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THE ARCHAEOLOGY OF SUSTAINABILITY: MESOAMERICA

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Abstract

The role of human ecology in a Mesoamerican context requires both rigor and imagination to assess the sophistication and accomplishment of the many diverse groups sharing its varied resources. Three overlapping and complementary ecological orientations from recent literature found generally elsewhere—outside the culture area—are (1) resilience and vulnerability of communities and their landscapes, (2) economic tasking logics, and (3) complexity trajectories. Mesoamerica charted a unique economic, political, and ideological course when compared to the Old World, one significantly affected by its environmental opportunities and constraints. Brief attention is given to lessons learned.

> "The past is never dead. It's not even past."
> —William Faulkner, **Requiem** ***for a Nun*** (1951)

When asked by Geoff McCafferty and Bill Fowler to write a piece about human ecology for the *katun* issue of *Ancient Mesoamerica*, I was pleased and challenged—pleased with the opportunity to develop my thinking with respect to landscapes and water systems of the past, but challenged by the need to make the presentation different from another survey of cultural geographic regions (Whitmore and Turner 2005). Over the years, archaeology has come to divergent assessments and goals that frequently separate into those emphasizing the humanities and those championing the sciences. Many of us see this as a false dichotomy, given the tenets of anthropology, which for most of us remains our overarching discipline (Marcus and Flannery 1994; Scarborough 1998). With respect to a less traditional assessment—perhaps—of ecological variables in the ancient record, I wish to integrate more fully the human face into our biophysical dimensions of the past for a truly anthropological evaluation of Mesoamerica and beyond.

The attractiveness of anthropological archaeology is that we foundationally deal with the material—everyday things that sometimes transform into spectacular architecture and artifacts of enduring merit. From the vantage of humanism, what we do fundamentally is to enliven and give voice to the myriads of past peoples without history—seldom with palatial dwellings in life or tombs in death—and allow them to partially speak about what they valued. It is a most imperfect decipherment and understanding, but it is much more than that made accessible by any other discipline by any other means.

Furthermore, our scientific approaches permit a complementary orientation that delves into the environmental contexts by which we live, frequently the underpinnings for immediate economic and political decision making. Archaeology has a long "natural history" of data retrieval rooted in environmental reconstructions identifying the constraints and options by which humans and societies harvest or exploit that which is necessary for making a living. In addition to our rich and textured interpretive base, we have developed the tools and language that immediately interdigitate with the natural sciences. We are the only social science that can make this bridge comfortably and in a welcomed manner.

My intent in this article is to develop a line of thinking that might appeal to both humanists and those with strong natural science leanings. I will make the suggestion—one made by several colleagues before me (Marcus and Flannery 1994:55)—that archaeology's strength rests with its ability to combine cleverly both these disciplinary orientations (though frequently assessed as divisions) to address truly meaningful issues of both the past and, by extension, our present. To aid in cultivating these linkages from our interpretations of the ancient past, a brief assessment of our uniting evidentiary logic is offered, drawing from the rich and complicated data sets of ancient Mesoamerica.

Where do our inferences come from? What is speculation? Who says? These queries are at the level of philosophy of science and our perceptions of what is disciplinary order. In the New World, the history of archaeology is grounded in the colonial encounter. What Columbus and his successors recorded about native peoples and what they did to them and their environments represents our principal baseline, a baseline that is frequently assumed by most of us less knowledgeable but wedded by extension to those early Spanish documents by our more informed colleagues (like our editors here!). I am not a historian and quite unable to evaluate much of this early recordation. Nevertheless, the interpretations and reinterpretations of this colonial embrace remain our principal datum for pushing the past back and linking us inferentially to an ethnohistorical grounding. That said, we frequently are faced with the colonial Spanish cultural filters that cloud this history (Coe 1999; Restall 2003). The ethnographic present is another tangible source from which archaeology readily draws, but its distance from the ancient Mesoamerican past requires yet more care to determine what are "survivals" and how they may have been distorted by subsequent periods and processes.

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What the material record of the pre-Conquest period does allow is a structural scaffolding based on the original remains of those ancient societies, scaffolding that permits the careful and adept overlay of history and ethnography in an attempt to establish degrees of "goodness of fit." Our charge in attempting to understand the past is to regularly refine the quality of our information from these three spheres: (1) ethnohistory; (2) ethnography; and (3) the past material record as retrieved by archaeologists. Our understanding of past societal structures must be an evolving process that loosely matches a kind of triangulation between these three research avenues. Because of my own dependence on cross-cultural assessments (Scarborough 2003a), I am not of the fixed opinion that our ethnography be drawn from Mesoamerica in its totality. Because we are looking for complicated associations that may not have existed during the colonization of New Spain or simply went undocumented, informed data sets from cultures elsewhere in the world when contextualized by levels of societal complexity can be judiciously incorporated. Because significant gaps exist in our empirical data, and always will, matching the past by way of highly critical assessments from other times or places of the world cannot be dismissed.

So our inferences are informed and at least partially derived from spatial and temporal patterning of things, the remains of human handiwork, contextualized by meaningful investment in notions of past societal structure. Too, it is important that the role of "speculation" not be dismissed as it is the essence of the *hypothesis* when formalized. Nevertheless, it is the purview of disciplinary thought to act reasonably based on past experience and rigorously derived insight. And this is the "who says" part of our intellectual responses and development as an archaeological community. Thomas Kuhn (1970) had much to say about the structure of disciplinary trajectories and the role of paradigm shifts. Ultimately, change or flux in a body of thought is accepted or rejected by a "group of reasonable people" trained in the ways of that body of thought. So what is acceptable inference? The number of meaningful data points necessary for affirmation of a principle or significant "fact" is dependent on the community consensus; what is unacceptable speculation even when supported by an array of marshaled "facts"—if inappropriately aligned—is implicitly juried by the same community of scholars.

In Mesoamerica, the quantity of data used to assess any aspect of the past are potentially vast, and no formulaic approach to ordering them is advisable or realistically possible. Nevertheless, three orientations drawn from human ecology and economic anthropology may help in our deliberations. These orientations are: (1) resilience and vulnerability; (2) economic logics—technotasking and labortasking; and (3) complexity. By incorporating these themes, an integrated prehistory and history is possible, one that is open to both ecology and belief systems. By introducing the terms *resilience*, *economic logic*, and *social complexity*, aspects of Mesoamerican social structure and its institutions are seen in a different light and perhaps reveal meaningful assessments for archaeology and its interpretations for both the past and present on the greater world stage. These terms and complementary orientations are ways of reconnecting our community of scholars in attempting to couch our inferences. They offer another approach for evaluating our assumptions, directing our research agendas, and linking the discipline holistically. The following sections initially identify these orientations and then contextualize their implications and meanings for our collective work in ancient Mesoamerica.

Resilience

Resilience Theory as outlined by the biological sciences has been championed by Charles Redman (2005; Redman and Kinzig 2003) on several occasions for our discipline, and I would like you to imagine it as a viable approach to what we do in Mesoamerica. At the outset, let me be clear in stating that it is not a workable theory; it doesn't yet allow testable hypotheses and unassailable prediction, though it does permit a set of explanations with the potential to contextualize both the archaeology of science and that of the humanities.

The ecologists Holling and Gunderson (2002) have emphasized the "lazy figure 8" schematic to reflect the cycles of continuous change associated with their assessment of Resilience (Figure 1). What is most apparent is the rate and process of change at several stages along the life history of the set of ecological interactions examined. The "stages" through time entail organization/reorganization (α), exploitation (r), conservation (K), and release/sentience (Ω), and they suggest a closed system in some of the early diagrams. However, the view is much more dynamic and emphasizes the permeable boundaries that always prevent closure to the system and its nonlinearity that results in significant difficulties with prediction, but it does aid in explanation. Societal change is envisaged to evolve in a similar manner in concert with its environment broadly conceived. What Resilience allows is a measure of the rate of change in the society based on its past "state" as borrowed from the above trajectory. Generally, the period in a life cycle correlated with reorganization and exploitation is associated with small and fast change to the system followed by large and slow accretional modifications identified here as periods of conservation and release. This life history trajectory and its variable pace have been interpreted as basically the same pathway for all societies and, from my vantage, assumes a technotasking economic logic (to be discussed below; Scarborough 2003a).

The notion of Resilience is that biological systems are open sets of relationships and interdependencies that adapt and survive—though vulnerability leading to fragmentation and even collapse is always an option. Generally speaking, people are poorly integrated into most of these models by the biophysical community of scientists, though human presence in biological evolution over the last 10,000 years has been legion (Denevan 1992; Scarborough 2003b). From long-term sedentism supported by aspects of domestication to true urbanism several thousand years later, our impact on the environment has

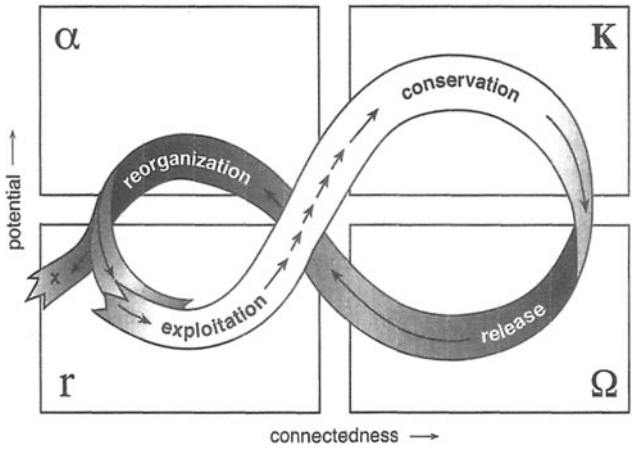

Figure 1. Lazy Figure-8 (from Hollings and Gunderson 2002).

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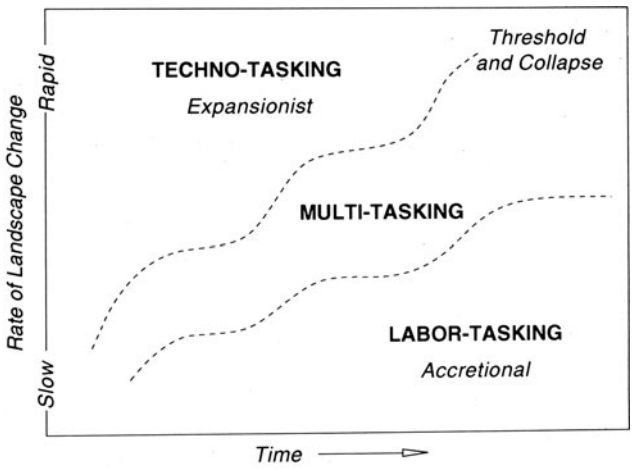

Figure 2. Schematic identifying idealized relationship between rates of landscape change and processes of resource use cross-culturally (From Scarborough 2003a).

been greater than all other factors affecting the biogeophysical ecology of the planet combined, given the extreme brevity of human existence. The attractiveness of the Resilience approach is that it seems to work in the biological sciences as assessed by "reasonable people" in spite of their natural science miscarriages, or simple neglect, of the human past. It remains a useful approach for framing and addressing aspects of social complexity and change when evaluated less as a monolithic paradigm and more as a potential linchpin for developed views about societal decision-making processes. A Resilience orientation allows an examination of societal transition by way of different rates of change contextualized by different environmental and social processes.

Economic Tasking Logics

Elsewhere (Scarborough 2003a, 2005, 2008), I have suggested that at least two pathways to social complexity exist: (1) technotasking; and (2) labortasking. These adaptations are a consequence of different rates and processes of resource use. Briefly, technotasking is the world in which we live today (Figure 2). It is driven by our societal demand to distance ourselves from the immediacy of the biophysical environs and live as comfortably as possible by way of technological breakthroughs. It has brought remarkable health, longevity, and degrees of economic well-being for growing numbers of the world's population, but it has a price (McMichael et al. 1999). Because technotasking is linked to rapid and frequently exploitative resource use, it will leave a residual and frequently subordinate population of under-skilled labor during its accelerated investment in change. Technological breakthroughs can leave sizable segments of a population behind and vulnerable to abject poverty as well as related social and environmental degradations. It frequently results in an environmental signature of over-exploitation and waste. Nevertheless, over the *longue durée*, we have come to accept this orientation as the presumed way of the human condition (Adams 1996; Clark 1992; Diamond 1997), a condition that likely evolved along the Tigris-Euphrates Rivers by the fourth millennium B.C. Grounded, in part, on the early acceptance of formalized canalization, the ability of its builders vastly increased domestic production from a desert setting of otherwise highly restricted use. The success of this rapid and exploitative trajectory is now manifest in the nation state, it co-opting all other forms of cultural evolution (Figure 3).

But at least one other pathway was well defined in the past and may have its vestiges in the ethnographic record (Lansing 1991, 2006; Scarborough et al. 1999). Labortasking is that investment in accretionally built enhancements and long-lived survival for a changing and highly dynamic landscape (Figure 2). It operates at a

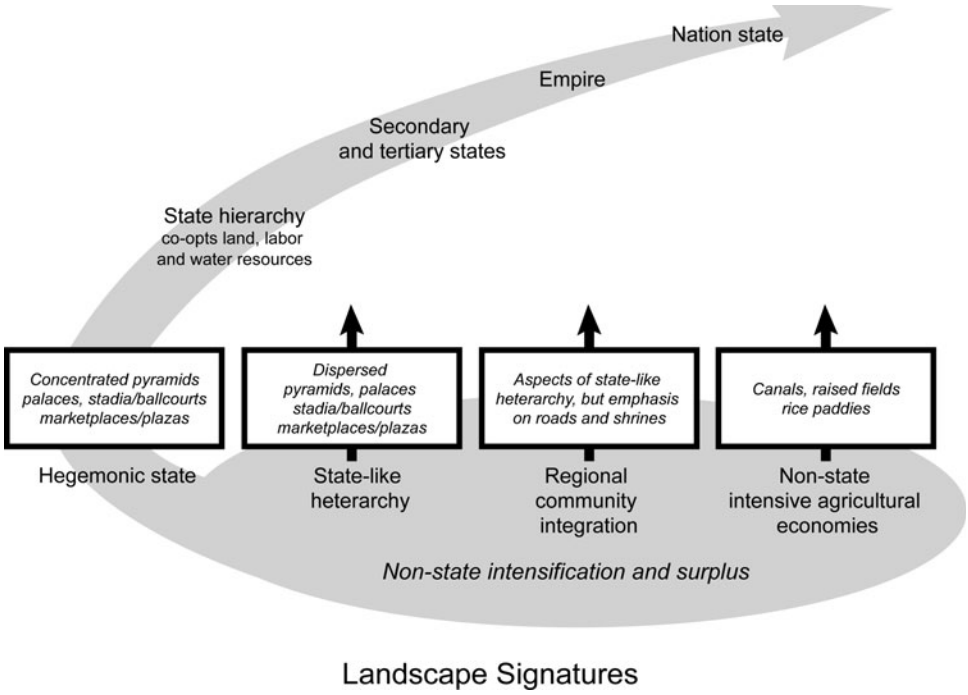

Figure 3. Landscape signatures: Kinds of engineered landscapes and associated socioeconomic and sociopolitical organizational schemes appropriated by hegemonic states with time (from Scarborough 2006b).

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diminutive scale from household to community (highly inclusive of the notion of the family), and on to the macroscale of intercommunity networks that require sustained investments in societal-wide structures and between-community interdependencies. This trajectory is a slowly evolving set of parameters linking the environment and the people who harvest its modified ends. It is based on self-organization (Lansing 2003) and the necessary connectivity between the actual landscape and its developing/changing function as perceived by the occupying society. Group identity is accented and compounded through several institutions; primary among them is ritualized worldview (Scarborough 1998, 2005; Lansing 2006). Labortasking permits an emphasis on aspects of humanism perhaps missing from a more formal assessment of world cultures based on technology and identified by immediately functional achievements and things.

Multitasking is yet another potential pathway based on a population limited by constraints in the environment, such as high incidence of disease or poor soil conditions frequently identifiable in equatorial settings (Figure 2) (Scarborough 2003a:14–15, 35–38). Such societal developments tend to maintain dispersed populations and reduced levels of productivity outside the extended family, and they do not invest in technology given its lack of immediate return and the costs associated with technological acceptance (Scarborough 2003a). We have few well-identified examples of this pathway in our archaeological data sets because of the ephemeral investments made by these societies by way of the material record. Nevertheless, they were likely a highly resilient adaptation by some sedentary societies, perhaps those with greater mobility than the other two trajectories noted. Too, these kinds of societies were likely embedded in the classic technotasking adaptations of the past and can still be seen in the "below the radar" census of the nation-state as manifest in the "flea markets" of northern Kentucky (Halperin 1994) or aspects of the solar or periodic markets of indigenous Chiapas or Guatemala today (Annis 1987; McBryde 1945; Reina and Hill 1978). Rather than coupling themselves with outwardly robust economies operating on the world stage and the vagaries of volatile coffee or sugar pricing, they work part-time for those *fincas*, or plantations, but maintain an active and demanding presence in subsistence economies so as to buffer themselves and their families from the economic and political turbulence of global market forces. Although considerably different in the ancient context, early technotasking societies likely had this less visible but resilient component of society embedded (Yoffee 2005). Economic logics are the underpinnings for any evolving societal trajectory. They not only accommodate the economy but also the political and ideological dimensions. They affect the pace of social and environmental change as well as the kinds of processes at work within any social structure.

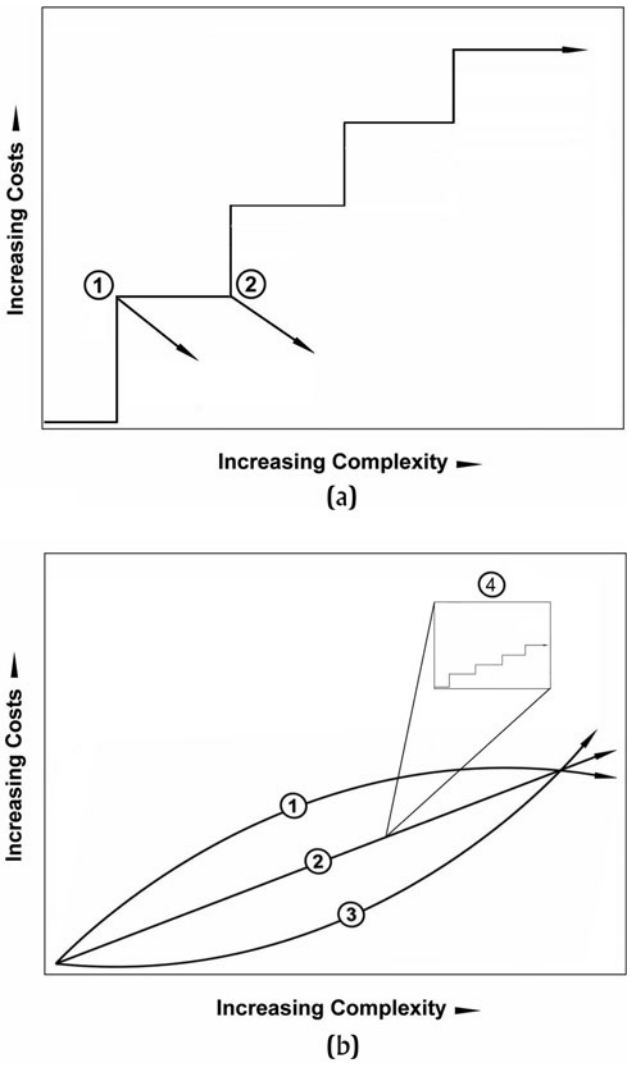

Figure 4. Schematic identifying two idealized types of complexity trajectories: a) A high-stepped, steeply pitched pathway frequently associated with technotasking. al represents the juncture of successful phase transition to a new level of social complexity, though vulnerability exists. a2 represents the onset of change either phase transition to new levels of complexity or partial reversion to an earlier adaptation or possible collapse. b) A highly monitored, low-pitch, self-organizing pathway frequently associated with labortasking. bl, b2, and b3 represent possible complexity trajectories based on initial conditions and environmental perturbations. b4 reveals the same stepwise forces advancing change, but operating at an increased frequency and a much reduced ascent (from Scarborough and Burnside 2010).

Complexity

Here, social complexity is identified as an evolutionary condition in which labor and resource costs or the energy expenditure to obtain a material livelihood and its refined trappings are seen as a stepwise plot (Figure 4) (Scarborough and Burnside 2010). Complexity rises abruptly when resources are concentrated and assembled/reassembled in ways that allow new methods for coping with both the social and biophysical environs. Societies have several options during these stepwise periods in their temporal trajectories. Those that rise to a new level of significant social change and complexity frequently crest at a threshold and stabilize or plateau at positions of much less costly investment (Figure 4a). Nevertheless, there are potential pitfalls along this trajectory that are most pronounced at the point of precipitous rise from an earlier plateau or at the point of threshold rise immediately prior to a new plateau level (Tainter 2000). In the first case, conditions may drive the social and environmental coupled interdependencies into a collapse or fragmentation mode. The previous consumption of resources may well exceed both production and its allocation, forcing change—but change that cannot support a new or novel adaptation to greater social complexity. The system reverts to an older, though now modified, set of less energy-demanding stages *or* it simply collapses. Alternatively,

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society may well push toward the new threshold of accomplishment and complexity only to find that the resources necessary to make this phase transition are inadequate, and by overextending—or overshooting—society again suffers from a fragmentation and perhaps collapse (Demarest et al. 2004; Webster 2002).

But this schema is not the whole story, as the rate and process of change varies by way of the socioeconomic logics that a society follows. Technotasking does seem to follow the pathway outlined above with several periods of societal displacement, or worker alienation as Marx phrased it, during the acceptance period of a "technological breakthrough." Change is frequently abrupt and most disruptive of the livelihoods of the lower ranked or stratified tiers of society.

However, another trajectory presents itself with the labortasking economic mode (Figure 4b). Although the stair-stepping relationship between costs and complexity are further embedded, the interplay does not manifest itself through major technological breakthroughs and the abrupt ascent (or descent) associated with change and resource acquisition and/or reallocations. Rather, the social and environmental system is in constant flux with incremental change a reflection of sustained self-organization. Self-organization in this context is that process and exchange between human groups and their environments resulting in highly interdependent linkages that slowly evolve in transforming both society and the landscape it inhabits. External forcings such as climate change, marked population spikes from in-migrations, or militarism will have extremely deleterious consequences given the incremental developmental alterations between groups and their biophysical setting.

Generally speaking, technotasking can absorb marked external forcings as it is preadapted to major and frequently costly perturbations. As I have suggested elsewhere (Scarborough 2005), it can accommodate aspects of industrial-level warfare by way of instigating conflict to fuel a "leap" forward in complexity—with the accompanying high costs. Labortasking cannot well absorb violent external forcings given its self-organizing premise. Furthermore, after extended periods of successful adaptations, self-organized in producing a highly integrated and sustainable landscape, accumulated "less visible" problems may well manifest themselves by way of a major collapse, especially if external forcings are included. This scenario is what is projected in explaining the ancient Maya collapse (Scarborough and Burnside 2010).

My use of the term "social complexity" does not necessitate a "new" social form or an abrupt break from an earlier type or social "stage," though this definition may contradict the exclusivity of conventional models of hierarchy and technotasking. Labortasking does lead to social complexity, but it does so incrementally and at a slower rate of change [or when depicted graphically, a lower "pitch" (Figure 4b)]. In evaluating these three orientations—resilience, economic logics, and complexity—in the context of ancient Mesoamerica, what can now be learned?

MESOAMERICAN HUMAN ECOLOGY AND ECONOMY

In assessing aspects of Mesoamerica, it is important to appreciate that much of the setting is located in semitropical environments; and in the case of the Maya Lowlands, a rainfall regime associated with a wet-dry rainforest. In spite of the semitropical climes, the great rivers of the world were never etched into the landscape of Mesoamerica. These are very different environments when compared to early state levels of complexity that evolved in the Old World—at least during the archaic state's initial appearances. The latter were tethered to the great rivers of the world and located several latitudinal degrees further north than our Mesoamerican arena.

What do we know about tropical and semitropical settings? These ecological communities are considerably more varied and interdependent in their considerable species diversity, but they are also identified with markedly reduced numbers (richness) of any one species in any one microenvironment or patch than in more temperate zones. Those of us examining the origins of agriculture have long argued that the vast stands of wild wheat and barley accommodated by the environments of the greater Near East or the evolution of wild herd animals with certain predilections for gregarious "following-a-leader" behavior were preadapted to domestication (Bar-Yosef and Belfer-Cohen 1992; Bar-Yosef and Meadows 1996; Byrd 1992; Moore 1985; Smith 1995). Tropical and many semitropical settings do not permit the kind of species richness necessary for the types of experimentation associated with this kind of domestication process because the species are not concentrated enough to promote the required plant and animal modifications. This is not to say that the domestication process was poorly developed in the New World—obviously it was well established—just that it was manifest in a different manner (Piperno and Pearsall 1998).

Too, Diamond's (1997) brilliant insight requires mention with respect to the difficulties those plants that were domesticated in the New World had in rapidly and successfully migrating with early agriculturalists within an intercontinental geography that emphasized a north-south longitudinal axis. There were obvious hurdles in physically negotiating another climatically-altered setting once a domesticate was contrived from within a narrowly controlled microenvironment (i.e., self-organized in the context of a labortasking-like set of developments). Such a condition was much less the case within the broad temperate belt of the Old World extending from the circum-Mediterranean area through the Middle East and into sizable portions of India and China—a biophysical environment topographically varied but latitudinally shared—associated with early sedentism, or the earth's "Great Adobe Belt," and the genesis of many of the plants and most of the animal foods that we now eat.

Nevertheless, Mesoamerican florescence was real and grounded on a different definition of the environment and how it might be harvested. Societal transformations may well have proceeded at a slower and more measured pace. I suggest that much of the cultural geographical core of Mesoamerica (after Kirchoff 1943; Steward 1955) opted for aspects of a labortasking economy from the outset, in part, based on the environments its occupants were dealt. This is not as deterministic as it may sound. As Flannery (1972:46) noted three and a half decades ago, ". . . in contrast to the Near East, the family was already established as the basic unit of procurement and storage [in Mesoamerica] long before agriculture began . . . ." The family and its complicated extensions represented the essence of labortasking. Recently, I (Scarborough 2007) have argued that one of the great legacies of Mesoamerica was its wetlands and their reclamation—unlike the frequently canalized riverine resources apparent in many other portions of the world where early states arose (Scarborough 2006a, 2007). The kind and degree of labor investment made in wetland reclamation lent itself to a labortasking logic—a slow, accretional manipulation of the landscape in producing a "loose knit, glove fit" between the evolving built environment and a societal definition of economy,

politics, and ideology. This is not to say that many settings in the Old World avoided a labortasking economic logic, as labortasking is evident in Southeast Asia and portions of West Africa [though a multitasking pathway may best apply to the latter (McIntosh 2005; Scarborough 2003a)] as well as during several phases and stages along the "Great Adobe Belt." Generally, however, the Old World brought us technotasking with the first states in the Near East and especially pronounced developments as its institutions moved into Europe (Bray 1986; Scarborough 2003a, 2005). Because of my focused knowledge of the Maya Lowlands and my limited page length, I will not develop the grand enterprises constructed for wetland reclamation elsewhere. Although the Maya Lowlands clearly lends itself to such discussion—a charge presented below—suffice it to say here that several other areas in "highland" environments demonstrate this focus and selection, perhaps the most touted represented by the *chinampas* of Lakes Xochimilco and Chalco in the southern Basin of Mexico (Armillas 1971; Sanders et al. 1979) and now well identified in west Mexico (Fisher 2005; Fisher et al. 2003; Scarborough 2006a, 2007; Stuart 2003; Weigand 1993, 2007).

The Maya were an interesting variant on the greater Mesoamerican Great Tradition (Sanders and Webster 1988; Webster 2002) and representative of many of the shared cultural and environmental elements that identify Mesoamerica (Kirchoff 1943). Nevertheless, the karstic bedrock prevented surface concentrations of water for much of the Lowlands in spite of the seasonal abundance of rainfall. Without Old World canalization of scale, domesticated animals, or metallurgy, ideas like the wheel—inclusive of the Old World water wheel and the pulley—were unincorporated. Too, the topography may not have lent itself to the obvious efforts to negotiate rugged and sometimes swampy terrain. Nevertheless, large labor pools and their highly structured organization is what set civilization apart from other forms of socioeconomic and sociopolitical order. In the New World—and in the Maya Lowlands specifically (Rice and Culbert 1990)—human populations were sizable and likely much more so than their Old World counterparts at a comparable period of social complexity as measured from the onset of the early state (Scarborough 2005; Trigger 2003). Ironically, part of human population success in the New World was the absence of domesticated animals and the lack of disease crossovers that significantly affected the Old World through the ages. One consequence of these human population densities was the effects of a Spanish conquest that revealed the extreme vulnerability of native groups to smallpox, a disease with much more historical immunity in Europe, given its antiquity there (Borah and Cook 1963; Dobyns 1966, 1983; McNeil 1977).

The point here is that several environmental conditions conspired to accommodate a labortasking economic logic in Mesoamerica. Large human populations substituted for the technological breakthroughs driving many of the earliest Old World states. When coupled with the fragility of some semitropical environments in Mesoamerica, landscapes were transformed slowly, incrementally, in producing a highly successful set of socioeconomic and sociopolitical adaptations based more on a wetland reclamation model than that associated with the kinds of fast-paced, technology-driven exploitation frequently associated with some other economic pathways.

MAYA LOWLANDS CONTEXTUALIZED

The Maya Lowlands were some of the more difficult terrain on which to colonize in Mesoamerica. Given present chronologies, they do appear to have been significantly colonized perhaps 500–1,000 years after several other zones in Mesoamerica (Neiderberger 1979; Scarborough 2000). Thin soils, seasonal and frequently erratic rainfall, karstic landscapes, and dispersed resources preventing sizable resource concentrations or rapid availability of surface water made the biophysical setting a challenge. Nevertheless, one of the most literate and architecturally accomplished New World societies thrived from 400 B.C.–A.D. 800. This happened because of a labortasking mode of production.

Fred Valdez and I (Scarborough and Valdez 2003, 2009) posit that the ancient Maya developed a network of relationships based on what we are calling "resource-specialized community organization." This was a manifestation of labortasking in which communities—small, dispersed, but numerically abundant—across the Maya Lowlands specialized individually to best harvest a limited number of regional- or area-specific resources. Selection and refinement of a resource was dependent on the obvious availability of the item to be harvested and processed, as well as the availability of the resource or set of resources to be developed in the context of a network of exchange. In other words, communities self-organized so as to emphasize and select resources that complemented one another within a region. Although several communities may have had a redundancy of resources open to them all, over time a process of complementary selection was posited in which each community specialized in a suite of items that were different enough to accommodate specificity and quality of production to enhance rapid, predictable, and welcomed exchange within a loosely bounded region. As a dynamic economic system, a community might well cultivate new and different products or find that their resources fit better with another interaction orbit, thus forcing them from one primary regional exchange network into another. Too, some communities may have been wedded to an isolated self-sustaining community model and not deeply embedded in the resource-specialized community order. Autonomy was frequently identified as the principal model of social organization for the ethnographic present or the "closed corporate community" (Wolf 1957). Nevertheless, given what we know of the diversity of resources available to humans and their dispersed settlement design, the slow self-organizing set of adaptations developed in the Maya area was made resilient by mimicking aspects of the natural ecological rhythms, i.e., specialization/diversity and dispersion.

Wetlands are part of this planning effort, planning identified with openness to the cooperative interplay between society and the biophysical environs. McIntosh's (2005) diversity and specialization arguments for the Middle Niger of West Africa come immediately to mind, a situation in which our current assessments of hierarchical controls for the rise of complexity are challenged. Economic diversity is mimicked by ecological diversity, the former frequently identified by economic specializations and complementary ideological separations—a set of circumstances associated with a labortasking logic of clear social complexity. Although the Maya Lowlands may not have been as risk-prone environmentally as the Middle Niger, it was a difficult setting given the vagaries of rainfall, water access, and soil conditions. With 40% of the Lowlands associated with wetlands (Dunning et al. 2002, 2006), the highest density of Classic period communities were located near the most extensive margins of these swamps. Furthermore, the adjacent uplands added to the complicated mix of juxtaposed environments. Valdez and I (Scarborough and Valdez 2009) suggest that these circumstances promoted an intricate set of linkages between the many thousands of small communities in the Maya Lowlands resulting in the

"dual economy"—really multiple economies—complementary but separated from the large, well-known centers.

In a speculative vein, I (Scarborough 2005) have discussed the import of ritualized decision making in the context of labortasking. In environments with high species diversity but access to low availability of any specific species or resource, livelihood predictability becomes a challenge. Whether in the Maya Lowlands (Scarborough 2008; Scarborough and Burnside 2010) or ancient Bali, Indonesia (Scarborough et al. 1999), semitropical and tropical settings provide the kinds of ecological diversity that can lead to niche specialization networked into other micro-settings in providing the balance of natural and refined resources necessary for resilience. Complex interconnecting ideological explanations develop to rationalize economic linkages (McIntosh 2005, 2009).

Humanism in this context can be addressed by the same archaeological record that identifies climate change, population pressure, or urbanized resource concentrations. Although economic and political issues pervade our assessments, the ritualized record materialized by artifacts like shrines and ball courts located in the smallest of communities reveals aspects of the niche specialized linkages usually associated with tangibly economic materials like food, building supplies, or even luxury items. The architectural signatures on the landscape at small sites that suggest a "ceremonial" function provide insights into the kinds of networks operating under the radar of the largest centers. These small-scale interdependencies between several small communities—fluid in their alliances—produced many of the same architectural and artifactual indices we usually associate with the grand "cities"—ballcourts, pyramids (though diminutive), "big houses" (if not palaces), causeways, reservoirs, and even an occasional and likely crude stela. In addition to their small dimensions, these components of the built environment were seldom concentrated at one site or community. Rather, alterations to the engineered landscape were highly dispersed, littering the environs in a manner that provides clues to the integrity of these "resource-specialized communities" broadly defined. Large centers did occasionally well up and dominate a region, a Maya archaeology on which most of us were weaned and many of us continue to practice. However, the sea of small communities defining the hinterlands frequently did not develop in this manner and likely resisted the centric adaptations. The scattered patchwork of activities, many of them imbued with ritualized meaning as manifest by shrines and ballcourts were spread apart to mimic the distribution of most other resources and activities found in a tropical setting. Many of these architectural and artifactual assemblages were intercommunity devices to knit together the areawide dispersion of communities, an adaptation that sometimes resulted in true centralization with the advent and precipitous growth of the largest centers when resources and political intangibles aligned. However, as Marcus (1993, 1998) has so clearly shown, these centers were frequently unable to sustain their dominance and "cycled" in and out of hierarchical/hegemonic control. Generally, however, it was those small linked communities that were the most resilient—i.e., successful adaptation and long-term survival by way of open interdependencies—not necessarily the specific community, but the constellation of communities acting as a dispersed version of some of the largest "cities."

CONCLUSIONS

Resilience, complexity, and several economic logics have affected the course of ancient lifeways everywhere. In Mesoamerica, the trajectory was different from classic definitions of urbanism and statecraft elsewhere, though considerable regional variation occurred within this biogeographical context—some of it resembling Old World definitions of civilization. Regardless, the Maya Lowlands' wetland reclamation and "resource-specialized communities" characterized a highly successful adaptation to their biophysical and social environments and provide a nuanced assessment of resilience and complexity through a labortasking economic logic.

We have some lessons to learn about the past from a broad range of biophysical scientists—from the climate change modelers to the population statisticians—lessons that will inform the present, if that is our wish. Nevertheless, there is more yet to extract embedded in our diverse data sets, information and its interpretation that will significantly broaden and deepen our understanding of our options for well being on this planet. Many pathways to social complexity and resilience are recorded in the archaeological record, though most of these societal trajectories have been co-opted by the highly developed form of technotasking that drives the present-day nation state (Figure 3). Frequently the impact of the world we know best—that of the nation state—prevents us from seeing other ways of harvesting a landscape and adapting to our surrounds. We can be both resilient and complex by incorporating past economic logics like labortasking, multitasking, or some other less understood socioeconomic pathway, in addition to our decisive investments in today's sophisticated but uncertain technotasking logic. The question for some of us might be, "Where is archaeology headed and will it be clever enough to catch up with the present?" We will need the entire spectrum of the past to project meaningfully into the future. Perhaps an "ecology of ritual" is the next frontier, and it is ours not only to reveal but to apply (Gonlin and Lohse 2007; Wells and Davis-Salazar 2007).

RESUMEN

El papel de la ecología humana en un contexto mesoamericano requiere tanto rigor como imaginación para evaluar la sofisticación y los logros de los muchos diversos grupos que compartían sus recursos variados. Tres orientaciones complementarias y sobrelapadas de la literatura que se encuentra en otras áreas—fuera de Mesoamérica—son: (1) la capacidad de resistencia y vulnerabilidad de las comunidades y sus paisajes, (2) la lógica de emprender las tareas económicas y (3) las trayectorias de complejidad. En comparison a las culturas del Viejo Mundo, las de Mesoamérica siguieron un curso distinto con respecto a la economía, la política y la ideología, el cual fue marcado sensiblemente por las oportunidades y las restricciones del medio ambiente. Se presta atención a las lecciones aprendidas de los estudios recientes.

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