Early Mainland Southeast Asian Landscapes in the First Millennium A.D.

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Key Words

Southeast Asia, early states, archaeology, complexity

Abstract

Southeast Asia's earliest states emerged during the first millennium A.D. from the Irawaddy River of Myanmar to the Red River delta of northern Vietnam. Developments during this time laid the groundwork for the florescence of the region's later and better-known civilizations such as Angkor and Pagan. Yet disciplinary and language barriers have thus far precluded an anthropological synthesis of cultural developments during this time. This review uses a landscape focus to synthesize current knowledge of mainland Southeast Asia's earliest states, which emerged in the first millennium A.D. Research from archaeology and history illuminates articulations between physical and social factors in several kinds of Early Southeast Asian landscapes: economic, urban, and political. Social and ideological forces that shaped these first-millennium-A.D. landscapes are discussed as integral aspects of early state formation.

On ne saurait écrire de bonne histoire sans savoir comment une civilization organize son espace naturel pas plus, bien sûr, que la géographe ne comprendre un paysage humain s'il ne suit, étape par étape, sa genèse. (Groslier 1973, p. 338)

INTRODUCTION

For several reasons, research on the origins of complex societies in the Old World gives little attention to Southeast Asia relative to other geographic regions (e.g., Cowgill 2004, Stein 2001). The paucity of published material and a prevailing emphasis on insular, rather than mainland, Southeast Asia, particularly after the fifth century A.D. (Christie 1995; Manguin 2000, 2004; Miksic 2000), has dwarfed our knowledge of the Southeast Asian mainland. Significant organizational changes occurred, however, in mainland Southeast Asia between 500 B.C. and A.D. 500 that established the foundation for the region's earliest states along its South China Sea coasts and major inland river valleys, from Myanmar to Vietnam (**Figure 1**). Few archaeologists have ventured into this territory, which has traditionally been controlled by historians and philologists. Yet the Southeast Asian mainland, similar to its island neighbors to the south (Lape 2003), was an important cultural crossroads, and archaeological research is essential for deciphering local, regional, and macroregional developments that involved the Near East, South Asia, and East Asia.

This review article examines physical and cultural parameters of early state formation because these landscapes shaped, and were shaped by, their human inhabitants. This chapter has three central goals: (*a*) to provide a historical background on the study of early Southeast Asian landscapes; (*b*) to discuss the scale and nature of Southeast Asian landscapes that scholars have studied, examining both social and economic forces that structured their production; and (*c*) to discuss key themes for future research.

Conceptual Issues

Several conceptual terms that frame this discussion require limited consideration. The first involves scalar issues, which include both the size and the configuration of effective regions (following Crumley & Marquardt 1990, pp. 76–77) at different points in the sequence and the nature of these early "states." The configuration, durability, and typologies of early states are the subject of perennial research (e.g., Feinman 1998; Feinman & Marcus 1998; Nichols & Charlton 1997; Trigger 2003; Yoffee 1997, 2005). Whether these early polities across mainland and peninsular Southeast Asia were predominantly city-states (Manguin 2004), chiefdoms (Wheatley 1983), or kingdoms (Coedès 1968, Gutman & Hudson 2004) remains unclear and is examined below.

The term landscape also requires elaboration, given its polysemous definitions by previous scholars (Anschuetz et al. 2001, pp. 160–64). People constructed, inhabited, and imagined their landscapes in the past through a series of social and spatial practices, but the archaeological record is more amenable to historical ecological studies than to research on idealized landscapes. Viewing landscapes instead as materialized histories of decision-making helps sidestep the dichotomy that opposes landscapes as records of land-use strategies versus records of social history (Ashmore 2004, p. 260). This review uses landscape approaches to study the formation of both anthropogenic landscapes and archaeologies of "place," with a decided emphasis on the former.

Mainland Southeast Asia's archaeological record, not documentary records, offers the most accurate information for reconstructing the first millennium A.D., but it has been underutilized. Reliance on external documentary sources and on the region's art and epigraphy led earlier scholars to externalize influences on the region's earliest state formation (Bentley 1986, Kulke 1990, Mabbett 1997); more recent discussions

Figure 1
Mainland Southeast Asia in the first millennium A.D. Adapted from Hall (1985, map 1, p. 22) with permission from Univ. Hawaii Press.

incorporate internal factors as well (Reynolds 1995, Wolters 1999). The lack of systematic archaeological research on post–A.D. 500 settlement patterns (Miksic 1995, p. 56) has hindered progress. Until recently, political unrest and its accompanying hazards (such as land mines) have favored the use of remote sensing rather than pedestrian field survey and test excavations (but see Welch 1989, 1997). This chapter reconstructs mainland Southeast Asia's first millennium A.D. history by triangulating between archaeological, art historical, epigraphic, and paleoenvironmental data sources.

Methodological Considerations

Several types of source materials provide the basis for this review of early Southeast Asia's landscapes. Within archaeology, sources include archaeological survey and excavation, sediment coring, and the analysis of remote-sensing data. Source materials beyond archaeology include art historical, documentary records (both indigenous and external) and paleoenvironmental data. Each source informs on different kinds of landscapes, in sometimes contradictory ways. Yet one without the others is incomplete, particularly because most interpretations of this period

have been dominated by documentary sources [as one example see Schweder (2000) versus Southworth (2000)].

Northeast Thailand and, through remote sensing, northwestern Cambodia are two of the best-documented archaeological regions in mainland Southeast Asia (e.g., Moore 1992, Welch 1989). Huge gaps exist in geographic coverage of the rest of the mainland. The emphasis on excavating large sites, rather than on survey projects, has informed on such topics as the nature of South-Southeast Asia interaction over time (Bellina & Glover 2004, Glover 1998, Theunissen et al. 2000) but has overlooked most landscape issues. Such work has focused on later periods in Thailand and Cambodia (Mudar 1999, Pottier 1999) and rarely includes a focus on the first millennium A.D. Substantial art historical research, from the colonial era to the present day, has concentrated on this period, which coincides with the appearance of the earliest Indic-inspired art (Brown 1996, Dalsheimer & Manguin 1998, Jacq-Hergoualc'h 1992). The focus on objects, rather than also on their locational contexts, has limited art history's contributions to our understanding of ancient landscapes.

Indigenous and nonindigenous documentary records also inform on early Southeast Asia. Chinese dynastic annals, which had a dominant role in shaping interpretations of the period (Ishizawa 1995, Wheatley 1983), describe diplomatic and trading missions to the land of the "southern barbarians." Some accounts also describe terrestrial and maritime routes from China to these locales (e.g., Southworth 2000). Problems inherent in these external sources have been described previously (Jacques 1979, 1995; Stark 1998), including intergenerational copying errors, a focus on trade centers that had relationships with China, and problems with linking Chinese toponyms to geographic points on the landscape (Jacq-Hergoual'ch 2002, pp. 163–64; Leong 1990, pp. 19–20).

Indigenous texts are also available for several of the region's early states: the Pyu (Myanmar), the pre-Angkorian Khmer (Cambodia), and the Cham (Vietnam). They tend to inform more on dynastic sequences than on political and economic organization (but see Vickery 1994, 1998). In a few cases, the names assigned to these early states have been found in contemporary indigenous sources (inscriptions or coins): the "Cham" of coastal Vietnam (Southworth 2004, p. 209), and "Dvaravati" (Indrawooth 2004, pp. 128–29) and the purported state of "Sri Canasa" in Thailand (Saraya 1992, p. 133; compare Brown 1996, pp. 25–27). However, most polities are known instead from outside sources, and increasingly, from the archaeological record. The next section offers time-space systematics to contextualize the study of landscapes in the first millennium A.D. across mainland Southeast Asia.

BACKGROUND

Timing

The period under study concentrates on the first seven centuries of the first millennium A.D. This period has elsewhere included the Iron Age (Higham 2002), the protohistoric period (Bronson & White 1992), or the early historic and Pre-Angkorian periods (M. Smith 1999; Stark 1998). Settlement hierarchies (or heterarchies?) formed during the first millennium B.C. in almost all regions where complex polities subsequently emerged (Higham 2002, pp. 168–227; O'Reilly 2003; White 1995).

China had intensive political and commercial relations with mainland Southeast Asia during much of the first millennium A.D. (Hall 1985), before political events in Tang China cut the southern Chinese ports off from their northern markets in the Tang dynasty (Southworth 2004, p. 226). A terrestrial "Southwest Silk Road" also linked Southwest China to much of mainland Southeast Asia from the Han period onward and linked China to India through upper Myanmar (Moore 2004b, p. 6; Yang 2004, pp. 287–89). A maritime Silk Road linked south and southeast China to the South China Sea coasts. This maritime route gained

importance when the independent state of Wu arose and controlled territories south of the Yangzi River (including parts of northern Vietnam) in A.D. 221–280. As keen observers of early Southeast Asia, the Chinese have provided some of the most informative documentary evidence for the region's polities.

At least three phases of South-Southeast Asia contact characterize this period. In the first phase, sporadic interaction between the fourth century B.C. and second century A.D. (Bellina 2003, Bellina & Glover 2004) may be linked to the rise of Buddhism and Jainism in South Asia and resultant investment in international trade (Ray 1994, 1997, 2005). Tin, found throughout much of Southeast Asia (Bronson 1992, p. 80), was a major attraction to South Asians, whose metallurgical tradition incorporated high-tin bronzes. The Bay of Bengal formed the nexus of such interaction; by the second century B.C., a string of coastal entrepôts emerged along India's eastern coast (Ray 1997). The second phase of interaction (i.e., the second through the fourth centuries A.D.) was characterized by higher-volume, more regularized commodity circulation (Bellina 2003, Bellina & Glover 2004). Intensified ideological contact after the fourth century A.D. constitutes the third phase, in temporal parallel to the rise of the Guptas in South Asia. Whether South Asian events were causal in Southeast Asia, through unidirectional influence or competitive emulation, is a matter of some debate (e.g., Michell 2000, pp. 44–47; Morrison 1997, p. 95; Smith 1999, pp. 12–16). Differing interpretations largely reflect varying levels of reliance on documentary, rather than archaeological, evidence (e.g., Sinopoli 2005).

The period's end point of A.D. 750–800 approximately coincides with political transformations throughout the region that are associated with the onset of Thailand's Dvaravati phase (Brown 1996; Suchitta 1992; Vickery 1994, 1998; Welch 1997). Economic and ideological changes within Southeast Asia characterize this period because its trading focus shifted to island Southeast Asia, and particularly toward Buddhist kingdoms in southern Sumatra (Manguin 2004, pp. 301–4). Beyond Southeast Asia, the beginning of the Tang dynasty in China, the Gupta Empire's decline in South Asia, and the rise of regionalism in the Tamil country of southern India also affected (but did not unilaterally determine) developments that were internal to Southeast Asia. Despite some ethnolinguistic discontinuities, most first-millennium-A.D. states in mainland Southeast Asia established the template for subsequent "classical civilizations" (Bagan/Pagan, Sukothai, Angkor, Nam Viet) that emerged in the ninth through fourteenth centuries. Thus the first-millennium polities share close historical links with the region's contemporary nation-states.

Late Holocene Geography and Environment

Variation in climate, geography, and environment during the Late Holocene (here defined as 3000 BP to the present) affected both settlement and economic patterns across mainland Southeast Asia. This period's climatic variability remains poorly documented, although research in Vietnam's Red River delta suggests a shift from a cool wet climate around 2100–1540 BP to a drier and cooler climate around 540–640 BP (Li et al. 2006; see also Godley 2002). Debate continues about the nature and relative impact of a mid-sixth-century-A.D. catastrophic event that produced exceptionally low solar activity (Gunn 2000) and about its potential role in structural transformations that several mainland Southeast Asian polities underwent shortly after that time.

Marine transgressions and delta progradation constrained human settlement across the Southeast Asian mainland during this time. Sea levels in northern Vietnam lowered and stabilized to current levels about 2000 years ago (Boyd & Lam 2004); this stabilization occurred in peninsular Thailand/Malaysia about 1500 years ago (Tjia 1996, p. 99). Dvaravati settlements were established along the fringes of the swampy Chao Phraya plain (**Figure 2**;

see color insert) because its center was swampy and uninhabitable until 1000–1500 years ago (Sinsakul 2000); so were the southern reaches of the ever-expanding Mekong delta before the appearance of intensive cultivators with knowledge of water control techniques. At any rate, the delta's edge was 20–60 km inland of its current coastline at the beginning of the first millennium A.D. (Nguyen et al. 2000, p. 437; figure 5).

Researchers assume that much of mainland Southeast Asia was forested at 2000 BP, except for areas along its major drainages, their tributaries, and the region's coastlines. Paleoenvironmental research indicates that several key areas underwent cyclical vegetational changes between forest and open grassland, which have been correlated with increased intensity of land use. These include Thailand from its peninsular to its northern and northeastern reaches (e.g., Boyd & McGrath 2001, Kealhofer 2002, Maloney 1999, Penny & Kealhofer 2005), northern Vietnam (Li et al. 2006), and southern Cambodia (Bishop et al. 2003). Reliable studies of first millennium A.D. anthropogenic change, however, remain rare for at least two reasons: (*a*) Many of the region's best pollen cores lack late Holocene dates; and (*b*) few areas with high-quality paleoenvironmental data also contain well-documented archaeological evidence of settlement. Collaborative paleoenvironmental-archaeological research is currently underway in southern Cambodia [the Lower Mekong Archaeological Project (Bishop et al. 2003, Stark & Bong 2001)] and in Northeast Thailand [The Origins of Angkor Project (Boyd and McGrath 2001; Higham 2002)], but work is still needed across the rest of the region.

GEOGRAPHY OF EARLY SOUTHEAST ASIA

Geopolitical Landscapes

Archaeological landscape studies generally rely on regions as the scalar unit of research (Ashmore 2004, p. 262), although archaeologists differ in their definitional criteria. Reliance on Chinese and Sanskrit ethnonyms identifies at least seven major geographic regions across mainland Southeast Asia in the first millennium A.D. (**Figure 1**). Stark (2001) summarizes their archaeological configuration and attributes; the following comments offer additional insights based on work published since that time.

The Pyu of Myanmar/Burma. Major sites include Beikthano, Halin, Mongmao, Sri Ksetra, and Otein Taung/Pagan (Gutman & Hudson 2004, pp. 158–69; Hudson et al. 2001, pp. 59–61; Moore 2004b). The archaeology of Myanmar/Burma for the first millennium A.D. remains poorly known for political as well as historical reasons. A small number of site reports from the Archaeological Survey of Burma (summarized in Stargardt 1990) and a few research projects in the past decade have generated more questions than answers. Yet the region's interstitial location between South and Southeast Asia, its emerging record of continuity from the prehistoric to historic periods, and its early and Buddhist material manifestations make research along Myanmar's major river valleys essential for understanding developments across mainland Southeast Asia.

Peninsular Myanmar/Burma around the Gulf of Martaban and Arakan. Although this region's role in the Bay of Bengal interactional network could have been very important during the first millennium A.D., no major site has been the subject of systematic archaeological investigation (Gutman & Hudson 2004, pp. 161–63; Moore 2004b).

The Pre-Dvaravati and early Dvaravati Central Thailand. Major sites from the Chao Phraya basin include Ban Don Ta Phet, Chansen, and U-Thong. Far more sites, however, have been documented for the succeeding Dvaravati period (Higham 2002, pp. 254–60; Indrawooth 2004, p. 120; Mudar 1999;

Vallibhotama 1992, p. 126). A marine transgression that coincides with the beginning of this period submerged substantial portions of central Thailand into marshy lowlands (Tanage et al. 2003), precluding extensive settlement in that area until later in the first millennium A.D.

Peninsular Thailand and Malaysia. Major sites include Kedah, Kuala Selinsing, Khao Sam Kaeo, and Khuan Lukpad. Perhaps ten or more coastal centers may have developed along the Malay Peninsula's coasts during this time, if Chinese reports are taken at face value (Christie 1995; Leong 1990, 1993; but see Allen 1997). The process of "Indianization" may have begun as early as the second century A.D. in peninsular Thailand. Qualitative changes occurred, however, in the fifth century A.D. as Indic statuary, writing, and architecture appeared across the Malay peninsula (Jacq-Hergoualc'h 2002, p. 105).

The late Iron Age of Northeast Thailand. No specific sites associated with this period have been thoroughly reported, although some "Iron Age" sites like Noen-U-Loke have associated water features that date to the first millennium A.D. (Higham 2004, p. 63). In addition, sixth- through eleventh-century Dvaravati sites in this region are commonly constructed on Iron Age predecessors (Higham 2002, pp. 193–212).

The "Funan" and pre-Angkorian periods of Cambodia and southern Vietnam. A few key sites such as Angkor Borei and Oc Eo have been documented in great detail (e.g., Stark 2003, Stark et al. 1999, Trinh 1996, Vo 1998); in addition, the "Oc Eo" culture sites of southern Vietnam fit into this period. In the Mekong basin, state-like polities also emerged that have been (problematically) glossed as Funan and Chenla (Coedès 1968; Vickery 1994, 1998). In Chinese accounts, the first millennium A.D. "Funan" arose largely through the intraregional and international maritime trade networks, and various Funan rulers controlled parts of the Malay Peninsula, central and southern Thailand, and the lower Irrawaddy valleys (e.g., Wheatley 1973, pp. 15–21). These documentary-based scenarios, however, have been questioned recently (Jacques 1995, Stark 1998, Stark et al. 1999, Vickery 1998).

The Cham civilization of central Vietnam. Major sites include Tra Kieu, My Son, Thanh Ho, and Go Cam. The earliest Cham occupations date to the mid–first millennium A.D., exhibit continuity from the prehistoric Sa Huynh culture, and bear a substantial Han Chinese imprint after 111 B.C. during the Han occupation of northern Vietnam (Glover & Yamagata 1998, Glover et al. 1996, Southworth 2004, Yamagata & Glover 1994). Third-century Chinese annals describe the state of "Linyi" in mid–third century A.D. (Yamagata 1998) that was a major political force (or collection of polities). Scholars believe Linyi's southern limit during this time lay at the Hai Van pass (between Thua Thien-Hue and Quang Nam province), that it incorporated areas as far southward as the Tra Kieu area by the fifth or sixth century A.D., and that Linyi was surrounded by multiple, competing trading states that acted independently of Linyi.

Northern Vietnam lies largely beyond this review because few western-language publications are available for the region and period (but see Nguyen et al. 2004). Its close political engagement with China during this time involved prolonged periods of Chinese control; the imposition of a preordained Chinese template generated northern Vietnamese landscapes quite distinct from those that developed elsewhere in mainland Southeast Asia.

Settlement Patterns and Interaction

Early Southeast Asian settlements concentrated primarily in one of three geographical settings: coastal areas, floodplains along tributaries, and areas in proximity to large freshwater lakes (Stark 2001). Areas of coastal

settlement were situated near freshwater sources and potential harbors; inland riverine communities were found at interfaces between floodplain and upland areas (Vallibhotama 1992, p. 125). Settlements on floodplains were located on island-like elevated areas in central Thailand and the Mekong delta, which could support relatively large populations through either intensive or flood recession agriculture (Ng 1979, van Liere 1980). Phytolith evidence from central Thailand suggests reliance on rice agriculture well before 2000 BP (Kealhofer 2002, p. 187). The only major lake in the region, the Tonle Sap of northwestern Cambodia, has an increasingly robust record of first-millennium-A.D. settlement.

Interactional networks of this period integrated coastal and inland settlements through roads, rivers, and seaways. These transportation linkages have been most intensively documented for the Mekong delta from the French colonial period to the present in both Cambodia (Bishop et al. 2004) and Vietnam (Bourdonneau 2003, p. 270). Ostensible ancient canal traces, which Stargardt (1998) recorded around the Satingpra area (peninsular Thailand), may have served transportation as well as agricultural functions; these "canal" traces, however, lack sufficient chronometric dates at present. Given their morphology and locations, early- to mid-first-millennium-A.D. canals in the Mekong delta and peninsular Thailand were more likely designed for transportation than irrigation (Allen 1997, p. 81).

Intraregional trade networks likely preceded Southeast Asia's participation in an international trade network. Excavations of several first-millennium-A.D. sewn-plank boats (Manguin 1993, 1996) suggest active trade within South China Sea and Java sea networks. In the mid to late first millennium B.C., accelerating trading activity in the Malacca Straits and in the Java Sea (Christie 1995, pp. 246–51) involved mainland Southeast Asia, and particularly the Dongson region of northern Vietnam. That such networks continued their operation is evident from third-century-A.D. reports by Chinese envoys about the South China Sea metals trade in iron and tin (Harrison & O'Connor 1969, p. 307). The widespread use of Sanskrit-derived scripts, Indic-influenced statuary, and brick architectural styles suggests that ideas moved rather freely within this interactional sphere. So do similarities in archaeological assemblages that are found among sites located from peninsular Malaysia and the Melaka Straits to the Indochinese peninsula (Christie 1995, pp. 248–49; Manguin 2004; Stargardt 2003).

Southeast Asia's involvement in international maritime trade affected settlement distributional patterning, particularly for coastal settlements that participated in what Jacq-Hergoualc'h (2002) calls the "maritime silk route." We do not have enough evidence yet to document the nature of early Indian shipbuilding technologies in the Bay of Bengal. Investigations of several waterlogged vessels in island Southeast Asia, however, indicate that Southeast Asians possessed the technology to construct and sail watercraft to and from South Asia. Chinese Buddhist pilgrims described *bo* sea-going ships (>50 m in length) in Southeast Asia that could carry 600–700 people and 10,000 bushels of cargo (Manguin 1993, p. 262, 1996; for review see also Ray 1994, pp. 182–85).

Southeast Asians sought cotton cloth, sugar, and agricultural products from South Asians who plied their shores (Ray 1994, p. 117); from the Chinese came silk and porcelains, among other products. The Chinese, in turn, sought sumptuary goods (such as glass and precious stones), forest products, and spices from Southeast Asians. By the end of the period, the Chinese also sought religious icons and texts from Southeast Asia (Brown 1996). Small coastal settlements were established along the Malay peninsula, which exported local products and acted as "feeder points" (Leong 1990). These feeder points, in turn, supplied "collecting centers" that have prehistoric roots. The nature, directionality, and scale of this trade network changed

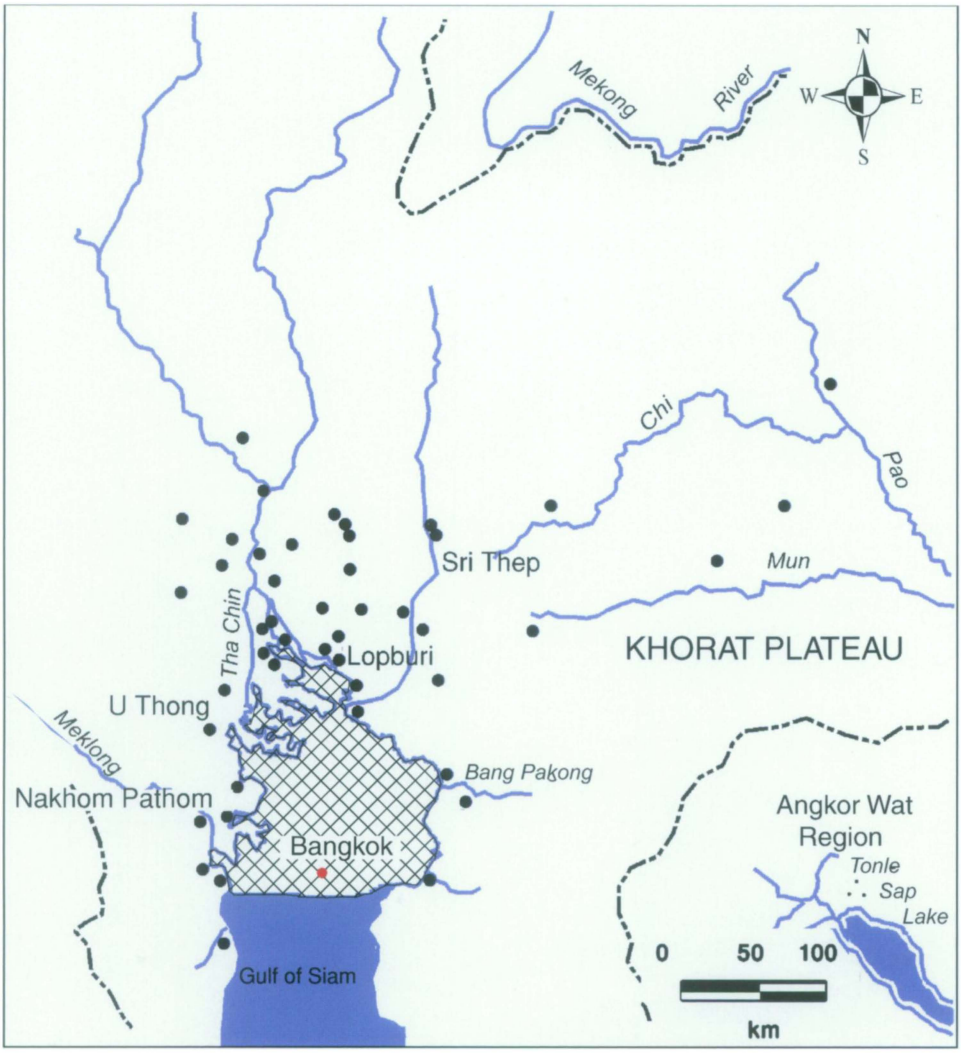

Figure 2

Relationship between marine transgression and Dvaravati site settlement patterns in the Chao Phraya basin, first millennium A.D. Reprinted from *J. Anthropol. Archaeol.* 18(1):1–28, Mudar, K. M., "How many author(s), how many Dvaravati kingdoms? Locational analysis of first millennium A.D. moated settlements in central Thailand." Copyright (1999), with permission from Elsevier.

Figure 3

Manguin's "city-states" and hypothesized trade networks in first-millennium-A.D. Southeast Asia. Reprinted from Figure 12.1 on p. 284 of "The archaeology of early maritime polities of Southeast Asia" by P.-Y. Manguin in *Southeast Asia: From Prehistory to History* (Glover & Bellwood 2004) with permission from RoutledgeCurzon.

substantially after the eighth century A.D. in the Malay Peninsula, when true entrepôts emerged in areas with good natural harbors (also see Jacq-Hergoualc'h 2002, Leong 1993).

Coastal settlements also developed among the Cham of central Vietnam. The economic base of the earliest Cham state relied on coastal trade with China (Southworth 2004, p. 209), and this trading network may have prehistoric roots in the first-millennium-B.C. Sa Huynh culture of Vietnam (Yamagata et al. 2001). Cham settlements offered safe harbors and fresh water for trading ships between Southeast Asia and China. Overland trade with South Asia and China also played a role in settlement location in what is today Myanmar (formerly Burma). The Dry Zone of the Upper Irawaddy river basin was the only area of direct contact between South and Southeast Asia; this region boasts the highest site densities in the country in the first millennium A.D. Chinese overland routes also reached Myanmar via Sichuan and Yunnan by the second century B.C. (Gutman & Hudson, p. 157).

First millennium A.D. Southeast Asian landscape changes reflect, but are not determined by, the region's involvement in intraregional and international trade networks. The current skew toward historical (rather than archaeological) approaches has led to the persistence of explanations of "Indianization" (Kulke 1990, Mabbett 1997). Paleoenvironmental research (Bishop et al. 2003) suggests that some cultural developments also responded to regional environmental shifts from the mid–fifth millennium A.D. onward. Additional archaeological and paleoenvironmental research can provide a more balanced and nuanced explanation of changes during this period.

LANDSCAPES OF LIVELIHOOD

Agrarian and Craft Economies

Archaeological research can inform on the geography of economic systems, and early states throughout mainland Southeast Asia may have developed similar agrarian and craft production landscapes (see also White & Pigott 1996). First-millennium populations could have utilized complementary strategies in their "agro-ecosystems" (following Kealhofer 2002): (*a*) flood recession farming in lowland floodplains and the backswamps; (*b*) garden horticulture and arboriculture along the river levees; (*c*) livestock grazing in fallow fields within and beyond field areas; and (*d*) back swamps, which may have provided fish, fowl, and other raw materials (see also van Liere 1980, p. 265). No published research has systematically documented field systems, although several scholars contend that premodern agricultural features (which tend to be smaller and aligned differently than contemporary fields) are visible in remote-sensing data for both the Mekong delta and the Tonle Sap basin.

Locations of these agro-ecosystems shared several characteristics that were key to their success during the early- to mid–first millennium A.D.: (*a*) access to potable water in noninundated areas for settlement; (*b*) availability of good rice-growing soils in proximity to deep basins used during dry-season farming; and (*c*) a climate with a pronounced dry season (see also Ng 1979). Some of these zones were ideal for rice cultivation with significant hydraulic intervention using tanks, reservoirs, and canals. Trade and exchange, rather than agriculture, provided the basis of early state polities along the Malay peninsula (Manguin 2000, p. 415). Areas lacking sufficiently large and arable floodplains, such as the peninsular Malaysian settlement of Kedah (Allen 1997, pp. 81, 83), had trade-based, rather than agrarian-based economies.

Whether this intervention involved true intensification (replete with irrigation canals) remains unclear. Scholars working in the Pyu area of Myanmar (Stargardt 1990), Peninsular Thailand (Stargardt 1998), and the Mekong delta (Fox & Ledgerwood 1999) contend that irrigation-based agriculture was viable without substantial labor input (also see

van Liere 1980). Were these claims verified, irrigation agriculture could have tripled the potential rice yield (Stargardt 1998, pp. 170–217). Promising environmental indicators have been identified in Thailand for rice cultivation (Kealhofer 2002, Mudar 1995, Penny & Kealhofer 2005), and perhaps also for forest clearance associated with upland agriculture (Kealhofer 1998, Maloney 1999). Convincing paleoenvironmental evidence documents the intensification of rice agricultural systems in other areas. Research in Northeast Thailand that associates forest recovery with a shift to controlled burns of ground cover during the early first millennium B.C. (White et al. 2004, p. 129), for example, provides a model methodology.

Little is known about the organization of craft production that structured community and regional economic systems, although White & Pigott (1996) contend that communities were engaged in "independent" (sensu Costin 2001), village-based specialization from the first millennium B.C. By the seventh century A.D., potters used the wheel in central and Northeast Thailand (Indrawooth 2004, p. 135) and in central Cambodia (Groslier 1981, pp. 14–15). Still higher-fired ceramic technologies are documented in Northeast Thailand (Welch & McNeill 1990, pp. 113–14). Evidence for glass bead production has also been recovered (or inferred) from sites in the Mekong delta (Dussubieux & Gratuze 2003, Malleret 1959). Work in central and Northeast Thailand also suggests that iron production may have been specialized at the village level by the sixth century A.D. (Moore 1992, Suchitta 1992).

A variety of specialists was likely required for the brick monumental construction underway by mid–fifth century A.D. The sheer volume of bricks manufactured for such projects suggests specialization in brick manufacture. Additionally, Hindu temple construction in contemporaneous South Asia required architects, artisans, and laborers, who were apparently organized into guild-like groups (Michell 1988, p. 55). Even religious specialists (Brahmans) were needed at various points in the construction process.

The foregoing discussion indicates how little is currently known about mainland Southeast Asian craft economies during the early first millennium A.D. Studies have not yet investigated evidence for elite control of production, such as through the recovery of evidence for specialized workshops in or near elite power centers (Schortman & Urban 2004, p. 191). Nor has much work concentrated on the contexts of production beyond White & Pigott's (1996; see Costin 2001) discussion concerning the circulation and consumption of both utilitarian and nonutilitarian goods. Work is also needed on the production and distribution contexts of smaller settlements in "hinterland" areas that surrounded large centers as an integral part of political economic reconstructions of early Southeast Asia.

Intraregional and Interregional Networks

Intraregional economic landscapes are also poorly documented for the first millennium A.D., although the circulation of both utilitarian commodities [such as earthenware ceramics, salt, and iron (Nitta 1997, Welch 1989, White & Pigott 1996)] and nonutilitarian commodities [copper and tin (traded both in raw and finished form), silver, horses, and cowry shells (Yang 2004)] probably continued from preceding centuries. That intraregional circulation of these goods ultimately moved them into the regional South China sea network seems clear (Higham 2002), but no research has systematically focused on production, distribution, or consumption contexts for these goods.

The emergence of Southeast Asia's earliest states with its incorporation into an international maritime trade network that linked China to South Asia and Rome has already been discussed. This network witnessed the development (or expansion) of a trade-based landscape that moved goods to Southeast

Asia's coasts from its interior areas, and that stimulated the establishment of inland and upland resource extraction settlements. Upland populations harvested the aromatic woods, camphor, and tin resources sought by the Chinese and Indians, whereas inland settlement of arable regions generated agricultural surpluses that could be transported to the coasts to feed traveling merchants and their entourages (Hall 1985, Ray 1994, pp. 115–17; Smith 1999, p. 20). Local labor, including artisans, was also needed to construct coastal settlements, to supply visiting traders, and to transport Southeast Asian goods into trading ships.

South and East Asian contact had an impact on first-millennium-A.D. Southeast Asia differentially. Although the Chinese never abandoned their attempts to control the "southern barbarians" of mainland Southeast Asia, they rarely established footholds south of northern Vietnam. Accordingly, Southeast Asia remained more a resource zone (for which Chinese envoys bartered gold and silk) than it did a vassal state or commandery. Perhaps this mercantile relationship explains Southeast Asian elites' reluctance to adopt (and resistance against adopting?) Chinese models of social, political, and religious structures that they associated with direct political control (Smith 1999, p. 18). In any event, Southeast Asian contact with South Asia may have been perceived as more benign, and the South Asian signature on the Southeast Asian landscape became increasingly pronounced through time. One of the areas with the clearest imprint lies in the form of mainland Southeast Asia's earliest urban landscapes.

URBAN ENVIRONMENTS IN EARLY SOUTHEAST ASIA

Urbanism, similar to "state" and "landscape," has been defined multifariously by previous scholars; most definitions, however, include site permanence, a clear urban-rural distinction, and a shared urban identity (Cowgill 2004; see also Smith 2003b). Early Southeast Asian urbanism poses additional difficulties because its hallmarks diverge from the Chinese examples that Paul Wheatley (Wheatley 1971) used to construct a general model of urbanism. And although recent comparative research on ancient Old World urbanism emphasizes its social construction (A. Smith 2003, M. Smith 2003b), rather than its origins as unintended consequences of gradual aggregation processes (Cowgill 2004, pp. 535–36), the origins of Southeast Asian cities remain largely unstudied.

Mainland Southeast Asia's earliest large nucleated communities appeared rather abruptly. A pervasive focus on Iron Age burial sites (rather than on their habitation areas) and on aerial data (rather than ground-truthing) limits the sample of Iron Age settlements from which settlement size can be derived. However, three of the larger and well-dated Iron Age sites in Northeast Thailand—Ban Chiang Hian, Non Chai, Noen U-Loke—range in size from 18 to 50 hectares in size, with a mean of ~35 hectares (data from Higham 2002, pp. 187–208). In contrast, mid-first-millennium-A.D. centers in the "Funan" region of the Mekong delta (Stark 2003, Stark et al. 1999) and the "Pyu" region of Myanmar's Dry Zone (Moore 2003, table 2) ranged in area from 222–300 ha (Moore 2003) (**Table 1**). The scale of these urban cores parallels that documented in several of the world's earliest cities, including some found in Egypt, Mesopotamia, and the Late Preclassic (Yoffee 2005, p. 43, table 3.1). The end of this period ushered in even larger settlements in Thailand's Chao Phraya basin and Cambodia's Lower Mekong region. In the former region, the seventh- through eleventh-century Dvaravati site of U-Thong measured ~1420 hectares (Indrawooth 2004, p. 128). In the latter region, Angkorian cities like Angkor Thom enclosed ~900 hectares by the thirteenth and fourteenth centuries A.D. (Gaucher 2003, p. 234).

That first millennium A.D. centers bore an Indic imprint in their configuration and construction techniques seems clear. Earlier

Table 1 Locational and scalar information on selected early centers in mainland Southeast Asia occupied A.D. 1–700 (sites in table whose occupation span continues after A.D. 700 are noted)

Region	Geographic location	Approximate date range	Site name	Site area	Source
Myanmar/Burma	Dry zone	A.D. 1–500?	Maingmaw	222 ha	Moore 2003, table 2; 2004b
Myanmar/Burma	Dry zone	A.D. 1–500 (Pyu)	Beikthano	291.7 ha	Moore 2003, table 2; 2004b
Myanmar/Burma	Dry zone	A.D. 1000–780 (Pyu)	Halin	208 ha[1]	Aung Thaw 1972; Moore 2003, table 2, 2004b
Myanmar/Burma	Dry zone	A.D. 400–800 (Pyu)	Sriksetra	1477 ha[2]	Moore 2003, table 2
Myanmar/Burma	West coast	A.D. 450–800 (Pyu)	Dhanyawadi	572 ha[2]	Calculated from Gutman & Hudson 2004, figure 7.9
Vietnam	Central coast	A.D. 400–700 (Linyi/Cham)	Thanh Ho	490 ha	Parmentier 1909, pp. 137–138, pl. XXVII; Southworth (personal communication, 2006)
Vietnam	Central coast	A.D. 600–800? (Linyi/Cham)	Chau Sa[2]	160 ha	Parmentier 1909, pp. 235–36, pl. LV; Southworth (personal communication, 2006)
Vietnam	Central coast	A.D. 500–600? (Linyi/Cham)	Thanh Loi	250 ha	Parmentier 1909, pp. 512–14, pl. CVI
Vietnam	Central coast	A.D. 100–800 (Linyi/Cham)	Tra Kieu	850 ha[2]	Claeys 1928, pp. 469–70, pl. XXXVIII)
Vietnam	Mekong delta	A.D. 1–1000 (Funan)	Oc Eo[2]	450 ha[4]	Malleret 1959; Manguin & Vo 2000, p. 113
Cambodia	Mekong delta	A.D. 1–1000 (Funan)	Angkor Borei	300 ha[1,4]	Stark et al. 1999
Cambodia	Central Mekong	A.D. 500–800 (Chenla)	Sambor Prei Kuk (Isanapura)	400 ha[1]	I. Shimoda, personal communication, 2005
Thailand	Chao Phraya basin	(early Dvaravati)	Nakhon Pathom	300 ha[3]	Mudar 1999, p. 7
Thailand	Chao Phraya basin	(early Dvaravati)	Sri Thep	176	Indrawooth 2004, p. 131
Thailand	Chao Phraya basin	(early Dvaravati)	U-Thong	142	Indrawooth 2004, p. 127

[1] Size only includes walled area; substantial settlement also found beyond the walls.
[2] Site occupation span extends beyond A.D. 700, which in some cases may explain the large area reported.
[3] Area listed is Phase I site size (Mudar 1999, appendix I), which is the earliest Dvaravati phase.
[4] Site occupation extends beyond A.D. 700; area listed refers specifically to A.D. 1–600 occupational span.

scholars instead emphasized the imposition of South Asians and their ideas on Southeast Asia (e.g., Coedès 1968, Wheatley 1983). More recently, some scholars have argued that these early cities were deliberately created to legitimize and constitute political authority (e.g., Jacq-Hergoualc'h 2002, p. 96, for the Thai-Malay peninsula). Yet little systematic research on the configuration and developmental history of individual centers, which could provide insight on this issue, has yet been undertaken.

Settlement Morphology

Settlement morphology is remarkably redundant throughout mainland Southeast Asia. Settlements were moated, with earthen embankments that were topped by wooden palisades, brick walls, and/or laterite walls.

Settlement form varied, in part owing to the location of the river that often formed one bank of the settlement. These enclosed areas contained multiple and diverse precincts, often including an interior walled area or citadel that sometimes contained an inner moat and wall (Saraya 1992, p. 135; Vallibhotama 1992, p. 125). Multiple reservoirs have been documented within enclosed settlements or immediately beyond settlements' walls. Mudar (1999, p. 6) contends that sixth- through eleventh-century-A.D. moated settlements throughout central Thailand indicate the ability to mobilize labor for such public works.

Research has identified the development of networks of satellite communities (residential, ritual, and mortuary) within a 3-km radius of the center. This configuration of an urban core and rural hinterland has been documented in central Thailand (Mudar 1999, p. 5; Vallibhotama 1992) and southern Cambodia (Stark 2003) but may characterize much of mainland Southeast Asia when other regions become the subject of systematic investigation.

Myanmar's Pyu settlements offer one of the better-documented examples of first millennium A.D. (Gutman & Hudson 2004, Moore 2003, Stargardt 1990). These settlements varied in shape (quadrangular, circular, rhomboid) and were enclosed by brick walls that were segmented into as many as 12 curved gates, with openings that might once have been used for wooden gates and iron fittings (Moore 2003, p. 32). Pyu sites generally had elite enclosures along their outer walls (Gutman & Hudson 2004, Moore 2003), and some had earthenware urn burial areas outside the city's walls (Moore 2003, p. 34).

Settlement Functions

The nature of early Southeast Asian urbanism has been the subject of some discussion, particularly regarding the centers' primary functions and their organization (Wheatley 1983). Emphasis has been given to the ceremonial qualities of the region's ninth- through fourteenth-century centers such as Angkor and Pagan (Higham 2000, Mannika 1996) and their arguable adherence to city specifications outlined in the Arthasastra, a South Asian text generally attributed to the third century B.C. or first century A.D. (see Coningham 2000). Whether the region's earliest urban centers conformed to such ground plans is unclear. That developments associated with secondary urbanization in South Asia (Morrison 1997, pp. 89–91) took place only a few centuries before they appeared in Southeast Asia is intriguing and may suggest a less pronounced South Asian influence on Southeast Asia than scholars previously imagined.

Miksic (2000, 2001) offers the terms orthogenetic and heterogenetic to characterize differing types of urban centers in early mainland Southeast Asia. In his framework, orthogenetic settlements in the Mekong basin were stable centers associated with ritual activity, surplus agrarian production, low population sizes, and a concentration of elites and their monuments (Miksic 2001, pp. 94–96). In contrast, the delta's coastal settlements were heterogenetic and characterized by entrepreneurial and manufacturing activities and dense populations (pp. 97–98). Although such models are useful on an heuristic level, empirical data are needed to examine their efficacy. As one example, the inland orthogenetic center of Angkor Borei may have been more densely populated than the Miksic model presupposes: Using the lowest estimates from five similarly sized early urban centers provided by Yoffee (2005, table 3.1, p. 43), Angkor Borei could have easily housed 20,000 inhabitants.

The coastal location of many of Southeast Asia's urban settlements has prompted Manguin (2000, 2004) to argue that these polities were city-states (**Figure 3**; see color insert). Most of the world's earliest states may have been city-states rather than territorial states (Charlton & Nichols 1997; Yoffee 1997, p. 263; but see Yoffee 2005, pp. 45–62), and mainland Southeast Asia's

first-millennium polities share many characteristics with other ancient city-states. Documentary records throughout mainland Southeast Asia describe multiple small competing principalities or kingdoms whose power rarely transferred to the rulers' offspring (Jacques 1986, p. 90).

GEOPOLITICAL LANDSCAPES OF EARLY SOUTHEAST ASIA

Understanding political forces that structured the production of early mainland Southeast Asian polities is essential; as in early states elsewhere, the political merged with the sacred. First millennium cities contained large brick temples, and smaller brick shrines located throughout the hinterlands marked localities with specific meanings. These monuments held sacred statuary, were sponsored by the region's elite, and reflected a syncretism of indigenous and Indic ideologies. Buddhism seems to have predominated in settlements and regions to the west (in central Myanmar and in central/western Thailand), and Hinduism predominated in areas further to the east in central Thailand, Cambodia, Laos, and coastal Vietnam.

Yet the co-occurrence of Buddhist and Hindu deities and architectural styles throughout mainland Southeast Asia suggests a selective adoption of Indic ideas that did not precisely duplicate their origin areas in South Asia. In peninsular Thailand/Malaysia, Brahmanical beliefs may have preceded Buddhist ideas (Jacq-Hergoualc'h 2002, p. 97), but both ideologies are evident after the fourth century A.D. (Bhattacharya 1997; Christie 1995, p. 256; Dalsheimer & Manguin 1998, p. 109; Ray 1994). In the Mekong delta, the Chinese considered Funan a great center of Buddhism (Pelliot 1903, pp. 284–85), yet its pre-Angkorian statuary tradition is largely Hindu in content. Similar developments occurred in the Late Phimai phase in Northeast Thailand between A.D. 300–600 (Welch & McNeill 1990, pp. 113–14). Perhaps groups in certain regions favored one Hindu sect over the other until the seventh century A.D.: Vishnu statues throughout the Mekong delta to the tip of peninsular Thailand/Malaysia bear close similarities to each other (Dalsheimer & Manguin 1998), while Siva images were worshipped throughout central and northern Cambodia.

Monumentality and Political Economy

Emergent ideologies and their material manifestations are key to establishing order and legitimacy in early civilizations (Baines & Yoffee 2000, pp. 14–15; DeMarrais et al. 1996). Monumental constructions are one medium for this process, and mainland Southeast Asia's first monumental arrangements (where the term monumental includes settlement embankments, settlement and enclave enclosure walls and moats, as well as a variety of brick constructions) were constructed in the mid–first millennium A.D. That earthen-walled and moated settlement precedents were constructed in the late prehistoric period is clear for both Thailand and Cambodia (Higham 2002; Moore 1992, p. 43). Among contemporary South Asian populations, settlement walls served multiple purposes: They protected against flooding and invaders, they restricted access by outsiders to the centers' markets, and they served as emblems of civic identity (Smith 2003a, pp. 278–79). Whether the emergent Southeast Asian monumental tradition reflected an "architecture of consensus," as Smith (p. 282) argues it did in South Asia, requires additional research.

India's Hindu temples also emerged as centers of social and economic activity under the Guptas by the fourth and fifth centuries A.D., when they were awarded royal land grants (Ray 1994, p. 161; 1997, p. 45). Brick monuments also appeared among the Pyu of Myanmar by the mid–first millennium A.D. In the Mekong delta and the Cham regions, brick and stone foundations that once supported wooden superstructures date between the fourth and seventh centuries A.D. (Gutman

& Hudson 2004, Southworth 2004, Vo 1998). In the Mekong delta, some brick shrines housed Hindu statuary (Dalsheimer & Manguin 1998, p. 100), whereas others served as mortuary monuments for cremations (Dao 1998). Southeast Asian shrines bear some resemblance to apsidal shrines that were established in the Indian subcontinent by the early first millennium A.D. (for latter see Ray 2004, p. 348). Mekong basin monuments also marked political and economic centers (Vickery 1998).

What forms of political leadership structured this cycle of monumental construction and use? Two general models have been proposed to explain leadership structure during this time: the "man of prowess" or mandala structure, and the galactic polity model (Tambiah 1985, Wolters 1999). In both models, power was fluid and contingent. As with early city-states elsewhere in the ancient world (Charlton & Nichols 1997, p. 11), power was diffuse in early Southeast Asia and few rulers were successful in passing their rule to their offspring (Vickery 1998).

Comparative research on early states in Africa, for example, suggests that leadership was closely linked to the supernatural (McIntosh et al. 2000, p. 29). This pattern holds true for first-millennium-A.D. mainland Southeast Asia in the linkage of Hindu images with royal authority. Fifth- and sixth-century mitered Vishnu statues have been recovered from the Mekong basin, areas to the south along the Malay Peninsula, and west Java (Dalsheimer & Manguin 1998, p. 90). Pre-sixth-century art forms bear clear similarities to art from southeastern India (specifically Tamil Nadu and Andhra Pradesh) but were manufactured within Southeast Asia (Dalsheimer & Manguin 1998; Stargardt 2003, pp. 107–9). Whether the popularity of Vishnu reflects the importance of Vaishnavism in first-millennium trading networks (Dalsheimer & Manguin 1998), such Hindu images were emblematic of the Indic ideology among these Southeast Asian populations. Elites commissioned and dedicated Indic images and the monuments that housed them (Brown 1996, p. 195); as elite-sponsored images of power, statuary and structures conferred order and legitimacy to the ruling elite and materialized their wealth (Baines & Yoffee 2000; Schortman & Urban 2004, pp. 192–94).

Lavy (2003) contends that the distribution of Vishnu and Siva iconography reflects the differential participation of ethnically and politically discrete groups before the seventh century A.D.: some in Vaishnavite cults and the others in Saivite cults. In this scenario, the appearance of the composite figure Harihara in the seventh century A.D. signaled efforts toward political unification between north and south and the emergence of new forms of leadership. Organizational changes during the seventh century A.D. include the expansion of Khmer culture into central, east, and Northeast Thailand and also Vietnam. Systematic documentation of the timing and nature of changes in regional settlement systems, accomplished primarily through regional survey, is required to evaluate this model.

Southeast Asian Ritual Terrains

Monumental architecture constitutes a politico-religious feature of the Early Southeast Asian landscape whose ritual meanings have persisted through time (Groslier 1973, p. 366; see also Knapp & Ashmore 1999, p. 19). Other features likely included rivers, springs, mountains, and caves, which ancient Hindu texts like the *Brihatsamita* describe as playgrounds of the gods (Michell 1988, p. 69) and which served as pilgrimage locations. Brick and stone temples were built atop natural promontories as far east as the Mekong delta (Vo 1998, p. 213) and west into lower Myanmar (Moore 2004a); so, too, were the region's first rock-cut caves. Buddhist residential monastic complexes appeared in South Asia in the second and first centuries B.C. (Ray 2005, pp. 313–14), and Cambodian hermitages may have been

present as early as the fifth century (Coedès 1968, p. 60). Despite concerted survey efforts, archaeologists working in Cambodia have been unable to find archaeological evidence of these ashrams (Pou 2002, p. 318).

Aggregations of individual dedicatory events stimulated the growth of some of southern Cambodia's and Northeast Thailand's first-millennium-A.D. settlements. Each time a temple was constructed, water control structures like tanks, dikes, and moats were also built. The temples embodied sacred mountains, and the moats, sacred waters. Such sites in Northeast Thailand contained multiple mounds and reservoirs (Welch 1997). Settlements such as Muang Phet contained moats and earthen and brick walls (constructed partially or wholly with bricks) that served as landscape and ritual architecture (McNeill 1997). Unlike residential structures, which were constructed of perishable materials, these sacred sites were made from durable materials. Both the nature of the archaeological record and difficulties in archaeologists' access to many monuments (which are still considered sacred and therefore inviolable) make disarticulating the sacred from the secular difficult, if not impossible.

RECONCEPTUALIZING MAINLAND SOUTHEAST ASIA IN THE FIRST MILLENNIUM A.D.

Thousands of first-millennium-A.D. mounds are scattered across mainland Southeast Asia today, and most remain to be discovered. Material from multiple data sources provides an intriguing yet frustratingly incomplete picture of urbanism, political transformation, and ideological structure for this period. Might a fundamental resilience have existed at the level of local sociopolitical units that counterbalanced macrolevel political instabilities that involved shifting polities and their centers (see Stark 2006)? Multidisciplinary approaches are needed to examine political, social, economic, and environmental contexts of state development.

The idea that first-millennium-A.D. Southeast Asia witnessed the emergence of a series of city-states in both the mainland and insular regions (Manguin 2000, 2004) is intriguing. We still know too little, however, about the nature of the region's earliest cities to place particular examples into one or another of the current, competing models of early urbanism and early state formation (see also Cowgill 2004, pp. 534–37, Smith 2003b). Such knowledge is best gained by investigating the spatial organization of economic activities (i.e., production, distribution, and consumption) within and between its early centers. Understanding early urbanism is particularly urgent to tracing continuities and discontinuities in the regional pattern, given what appears to be the relatively dispersed nature of some ninth- to fourteenth-century-A.D. urban centers such as Angkor (Greater Angkor Project 2003).

Archaeological work is also needed to evaluate models, drawn from historical sources (e.g., Bentley 1986, Wolters 1999), that suggest a cyclical quality of early Southeast Asian states. These models resemble patterns that archaeologists have documented elsewhere in the Old and New Worlds (Feinman 1998), but archaeological work is necessary to understand the existence, nature, and implications of this cycling. Such work is also key to understanding political cycling within its broader context of subsistence economy, ethnic identities, lower-level administrative structures, and ideology.

Mainland Southeast Asia is an excellent and underutilized region for comparative studies of early state formation, with great potential for examining changing spatial configurations of human-environment relations through time. Theoretical frameworks of archaeological landscape studies elsewhere vary widely (e.g., Anschuetz et al. 2001; Smith 2003), yet mainland Southeast Asia remains largely untouched by these debates, to its detriment. Understanding changing landscapes of mainland Southeast Asia in the first millennium A.D. requires attention to at least three research themes: (*a*) late Holocene

human-environmental and land-use histories, (*b*) changing patterns of settlement, and (*c*) economic networks at the regional and macroregional levels.

Late Holocene Human-Environmental and Land-Use Histories

Collaborative archaeological and paleoenvironmental research is also sorely needed to evaluate the nature of human impact on the environment with the rise of complex societies. Extant research on deltaic formations and changing sea levels, summarized in this review, has limited utility until they are examined against an archaeological backdrop. Work on climatic variability (both low-frequency and high-frequency processes) remains to be done in much of the mainland before we can examine the relative impact of climate on human decision-making.

Historical ecological approaches could articulate paleoenvironmental studies with anthropological questions and place settlement pattern studies more explicitly within their broader natural and ecological settings. Do we see long periods of landscape stability, or does evidence exist for changing patterns of land use (and agricultural intensification) through time? If so, what was its impact on local and regional watersheds? How did populations intentionally or unintentionally shape their landscapes at the local and regional scales? In turn, how did landscape elements constrain or direct human decision-making at different points during the first millennium A.D.? Such work should also distinguish anthropogenic from natural patterns to facilitate analysis of the relative importance of human action versus environmental factors in a variety of socioecological transitions.

Changing Patterns of Settlement

Systematic archaeological survey, combined with judicious test excavations to refine regional ceramic chronologies, is sorely needed to understand the first millennium A.D. Such work should encompass both major urban centers and their rural catchments, combine archaeological with epigraphic and art historical information, and incorporate paleoenvironmental data. The sociopolitical contexts of rice agroecosystems require further investigation. What was the potential for agricultural surplus generation within particular regions? To what extent was this surplus dedicated for export (to support maritime traders along the South China Sea coast), and to what extent did this surplus underwrite intraregional activities? That urban centers arose and grew suggests that populations generated sufficient surplus to support food collectors (fisherfolk and hunters) and craft specialists. Across pre-Angkorian Cambodia, at least, this surplus production was a form of social production: It supported ritual, ceremonial, and construction activities by religious officials (Stark 2004, Vickery 1998). Archaeological evidence, however, is needed to understand better the relative importance of each form of production.

Studying changing patterns of land use will also inform on the nature of urban-hinterland configurations. Not only are center-periphery configurations structured differently under discrete kinds of political economies, but also these may change through time. What was the effective scale of these early Southeast Asian polities? How did centers articulate with their peripheries? To what extent did they control their rural hinterlands and the potential agricultural yields (following Manguin 2000, p. 414)? Only settlement surveys offer the potential to understand the timing, nature, and extent of urbanization in various river valleys and deltas across the region.

At least two landscape-based studies that focus instead on the second millennium A.D. provide models for this work. One project, undertaken in northern Thailand (Grave 1995), uses the political region (or mandala) as its analytical scale and focuses on links between lowland Buddhist populations (seen in their monuments) and upland non-Buddhist

groups (seen in their mortuary sites). A second project, based in the Tonle Sap region of northwestern Cambodia (Greater Angkor Project 2003), uses the effective urban Angkor complex as its scale and is in the process of mapping the palimpsest of shrines, water features, and associated house-mound clusters, channels, and embankments (whether roads or banks of canals and water tanks) that comprise this ninth- to fourteenth-century landscape. Whether these second-millennium-A.D. systems had precursors in the previous millennium should also be a topic of archaeological investigation.

Political Economies and a "World System" of the First Millennium A.D.

That mainland Southeast Asia was embedded in broader economic, political, and social networks during the early to mid–first millennium A.D. is clear from Chinese documentary records that describe envoy journeys between southern China and various Southeast Asian polities (Coedès 1968, Ishizawa 1995, Southworth 2004, Wheatley 1983). More work, however, is needed to elucidate the nature and changing contexts of these systems at the intraregional, interregional, and macroregional levels. What kinds of communication and transportation networks linked subregions into broader interactional networks? Were regions structured into systems of village-based specialization and exchange of utilitarian goods, as White & Pigott (1996) suggested? Bellina & Glover (2004) have summarized our knowledge of goods imported from South Asia, but comparable scholarship remains to be conducted on a range of "prestige" goods (from precious metals, porcelains, and beads to horses and cowries) that originated in China and also circulated through the region.

Comparative studies of material culture could inform on the configuration of several interactional networks: within South China Sea communities, between mainland and island Southeast Asian regions, and between mainland Southeast Asia and its neighbors (southern India, southern China). Because art historical traditions have dominated such analyses, interpretations emphasize South Asian influence and the religious/ideological realm; more work is needed on the vernacular world. Documenting material culture homogeneity versus heterogeneity within and across regions and through time also informs on the nature, tempo, and directionality of organizational change versus cultural stasis.

A practice-theory approach to comparing technological traditions, as Bellina (2003) has initiated with bead studies, offers a holistic methodology that could benefit even more by incorporating compositional analysis. Work could compare and contrast technological styles in multiple material culture media, from ceramics (particularly the fine-paste wares found throughout island and mainland Southeast Asia after A.D. 300) and beads (glass and semiprecious gemstones) to brick manufacturing technology and architectural construction techniques. This work requires technological reconstructions of manufacturing sequences, stylistic comparisons of decoration, and provenience research.

First-millennium mainland Southeast Asia remains one of the world's richest and most underexploited areas of research for archaeologists studying early state formation. That this work must be undertaken at the regional and macroregional levels is clear, and close collaboration is needed between specialists in archaeology and those in ancillary disciplines. Also required are the energy and resources of a new generation of archaeologists who are committed to international collaboration with, and training of, archaeologists from the countries under study. Such interdisciplinary research blends archaeology, art history, and philology with the natural sciences and will greatly enhance our knowledge of mainland Southeast Asia's changing landscapes during the first millennium A.D.

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