tropics, so that the only way to offset the prospect of periodic famine when drought, hurricanes, or pests cause crop failure, is through market networks. Surplus maize in market systems can be sold for imperishable goods, and then when crops fail or are inadequate, the imperishable goods can be sold for food and seed in the same markets. This was, in fact, the observed practice in Yucatán in the Contact Period (Freidel and Scarborough 1982; Freidel and Shaw 2001), and Freidel (1986) has long argued that currency based market systems were the common economic institutions of Mesoamerica generally. So we suggest that one reason the E-Group technology may have worked was because people who participated in the ritual festivals also traded in the markets that typically accompany such festivals even to the present day in Mesoamerica (Freidel 1981). The ritual practice was in a practical manner tied to institutions redistributing perishable food stocks and imperishable tokens of wealth to effectively offset the risks of Maize agriculture in the tropical lowlands.

#### SPREAD AND LOCK-IN OF THE IN-LINE TRIAD

If maize agriculture worked in the lowlands because of the innovation of regional festival and marketing

networks, it is quite possible to imagine that such festivals were at some level competitive and that several different ritual «technologies» were being formed and expressed simultaneously. These different ritual complexes should be recognizable by their different symbolic emphases, even if all of them, at the base, were aimed at insuring agricultural prosperity and a subsistence economy relying on maize production. This is the situation we envision for the lowland Olmec and their lowland Maya neighbors to the east at the beginning of the Middle Formative Period. No doubt the Olmec were the first to innovate an effective network of the kind we are talking about during the Early Formative period, at least several centuries before the lowland Maya established such a network. Nevertheless, when the Maya network comes into focus in the early Middle Formative, it demonstrates innovative competition rather than wholesale adoption of the Olmec ritual technology.

The Gulf Coast lowland Olmec are well known for their innovations in ritual technology. Well known symbols such as the flaming eyebrow, hand-paw-wing, Olmec dragon, St. Andrews cross, vegetal motifs with an emphasis on maize, and stylistically distinct jaguarian imagery became socially negotiated symbols shared in diverse areas of Mesoamerica during the Early Formative (Clark and Pye 2000; Coe 1965; Joralemon 1976; Joyce and Henderson 2001; Reilly 1987, 1994; Schele 1995; Taube 1996). Interestingly, many of these symbols do not occur in the Maya lowlands with any degree of regularity, suggesting to some that the lowland Maya were not rigorously participating in the Olmec interaction networks. While this assertion remains to be demonstrated, the issue of Middle Formative E-Groups in the Gulf Coast lowlands has recently been raised by John Clark and Richard Hansen (in press). This debate provides a starting point to examine innovative competition among the Olmec and Maya.

John Clark proposes (Clark and Hansen, in press), in his collaborative discussion of E-Group development with Richard Hansen, that the earliest E-Groups are to be found in Chiapas and that these date to the Middle Formative period (ca. 600-850 B.C.). Hansen disputes this assertion, suggesting that the ceramic dating of the Chiapas E-Groups is not as reliable as the radiocarbon dating of early Middle Formative E-Groups in Petén at Nakbe and Tikal. In fact, no supposed E-Groups have been extensively excavated in Olmec country making it difficult to date these triadic assemblages and assess their function. Despite this

problem, we believe that Clark and Hansen are correct in associating the in-line triadic form in Olmec country with the same cosmological concepts embodied by the Maya E-Group.

We would suggest, however, that one key feature of the E-Group, the in-line triadic design, occurs earliest at Blackman Eddy in Belize, in the context of the earliest radiocarbon documented public architecture in the Maya lowlands rather than in Olmec country (Brown *et al.* 2000; Garber *et al.* 1998). Blackman Eddy is a small site in the Belize River Valley. Excavations in the B Complex, revealed in-line triadic Middle Formative public architecture complete with stucco masks during one construction phase. The western building was destroyed by modern activity, but given the Maya penchant for symmetry, the in-line triad is likely expressed in Complex B. Although Olmec motifs were recovered on Cunil ceramics associated with the earliest levels of construction, symbolic references to Olmec ideology disappear by the time the in-line arrangement was constructed. The B Complex at Blackman Eddy does not face west, as in the typical E-Group, but rather south. Further, it has no accompanying radial structure. As we have argued above, however, the in-line triad is, in itself, a theater for performing the resurrection of the Maize god. And there is, in fact, a turtle carapace associated with one phase of this building complex. A western facing focus and a radial structure may have been added to the complex at other Maya sites later in time. We do not agree with Arlen Chase's (1983) assertion that the idea of an E-Group is strictly defined by form and orientation.

We would posit that the turtle as an image of the Maize god's place of rebirth is primarily a Maya innovation, coming from the Caribbean coast and diffusing into the interior of the Maya lowlands. To be sure, turtles occur in the Olmec Middle Formative corpus of imagery, along with almost every other animal of any significance in Mesoamerica. However, the Olmec focus was not on the turtle so much as the crocodile when it comes to beasts bearing gods (Reilly 1994). The mother crocodile was, eventually, an important image to the Maya as well. So we are looking at emphases rather than presence versus absence of these motifs. Moreover, we are tracking competitive diffusion of these images and architectural complexes as the Middle Formative Maya network emerged as a competitor to the existing Olmec network.

Although Clark and Hansen focus on the Chiapas Maya/Zoque border as the interface for interaction during the Middle Formative, another logical place to se-

arch for evidence of cultural contact between the Maya and Olmec is the northern Maya lowlands, accessible to Olmec country by sea routes. This area has been rather neglected in such reconstructions, although the site of Komchen is sometimes discussed. Recent fieldwork by several projects suggests that complex innovations may have occurred in this region during the Middle Formative. Interestingly, Mamon ceramics from the northern lowlands demonstrate strong modal similarities to ceramics in the Gulf Coast lowlands, including La Venta (Andrews 1986, 1990; Joesink-Mandeville 1970, 1977; Joesink-Mandeville and Meluzin 1976; Robles 1998: 257).

More importantly, though, elements of the Maize theater appear in the northern lowlands during the Middle Formative. At Yaxuná, exploratory trenches by the Carnegie Institution in a E-Group revealed a Late Preclassic date for its final construction phase (Brainerd 1958). Given a substantial Middle Formative occupation at Yaxuná (Stanton 2000a; 2000b), it is likely that earlier versions of the in-line triadic form remain buried beneath Late Preclassic architecture. The Yaxuná E-Group indicates that the in-line triadic form was a widespread regional phenomenon. Other forms of maize theater appear in this region during the Middle Formative and the region appears to have been characterized by elites with competing versions of ritual technology. The recent discovery of Middle Preclassic ballcourts on the northwest coastal plain of Yucatán by Tony Andrews and Fernando Robles suggests that a distinctly Olmec version of Maize theater, the ballgame, was adopted by ritual specialists nearest to Gulf Coast trade routes (Lawton and Medina 2001). Other architectural plans are more difficult to interpret. The plan at Komchen, for instance, was not adopted by later Maya. It suggests, however, that Middle Formative northern lowland Maya were experimenting with versions of ritual technology and participating in politico-ritual competition.

We believe that the northern Maya lowlands was an important partner in the greater Mesoamerican economy from Middle Formative times onward. One major product we can point to is salt, of critical importance in contact period documents (Andrews 1983). Some of the largest saltworks in Mesoamerica are located in Yucatán and the presence of northern Maya lowland ceramics at Teotihuacan during the Early Classic (Rattray) and in feasting debris at La Venta during the Middle Formative (Tim Beach, personal communication 2001) may indicate the importance of the northern salt trade to «foreign» polities becoming

more reliant on maize production and consumption. The introduction of maize theater in the form of a single E-Group and several ballcourts in the northern lowlands during the Middle Formative probably signals the entry of the northern lowland Maya into emerging interregional interaction sphere of Mesoamerica. How northern Maya lowland polities were internally and regionally organized and how architecture like the ballcourt and E-Group functioned in this region are still unsolved questions. While some scholars have noted differences in sociopolitical organization among northern lowland polities and polities located in other regions of Mesoamerica including the southern lowlands during the Late Classic to Postclassic periods, these differences may have their genesis in the Formative. The important point, however, is that the northern lowlands may have played an important role in the diffusion and mediation of variants of maize theater between the southern lowlands and the Olmec region. Yet, until refinements in dating the northern lowland material are conducted, the role of this region in the spread of the in-line triad is uncertain.

At present, we do not view the evidence for the east to west spread of the in-line triad as a forceful imposition of ideology. Although we suspect that migrations of people took place and that each region was composed of varying degrees of ethnic heterogeneity, the evidence that could be marshaled for an argument of a forceful imposition of the in-line triad technology is problematic. First, the material markers that have been presented for migration arguments are stylistic in nature and present the age-old question; what does style mean? Second, evidence for warfare such as terminations rituals and defensive features is not currently sufficient to argue for some sort of state imposed religious system. We believe that a more likely scenario involves, but is not necessarily exclusive of, the local adoption of the successful variants of maize theater by foreign elite factions. That the most prominent E-Groups are found at large centers such as El Mirador, Nakbe, and Tikal in Petén may indicate how other centers outside Petén may have viewed the technology as successful. We must be careful to interpret concurrent changes in material culture and burial patterns in portions these areas as well.

In summary, we identify the beginning of the E-Group in Maya country with the innovation of the in-line triad complex. Just exactly when and where the in-line triad was combined with the radial structure on an east-west axis remains to be seen. If the direc-

tion of diffusion is from Belize into the interior of Petén, then Richard Hansen, in our view, is more likely to be right about the Nakbe and Tikal E-Groups being earlier than the E-Groups in Chiapas and Tabasco. What is certain is that the E-Group «locked in» in the Middle Formative as a kind of ritual theater with as strong a presence in the Maya lowlands as in the Olmec country to the west but without the elaborate iconographic complex innovated by the Olmecs in stone sculpture and portable art. To us, this indicates that the Maya network was not solely dependent on the Olmec network for its economic and political viability but that, on the contrary, the Olmecs were buying into the Maya network and its new theater for Maize god performances. In short, both cultures were mutually buying into the ritual theater of the other. Once these ideologies were agreed upon, they appear to become locked-in, to some degree at least, for centuries. And, most likely, the people who adopted foreign theater made it their own. The E-Group and the ballcourt do not have remained «foreign» in new areas for very long.

## DISCUSSION

So we return at this point to Arthur's model. Have we answered our three questions? Is the E-Group an expression of magical intervention by ritual specialists? Although it is difficult to «read» the intentions of individuals, we believe that the evidence clearly supports the interpretation of the E-Group as a geomantic tool for Maize rituals. Was the ideology behind the E-Group the result of culturally selecting and exalting certain religious metaphors taken from nature, an arbitrary and historically contingent process? We suggest that the choice of the turtle imagery in light of other possible options open to the Maya, such as those expressed at early sites such as Komchen, affirm that it was. Finally, was the widespread adoption of E-Groups accomplished through the reinforcing interactions of social agents? This final question is not easy to answer for a number of reasons.

While the timing of in-line triads is far from certain, we feel that the current evidence indicates that it is a Maya, not an Olmec, innovation. If we are correct, we still face the problem of understanding the complex social relations were responsible for the negotiation of interregional adoption of this ideological technology. As Arthur Joyce (2000) and Tim Pauketat (2000) have demonstrated, the process of the adoption of elite mo-

numental architecture not only involved the actions of elite, but was conditioned by the agency of commoners as well. In this light, we envision a situation where emerging elites in attempted to appropriate power through the creation, adoption, and transformation of ritual theater centered around agriculture. Ritual legitimizes social inequality and is thus a mechanism by which hierarchy can develop (Bloch 1977; Conkey 1985). Individuals agree to cooperate with the ritual process through belief in its power as a sanctioning device or by persuasive force (Aldenderfer 1993). Through chance events that are currently beyond our understanding, it is possible that the success of the in-line triad as form of this theater where elites portrayed themselves as mediators between the emerging commoner class and the cosmos influenced its adoption by a wide range of elites competing for power in their communities. That the Maya continued to elaborate on this form and placed important kings in later versions of these building during the Classic Period, attests to the importance of this locked-in tradition. In this sense, we believe that Arthur's model has merit.

Yet an uncritical use of Arthur's model brings up the problem of homogenizing the actors of the past. Mary Miller (1998:195) recently pointed out that «despite a widely recognized vocabulary in both writing and iconography, almost no duplication ever occurs in Maya art.» Despite the fact that her point could be argued, the value of her statement is that while people may be influenced by others, they can take an idea and make it their own. Therefore, we must be careful not to lose sight of the heterogeneity of culture from community to community and from individual to individual. For ideology, we might expect intentional variability as rulers transform ideas and symbols to further their hold on power. Slight innovations in a ritual system may actually be common, bringing up the question; how similar do ideas have to consider them locked-in? Is Bird Jaguar's Late Classic innovation of the flapstaff ritual at Yaxchilán part of the same ritual system used by his ancestors (Schele and Freidel 1990)? It is definitely not as drastic a change as the eighth century arrival of the Feathered Serpent cult (Ringle *et al.* 1998), yet this is a difficult question to answer. Since E-Groups changed their forms throughout the centuries, we may question just how locked-in they were.

The way Arthur outlines his model, he draws attention to an important social process, self-reinforcement, yet it is difficult to apply the model in such a simple form because it does not account for other variables that have huge impacts on decision-making; like the

fact that innovation in ideology can be just as important as sticking to tradition. At this time, we might suggest that a general ethos is locked-in rather than a particular version of the technology and that there are degrees of «locked-in-ness.» This criticism could also be applied to technological studies as Dobres (1995) has pointed to the variability of technology within locked-in traditions. We believe, however, that the idea has merit and that the E-Group is an example of how some degree of lock-in can occur in the realm of ideology.

## REFERENCES

- ALDENDERFER, Mark S. 1993. «Ritual, Hierarchy, and Change in Foraging Societies». *Journal of Anthropological Archaeology* 12: 1-40.
- ANDREWS, E. Wyllys, V. 1986. «Olmec Jades from Chacsinkin, Yucatan, and Maya Ceramics from La Venta, Tabasco». In *Research and Reflections in Archaeology and History: Essays in Honor of Doris Stone*, Ed. E.W. Andrews V, pp. 11-49. MARI. Pub. 57. Tulane University. New Orleans.
- ANDREWS, E. Wyllys, V. 1990. «The Early Ceramic History of the Lowland Maya». In *Vision and Revision in Maya Studies*, Eds. F.S. Clancy y P.D. Harrison, pp. 1-19. University of New Mexico Press. Albuquerque.
- ARTHUR, W. Brian. 1989. «Competing Technologies, Increasing Returns, and Lock-In by Historical Events». *Economic Journal* 99: 116-131.
- AVENI, Anthony F. and Horst HARTUNG. 1989. «Uaxactun, Guatemala, Group E and Similar Assemblages: An Archaeoastronomical Reconsideration». In *World Archaeoastronomy*, Ed. A.F. Aveni, pp. 441-461. Cambridge University Press. Cambridge.
- BANERJEE, Abhijit V. 1992. «A Simple Model of Herd Behavior». *The Quarterly Journal of Economics* 105: 797-817.
- BLOCH, Maurice. 1977. «The Past in the Present and the Past». *Man* 12: 278-292.
- BOEHM, Christopher. 1978. Rational Preselection from Hamadryas to Homo sapiens: The Place of Decisions in Adaptive Process». *American Anthropologist* 80: 265-296.
- BOEHM, Christopher. 1993. «Egalitarian Behavior and Reverse Dominance Hierarchy». *Current Anthropology* 24: 227-254.
- BRAINERD, George W. 1958. *The Archaeological Ceramics of Yucatan*. University of California Anthropological Records. Vol. 19. Berkeley.
- BROWN, M. Kathryn, Travis W. STANTON and James F. GARBER. 2000. «Maya Warfare as a Ritualized Institution». Paper presented at the 65<sup>th</sup> Annual Meeting of the Society for American Archaeology, Philadelphia.
- CARRASCO V., Ramon. 1999. «Actividad ritual y objetos de poder en la Estructura IV de Calakmul, Campeche». In *Land of the Turkey and the Deer*, Ed. R. Gubler, pp. 69-84. Labyrinthos. Lancaster.
- CHASE, Arlen F. 1983. *A Contextual Consideration of the Tayasal-Paxcaman Zone, El Petén, Guatemala*. Ph. D. Dissertation. University of Pennsylvania. University Microfilms. Ann Arbor.
- CHASE, Arlen F. and Diane Z. CHASE. 1995. «External Impetus, Internal Synthesis, and Standardization: E-Group Assemblages and the Crystallization of Classic Maya Society in the Southern Lowlands». In *The Emergence of Lowland Maya Civilization: The Transition from the Preclassic to the Early Classic*, Ed. N. Grube, pp. 87-101. Acta Mesoamericana 8. Verlag Von Fleming. Möckmühl.
- CLARK, John E. and Mary E. PYE. 2000. *Olmec Art and Archaeology in Mesoamerica*. Studies in the History of Art. Volume 58. National Gallery of Art. Washington D.C.
- COE, Michael D. 1965. «The Olmec Style and Its Distribution». In *Handbook of Middle American Indians. Vol. 3: Archaeology of Southern Mesoamerican, Part Two*, Ed. G.R. Willey, pp. 739-775. University of Texas Press. Austin.
- CONDOMINAS, Georges. 1986. «Ritual Technology in Swidden Agriculture». In *Rice Societies: Asian Problems and Prospects*, Eds. I. Norlund, S. Cederroth and I. Gerdin. Curzon Press. Riverdale.



- CONKEY, Margaret W. 1985. «Ritual Communication, Social Elaboration, and Variable Trajectories of Paleolithic Material Culture». In *Prehistoric Hunter-Gatherers: The Emergence of Cultural Complexity*, Eds. T.D. Price and J.A. Brown, pp. 299-324. Academic Press. Orlando.
- DOBRES, Marcia-Anne. 1995. «Gender and Prehistoric Technology: On Social Agency of Technical Strategies». *World Archaeology* 27: 25-49.
- FREIDEL, David A. 1981. «The Political Economics of Residential Dispersion Among the Lowland Maya». In *Lowland Maya Settlement Patterns*, Ed. W. Ashmore, pp. 371-382. University of New Mexico Press. Albuquerque.
- FREIDEL, David A. 1986. «Terminal Classic Lowland Maya: Successes, Failures, and Aftermaths». In *Late Lowland Maya Civilization: Classic to Postclassic*, Eds. J.A. Sabloff and E.W. Andrews, pp. 409-430. University of New Mexico Press. Albuquerque.
- FREIDEL, David A. 2000. «Mystery of the Maya Façade». *Archaeology* 53 (5): 24-28.
- FREIDEL, David A., Linda SCHELE and Joy PARKER. 1993. *Maya Cosmos: Three Thousand Years on the Shaman's Path*. William Morrow and Company, INC. New York.
- FREIDEL, David A. and Justine M. SHAW. 2001. «The Lowland Maya Civilization: Historical Consciousness and Environment». In *The Way the Wind Blows: Climate, History, and Human Action*, Eds. R.S. McIntosh, J.A. Tainter and S.K. McIntosh, pp. 271-300. Columbia University Press. New York.
- GARBER, James F., M. Kathryn BROWN and Christopher J. HARTMAN. 1998. «Middle Preclassic Public Mask, Triadic Architectural Arrangement, and Early Ritual Deposits at Blackman Eddy: Implications for Social Complexity during the Middle Preclassic». In *The Belize Valley Archaeology Project: Results of the 1997 Field Season*, Eds. J.F. Garber y M.K. Brown, pp. 33-48. Report submitted to Department of Archaeology, Belmopan, Belize.
- GLADWIN, Hugh and Michael MURTAUGH. 1980. «The Attentive-Preattentive Distinction in Agricultural Decision Making». In *Agricultural Decision Making: Anthropological Contributions to Rural Development*, Ed. P. Barlett, pp. 115-136. Academic Press. New York.
- HANSEN, Richard D. 1992. *The Archaeology of Ideology: A Study of Maya Preclassic Architectural Sculpture at Nakbe, Peten, Guatemala*. Ph. D. Dissertation. University of California. Los Angeles.
- . 1998. «Continuity and Disjunction: The Pre-Classic Antecedents of Classic Maya Architecture». In *Function and Meaning in Classic Maya Architecture*, Ed. S.D. Houston, pp. 49-122. Dumbarton Oaks. Washington D.C.
- HILL, James N. 1994. «Prehistoric Cognition and the Science of Archaeology». In *The Ancient Mind: Elements of Cognitive Archaeology*, Eds. C. Renfrew and E.B.W. Zubrow, pp. 83-92. Cambridge University Press. Cambridge.
- JOESINK-MANDEVILLE, LeRoy V. 1970. *The Comparative Cultural Stratigraphy of Formative Complexes in the Maya Area: A Reappraisal in Light of New Evidence from Dzibilchaltun, Yucatan*. Ph. D. Dissertation. Tulane University. New Orleans.
- . 1977. «Olmec-Maya Relationships: A Correlation of Linguistical, Evidence with Archaeological Ceramics». *Journal of New World Archaeology* 2: 30-39.
- JOESINK-MANDEVILLE, LeRoy V. and Sylvia MELUZIN. 1976. «Olmec-Maya Relationships: Olmec Influence in Yucatan». In *Origins of Religious Art and Iconography in Preclassic Mesoamerica*, Ed. H.B. Nicholson, pp. 87-105. UCLA Latin American Center Publications. Los Angeles.
- JORALEMON, David. 1976. «The Olmec Dragon: A Study in Pre-Columbian Iconography». In *Origins of Religious Art and Iconography in Preclassic Mesoamerica*, Ed. H.B. Nicholson, pp. 27-71. UCLA Latin American Center Publications. Los Angeles.
- JOYCE, Arthur A. 2000. «The Founding of Monte Alban: Sacred Propositions and Social Practices». In *Agency in Archaeology*, Eds. M.A. Dobres and J.E. Robb, pp. 71-91. Routledge Press. London.
- JOYCE, Rosemary A. and John S. HENDERSON. 2001. «Beginnings of Village Life in Eastern Mesoamerica». *Latin American Antiquity* 12 (1): 5-24.
- LAPORTE, Juan Pedro and Vilma FIALKO. 1987. «La cerámica del Clásico Temprano desde Mundo Perdido, Tikal: una reevaluación». In *Maya Ceramics*, Eds. P.M. Rice and R.J. Sharer, pp. 123-181. B.A.R. International Series 345. Oxford.

- . 1990. «New Perspectives on Old Problems: Dynastic References for the Early Classic at Tikal». In *Vision and Revision in Maya Studies*, Eds. F.S. Clancy and P.D. Harrison, pp. 33-66. University of New Mexico Press. Albuquerque.
- . 1995. «Un reencuentro con Mundo Perdido, Tikal, Guatemala». *Ancient Mesoamerica* 6 (1): 41-94.
- LAWTON, Crorey and Edgar MEDINA C. 2001. «The World Cup at P'odunc, Mexico: Ballcourts at Small Sites in Northwest Yucatan». Paper presented at the 66<sup>th</sup> Annual Meeting of the Society for American Archaeology, New Orleans.
- MILLER, Mary Ellen. 1986. *The Murals of Bonampak*. Princeton University Press. Princeton.
- . 1998. «A Design for Meaning in Maya Architecture». In *Function and Meaning in Classic Maya Architecture*, Ed. S.D. Houston, pp. 187-222. Dumbarton Oaks. Washington D.C.
- ORTIZ, Sutti. 1967. «The Structure of Decision Making Among Indians in Columbia». In *Themes in Economic Anthropology*, Ed. R. Firth, pp. 191-228. Tavistock. London.
- PAUKETAT, Timothy R. 2000. «The Tragedy of the Commoners». In *Agency in Archaeology*, Eds. M. A. Dobres y J.E. Robb, pp. 113-129. Routledge Press. London.
- REESE-TAYLOR, Kathryn V. 1996. *Narratives of Power: Late Formative Public Architecture and Civic Center Design at Cerros, Belize*. Ph.D. Dissertation. University of Texas. Austin.
- REILLY, F. Kent, III. 1987. *The Ecological Origins of Olmec Symbols of Rulership*. MA thesis. University of Texas. Austin.
- . 1994. *Visions to Another World: Art, Shamanism, and Political Power in Middle Formative Mesoamerica*. Ph. D. Dissertation. University of Texas. Austin.
- RICKETSON, Oliver G. and Edith B. RICKETSON. 1937. *Uaxactun, Guatemala, Group E*. C.I.W. Pub. 447. Washington D.C.
- RINGLE, William M., Tomás GALLARETA N., y George J. BEY III. 1998. «The Return of Quetzalcoatl: Evidence for the Spread of a World Religion during the Epiclassic Period». *Ancient Mesoamerica* 9 (2): 183-232.
- RUPPERT, Karl. 1940. «A Special Assemblage of Maya Structures». In *The Maya and their Neighbors: Essays on Middle American Anthropology and Archaeology*, Eds. C.L. Hay, R.L. Linton, S.K. Lothrop, H.L. Shapiro, y G.C. Valliant, pp. 222-231. D. Appleton-Century Company, INC. New York.
- SCHELE, Linda. 1995. «Sprouts and the Early Symbolism of Rulers in Mesoamerica». In *The Emergence of Lowland Maya Civilization*, Ed. N. Grube, pp. 117-135. Acta Mesoamericana 8. Verlag Anton Saurwein. Möckmühl.
- SCHELE, Linda, y David A. FREIDEL. 1990. *A Forest of Kings: The Untold Story of the Ancient Maya*. William Morrow. New York.
- SCHELE, Linda, y Peter MATHEWS. 1998. *The Code of Kings: The Language of Seven Sacred Maya Temples and Tombs*. Scribner. New York.
- STANTON, Travis W. 2000a. *Heterarchy, Hierarchy, and the Emergence of the Northern Lowland Maya: A Study of Complexity at Yaxuna, Yucatan, Mexico (400 B.C. -A.D. 600)*. Ph. D. Dissertation. Southern Methodist University. University Microfilms. Ann Arbor.
- . 2000b. Preclassic Sociopolitical Interaction in the Northern Maya Lowlands. Paper presented at the Annual Meeting of the American Anthropological Association, San Francisco.
- TAUBE, Karl A. 1996. «The Olmec Maize God: The Face of Corn in Formative Mesoamerica». *RES* 29/30: 39-81.
- TEDLOCK, Dennis. 1985. *Popul Vuh*. Touchstone. New York.
- WALDROP, M. Mitchell. 1992. *Complexity: The Emerging Science at the Edge of Order and Chaos*. Simon and Schuster. New York.

