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The Angkorian city: From Hariharalaya to Yashodharapura

MIRIAM STARK, ALISON CARTER, PIPHAL HENG,
RACHNA CHHAY, AND DAMIAN EVANS



¹ Bayon face-tower image.

In 1296, Zhou Daguan, an emissary from the Yuan dynasty of China, reached the gates of the Angkorian capital of Yashodharapura (fig. 1). While spending nearly a year in the city, he wrote detailed descriptions of life in Angkor in the late thirteenth century that resonate with the myriad archaeological ruins we associate with Greater Angkor today. The Angkorian Empire's epicentre now forms the Angkor Archaeological Park, a 400-square-kilometre region whose approximately 1400 brick and stone structures reflect six centuries of Angkorian ritual practice and pageantry. Angkorian architectural and art traditions have formed the focus of intensive study for more than a century,¹ and Angkor's documentary record of both indigenous inscriptions and Chinese visitor accounts informs much of our understanding of this classical Southeast Asian state.

For pragmatic as well as paradigmatic reasons, Angkor's archaeological record remains the least understood component of this ancient kingdom's history. Work by French scholars in the late nineteenth and twentieth century focused primarily on art history, epigraphy, and architecture.² More recently, the APSARA Authority and its international partners have worked to conserve and preserve the temples from tourism and encroaching vegetation. (APSARA is the Authority for the Protection of Angkor and the

Region of Siem Reap, a Cambodian government agency.) Anthropological and archaeological studies of Angkor's past remain in their infancy. Yet it is precisely such approaches that help us understand the city of Angkor: its biography, its structure, and its inhabitants.

Early cities varied in form across mainland Southeast Asia,³ but the roots of Angkor extend more than a millennium into the early urban centres of the Lower Mekong.⁴ The region's first true cities arose by the mid-first millennium AD, in the Mekong Delta and in what is now central Cambodia. In discussing both Ishanapura (Sambor Prei Kuk) and Mahendraparvata (on Phnom Kulen), Piphah Heng and Paul A. Lavy (this volume) provide the essential foundation for understanding the scope and scale of Angkor-period urban forms in (and beyond) the area that we call Greater Angkor.

The city of Angkor (fig. 2) was situated on the Tonle Sap plain, in the north-western section of Cambodia's alluvial lowlands that extend south into the Mekong Delta. Rice farmers who learned to use annual flooding to their advantage were drawn to settings throughout these vast low-lying floodplains by the third millennium BC.⁵ By the late centuries BC, urban landscapes that were linked through trade and interaction as well as ideology emerged in the Mekong Delta and up the Mekong-Tonle Sap river system.⁶ Piphah Heng describes the transition to pre-Angkorian Cambodia elsewhere;⁷ in this volume Heng and Lavy focus on key pre-Angkorian cities.

Our essay introduces the Angkorian city by briefly describing information sources, and then reviewing the timeline of what we might call "Urban Angkor", which, at points during the ninth through fifteenth century, could have had as many as 750,000 inhabitants.⁸ We then turn our attention to how archaeological research informs our understanding of Angkorian Khmers in their urban environments.

HOW WE KNOW WHAT WE KNOW ABOUT ANGKOR

Scholars use three primary lines of evidence to inform our understanding of the Angkorian Empire and its people: written documents, bas reliefs and sculpture, and the study of material remains through archaeology. Among the most famous and vivid historical documents of Angkor is the account of the city written by Zhou Daguan.⁹ Although we do not have the complete version of his original document, Zhou wrote about all aspects of Angkorian life, from the residences and how people dressed, farmed, and buried their dead to the foods they ate. Although his writings contain the biases and misunderstandings of a foreign visitor, his text provides us with a discussion of many intangible aspects of life in the Angkorian city.

IMPERIAL ANGKOR

ITS VAST WATER SYSTEM WAS A MARVEL OF ENGINEERING—AND A CAUTIONARY TALE OF TECHNOLOGICAL OVERREACH.

At its height in the 13th century (depicted in this reconstruction), the capital of the Khmer Empire was the most extensive urban complex in the world. Using imaging radar and other tools, researchers have learned that Greater Angkor covered almost 400 square miles, roughly the area of the five boroughs of New York City, with as many as 750,000 inhabitants. Most were rice farmers and laborers who worked the giant jigsaw of fields. In the city center, perhaps 40,000 people—elites and farmers alike—lived within the walls of Angkor Thom, a 3.5-square-mile enclosure with temples and a royal palace. Though the rainy season usually brought ample water, the ability to store water in great reservoirs called *barays* and control its flow gave Angkor an edge in times of drought or flood. But this engineered landscape required constant maintenance. When the water system faltered, so did Angkor's power.

SACRED SOURCE

The Kulen Hills sheltered the headwaters of the Siem Reap River and were quarried for rock to build Angkor's temples. The hills were logged for timber and firewood and to clear land for farming; deforestation may have caused floods that choked some of Angkor's canals with sand and silt.

LIFE IN A SEA OF RICE

On raised ground between fields, Angkor residents built timber houses on stilts. They planted palms and other trees to provide shade, fruit, and fronds for annual roof replacement. Ponds collected water during the wet season; during dry months water from the main canals fed the fields. Each community had a shrine (at bottom left), where priests may have helped mediate water use.

ANGKOR'S COMPLEX PLUMBING

In Southeast Asia, months of monsoon rains are followed by months of near drought. To ensure a steady water supply, stabilize rice production, and control flooding, Khmer engineers built a network of canals, moats, ponds, and reservoirs. Massive earthworks slowed the wet-season deluge flowing from the Kulen Hills, directing it into canals that fed the barays and temple moats. Spreading across the gently sloping land, the water drained finally into the Tonle Sap, the largest freshwater lake in Southeast Asia.

ART BY STEVE CONDON. GREAT MAP BY TOM CHANDLER AND MICHELLE LIA. NICHOLS UNIVERSITY. IN BRIDY OTTENHOFF AND LISA R. RITZER. THE GREAT MAP DATA BY DANIEL FINKEL, UNIVERSITY OF SYDNEY AND CHRISTOPHER BUTLER, PERKINS SCHOOL OF ARCHITECTURE. SOURCE: ERIC ORLANDO ANKOR PROJECTS & COLLABORATION OF APRIANA ERIC AND UNIVERSITY OF SYDNEY. SCALE: VARIES IN THIS PERSPECTIVE. LENGTH OF EAST BARAY IS 4.5 MI (7.2 KM).



2 Imperial Angkor reconstruction.



3 Pre-Angkorian Khmer inscription from Prasat Kok Roka or Preah Theat.

Other written documents come from the ancient Angkorians themselves, in the form of Khmer and Sanskrit inscriptions written primarily in stone and associated with temples and sanctuaries (fig. 3). These inscriptions were largely composed by elites, and focus especially on the relationship between the elites themselves, most frequently the royal family, and the gods. Khmer inscriptions are primarily concerned with more mundane political, economic, and bureaucratic aspects of temple donations and the functions of the temple. Sanskrit texts focus on honouring the elites, kings, and gods. Although these inscriptions provide a limited view of one facet of Angkorian life, they can nevertheless help us understand the resources involved in running an Angkorian temple, including the type of personnel required, and the food and goods being grown, traded, and donated to the temples. It is through inscriptions that we have also been able to reconstruct the names of the Angkorian kings, when they ruled, and the temples they built or modified. In some cases, these inscriptions tell us more about certain historic events or indicate political intrigue between those competing to rule. These inscriptions give us a deeper view into the lives of Angkorian elites and rulers in particular.

In addition to the stone inscriptions, carvings on stone temples can also be an important source of information for scholars seeking information on life at Angkor. While many carvings and sculptures depict the Buddha, Hindu divinities, or scenes from Hindu myths, we can also glimpse details of textiles and fabrics, clothing, and jewellery. Other carvings depict historical events such as battles and scenes from everyday life (fig. 4).

Archaeological research also provides an important glimpse into the Angkorian past. Through excavation, field surveys, and remote sensing techniques, archaeologists have identified the material remains of the ancient Angkorians. Of course, archaeological research in Southeast Asia is a challenge. Due to the hot and humid climate, organic remains do not survive well. For example, while the remains of wooden buildings, houses, and even the royal palace have not been preserved, archaeologists can identify postholes in the soil to determine the layout of structures. Combining this material data with descriptions of wooden buildings by Zhou Daguan and depictions in bas reliefs can help us imagine what these houses might have looked like from the ground up (fig. 5). Bringing these lines of evidence together sheds light on life in the Angkorian city, from its earliest form as Hariharalaya through its various incarnations of Yashodharapura.



4 Scenes of daily life from Bayon bas-relief; outer gallery south side.



5 Reconstruction of rural Angkorian village.

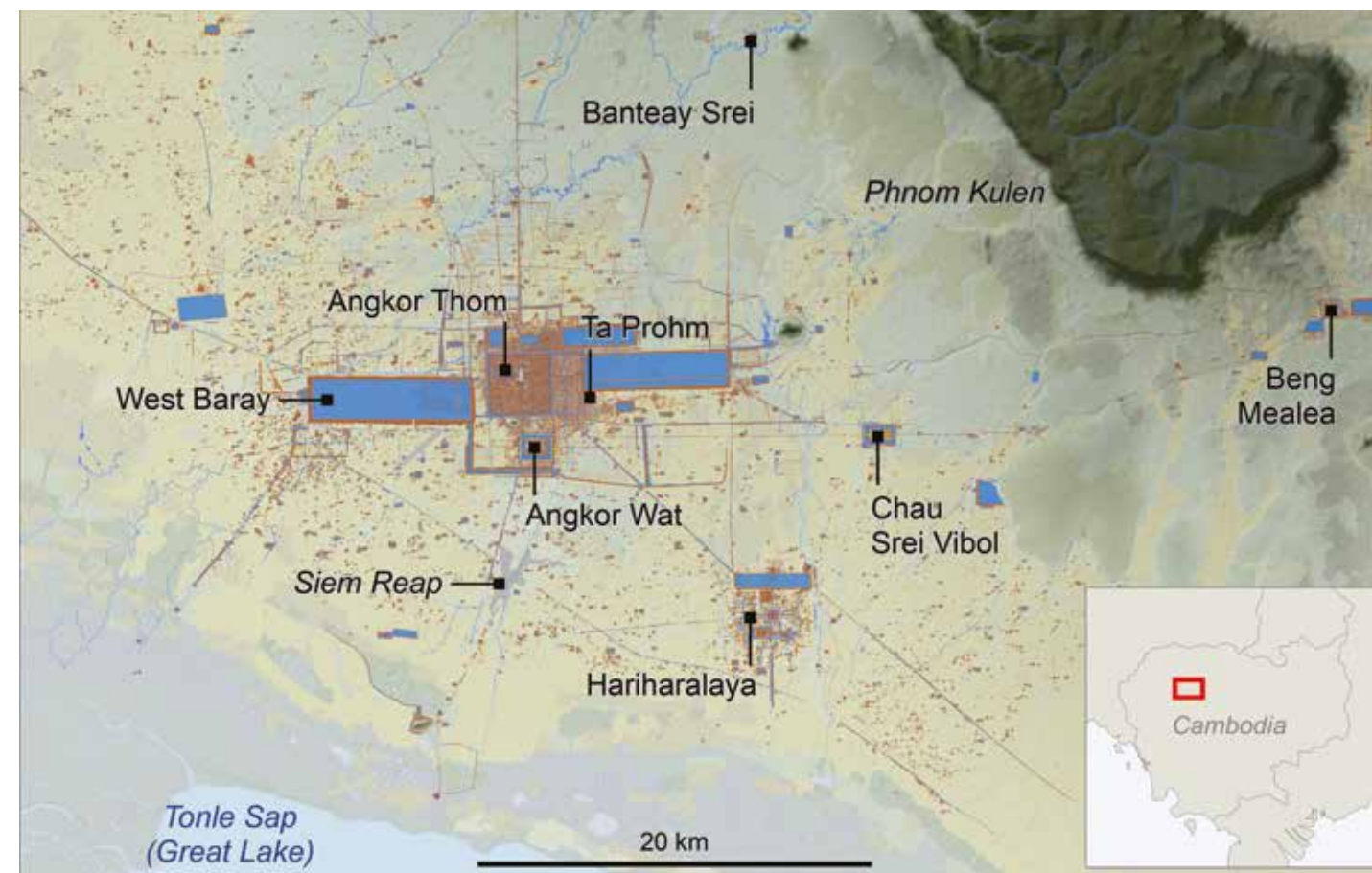
ANGKORIAN CITIES

Cambodia has long been, and remains a rural and sparsely populated country relative to its Southeast Asian neighbours: only 0.1 percent of Cambodia's total land area today is urban.¹⁰ Yet the 1000-square-kilometre area that is Greater Angkor was manifestly urban.¹¹ At least thirty-six Angkorian rulers left their urban mark through its ninth- through fifteenth-century history. Many founded "new" capitals by sponsoring monumental temple-complex construction projects. Based on the amount of rice that could be produced in the 1000- to 1500-square-kilometre area around Angkor, scholars have estimated a population of 750,000.¹²

Several Angkorian kings also established (and/or refurbished) provincial centres (see map, p. 12 for many of these) in central Thailand (Lopburi), northeast Thailand (Phimai, Prasat Phnom Rung), southern Laos (Wat Phu), eastern Cambodia (Preah Khan of Kompong Svay) and northwestern Cambodia (Banteay Chhmar, Preah Vihear). Whether these provincial settlements were truly urban or simply civic-ceremonial centres is less certain. That they all linked to the Angkorian epicentre through formal road and water networks has been documented archaeologically; some "royal roads" with stone bridges continued in use until the capital's fifteenth-century "collapse".¹³ Angkorian cities played similar functions through time: they were economic hubs as well as political centres, with agrarian production areas dispersed among administrative and residential areas in a low-density urban configuration. These Angkorian cities shared formal and organisational traits that previous scholars describe as part of an idealised urban model. In each, the urban epicentre typically included one or more state temples, a complex hydraulic system, royal residences, and public arenas for pageantry and display.¹⁴

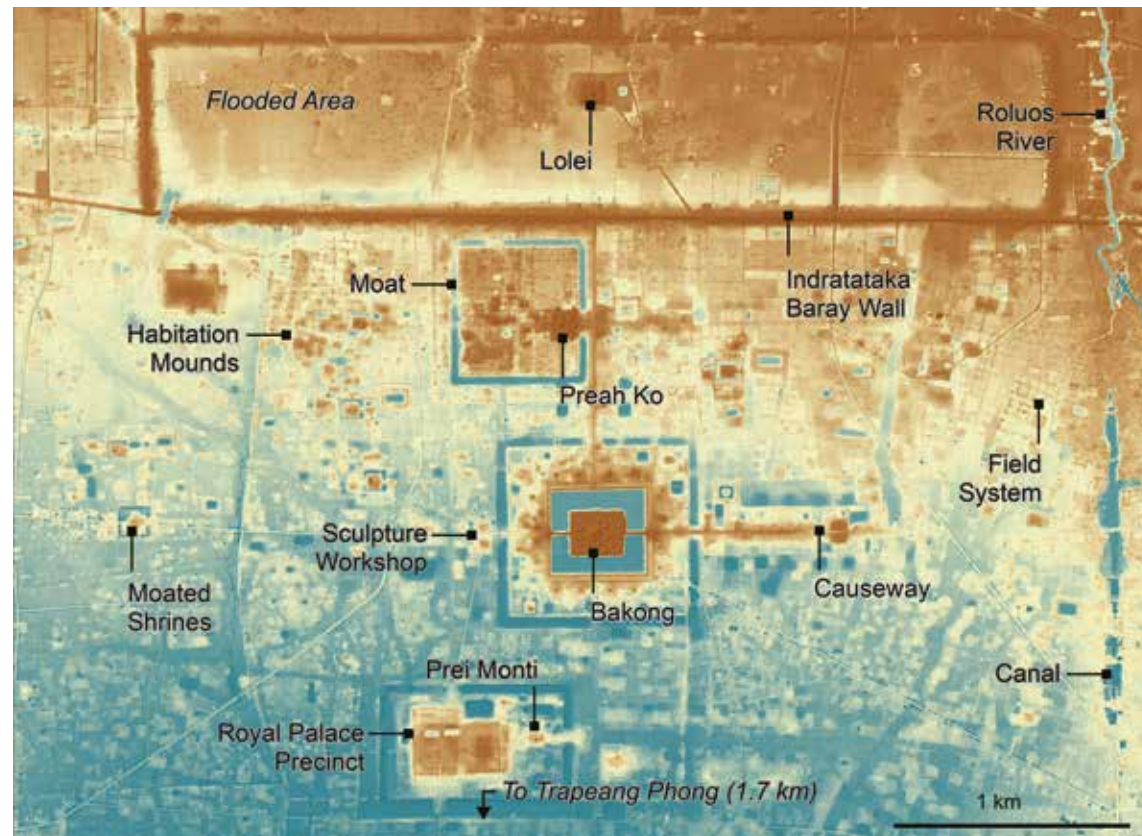
Suburban settlements, organised into hamlets with ponds and local temples (*prasat*), were embedded throughout the urban fabric. Boundaries shifted with each new ruler, but clusters of rural hamlets also surrounded each new capital, and each hamlet centred on a local temple and included ponds. The Angkorian city and its suburban and rural peripheries likely emerged in concert; each was dependent on the other for its existence. Rural Khmers relied on centres for their religious and social lives, which revolved around complex ritual calendars and political events at temple complexes and in public spaces. Rural farmers and artisans in the periphery surrounding the city provided essential commodities to the centre and its temples, from staples like rice and fish to crafts and seasonal labour.

Airborne laser scanning (LIDAR) surveys, completed in 2012, mapped a cardinal aligned grid that covers at least 35 square kilometres of Greater Angkor.¹⁵ Archaeological research to field-verify LIDAR data patterns and to understand elements of Greater Angkor's urban anatomy—its administrative districts, royal residences, state temples, craft workshops,



commoner residences, and market areas—is now underway. In the following discussion, we consider three successive capitals in and around the Angkor Archaeological Park that have been the object of archaeological attention (fig. 6). Our focus on the Angkorian city begins with the eighth- to ninth-century city of Hariharalaya, and moves to the Angkorian epicentre to study phases in the city that King Yashovarman founded in the late ninth century, which we call Yashodharapura. Studying Angkor Wat and Ta Prohm offers insights on how twelfth- and thirteenth-century temple enclosures fit into their broader urban settings as urban components but not temple-cities. We end by introducing Jayavarman's twelfth- and thirteenth-century city of Angkor Thom, which represents the grandest urban vision in Angkorian history.

⁶ Angkor region.



THE ANGKORIAN CITY OF HARIHARALAYA

We begin with a ninth-century site containing the remains of several temples, which have come to be called the “Roluos group”. This is Hariharalaya, where Angkor’s first king, Jayavarman II, lived before establishing the first Angkorian capital, Mahendraparvata, on Kulen Mountain (fig. 7).¹⁶ Most of the region’s Harihara statues, representing an integrated expression of Shiva and Vishnu (Cat. 96),¹⁷ have been recovered from the Roluos temple Prasat Trapeang Phong.¹⁸ Jayavarman II abandoned Mahendraparvata to live in Hariharalaya again at the end of his life, dying in the vicinity around 834. His son and successor, Jayavarman III, ruled the capital as a Vaishnavite king and founded approximately 100 monasteries. King Indravarman dedicated five royal foundations in the Roluos group (Preah Ko, Bakong, Prasat Lolei, Prei Monti, and Prasat Trapeang Phong) between 877 and 889. The large Indratataka reservoir, built just north of the temples, was 3200 metres long, 750 wide, and could hold 7,200 cubic metres of water.¹⁹ That Hariharalaya’s epicentre held sacred and administrative power is clear;²⁰ residential mounds mapped around the Prasat Trapeang Phong and Prei Monti buildings hint at the city’s broader settlement, which likely extended out significantly to the east, south, and west of the epicentre.²¹

THE ANGKORIAN CITY OF YASHODHARAPURA: ANGKOR WAT AND TA PROHM

Late ninth-century King Yashovarman I moved his court from Hariharalaya to Phnom Bakheng to found Yashodharapura. This city, located between the ninth-century East Baray and the early eleventh-century West Baray, persisted for nearly half a millennium, and had a series of shifting capitals. Suryavarman II’s twelfth-century construction, the great Visnuloka temple complex (now commonly called Angkor Wat), was not only his crowning achievement as both a Vaishnavite temple and a funerary monument, it is still one of the largest religious structures of the ancient world. The rectilinear temple complex includes four, nested enclosure walls. Its fourth, outer enclosure measures 810 by 1030 metres, an area of more than 83 hectares. The temple’s construction alone would have required a platform of about three million cubic metres of fill.²² Angkor Wat was a focal point, a religious hub, a cosmogram, and a lived space. Further analysis of the space is detailed below.

Approximately three kilometres northeast of Angkor Wat lies the late twelfth- or early thirteenth-century temple-monastery of Ta Prohm. The great builder Jayavarman VII (reigned 1182/83–around 1220) dedicated it to his mother, and it is associated with the Buddhist goddess of wisdom Prajnaparamita. The nested, five-enclosure Ta Prohm complex housed a temple and a royal monastery (*rajavihara*). Ta Prohm’s outer enclosure walls measure approximately 1020 by 60 metres, and cover an area of approximately 68 hectares. What distinguishes Ta Prohm from its neighbouring temple complexes is the recovery of the Ta Prohm inscription, which enumerates not only the temple’s buildings, but also the workforce required to maintain the complex and its continuous rounds of religious activities. The Ta Prohm inscription lists 79,365 Angkorians who serviced the temple, including 12,640 individuals tasked with regular temple maintenance, and an additional 66,635 men and women “in the service of the gods”.²⁴ Angkorian Khmers (and, it turns out, Burmans and Chams) lived, ate, worked, and studied in the Ta Prohm temple complex.²⁵

Ta Prohm is but one piece in the rich repertoire that is the monumental legacy of Jayavarman VII. His many temples, bridges, and rest houses are famous for their quantity and their Buddhist iconography and organisation. Yet many would argue that the consolidation of Angkor Thom (Khmer for “Great City”) was this king’s most significant accomplishment. Covering an area of nine square kilometres, with eight-metre-high walls, Angkor Thom enclosed nearly 146 hectares and was surrounded by a 100-metre-wide moat. But this walled area did not define the absolute limits of Angkor Thom. LIDAR data suggest a late twelfth- or thirteenth-century “overflow” of the grid into areas beyond the space delimited by temple enclosures.²⁶

7

LIDAR-based map illustrating archaeological sites and features in the Hariharalaya region.

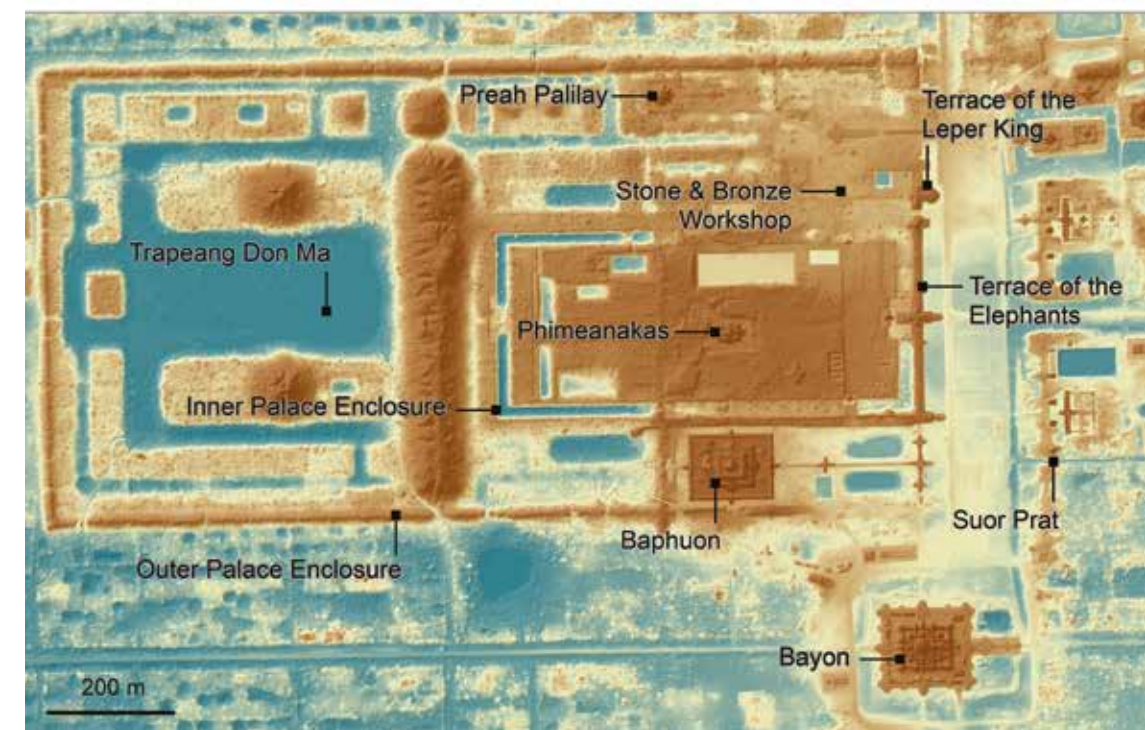
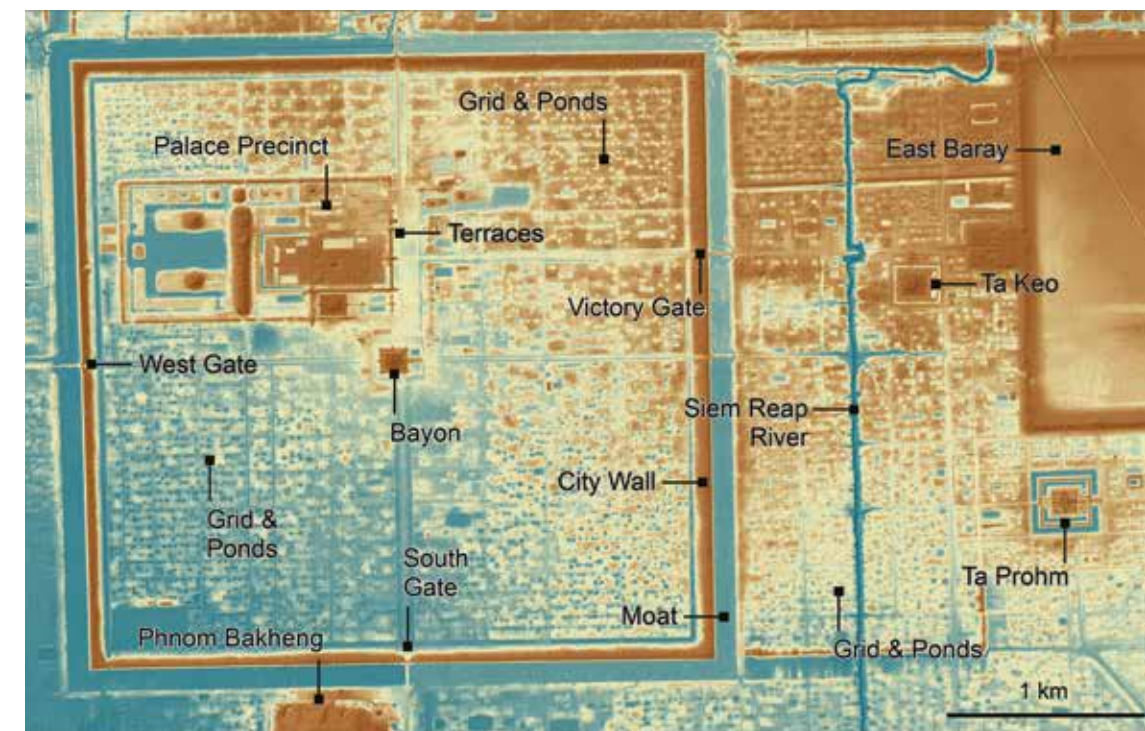
ANGKOR THOM

In enclosing his capital into the nine-square-kilometre, walled complex of Angkor Thom, Jayavarman VII created the last great Angkorian city (fig. 8). Planned along an orthogonal grid, Angkor Thom is organised into four equal quadrants of 225 hectares each, with the Bayon Temple at its centre and a royal quarter in the northwest. These city blocks contain more than 300 house mounds, roadways, canals, and more than 2,700 depressions, many of which were ponds; this great walled city contained the royal palace and many state monuments (including Bayon, Baphuon, Khleang, and Prasat Suor Prat).²⁷ Residential patterning comprises the bulk of Angkor Thom's area, however. Whether elite or common, the city at its peak may have housed up to 16,000 Angkorians, many of whom likely served the state.²⁸

The city's sandstone and laterite monuments dazzle today's visitors to Angkor Thom, but the Angkorians who made this city their home likely reacted more enthusiastically to the public performances and pageantry that filled the great city's open spaces. The most successful Khmer rulers sponsored these activities, and Angkorian urban planning included long causeways ("avenues of approaches") to facilitate public events and processions, religious or otherwise. One north-south swath of open space from the Bayon to the North Gate was ideal for such activity. The Terrace of the Elephants and of the Leper King face east into an open area free of grid lines that could have accommodated either onlookers, performers, or both. Large and small Temples housed deities who required daily and seasonal care: sacrifices, baths, food and floral offerings, song and dance.

Pageantry involved in annual pilgrimages, like that in public processions, reaffirmed Angkor Thom's centrality and celebrated the ruler under whose patronage these displays took place. Suryavarman II, for example, memorialised his reign on the southern gallery of Angkor Wat (Cat. 40). In one scene, the king and his entourage stand atop Mount Sivapada, and his followers swear an oath to their sovereign.²⁹ Jayavarman VII designed his great city to attract and host subjects from across his empire when he built the Bayon Temple some fifty years later. He designed the temple with 439 niches to hold individual statues, which art historians believe were *Jayabuddhamahanatha* images (statues of the Bodhisattva Avalokiteshvara) that their caretakers brought to Angkor Thom from at least twenty-three provincial centres for annual consecration during public festivals.³⁰

The Angkorian city was vibrant, dynamic, and complex. Understanding its physiology requires exploration into numerous sources, from documentary data to architectural detail. Generations of scholars have plumbed the depths of these sources to offer key insights on the daily lives of Angkorians, many of which are outlined in the next section. The chapter concludes with an exploration of how archaeological approaches, specifically work of the Greater Angkor Project, fill in gaps left in understanding *la vie quotidienne khmère*.



8 LIDAR-based map, with key archaeological sites within the walls of Angkor Thom (upper) and locations of features within the royal palace enclosure and open area to east (lower).

DAILY LIVES OF ANGKORIANS

Archaeologists and scholars have begun to put together a more complete picture of the daily lives of Angkorians by drawing on archaeological, historical, and art historical sources. From Zhou Daguan we know that the majority of the residents were Khmer-speakers, but Angkor was home to a diverse group of people. Chinese travellers visited and lived in Angkor, and an inscription (K. 273) from Ta Prohm describes Burmese and Cham people affiliated with the temple. While these inscriptions are largely concerned with the activities of elites and members of the royal family, they do list other members of society who worked at or were associated with the temples. Some temples employed thousands of labourers, with occupations including Brahmins and religious specialists, royal inspectors, teachers, students, temple dancers, merchants, and people who worked in the rice fields.³³ That they lived on temple grounds while they worked is suggested through archaeological work at Angkor Wat and Ta Prohm. A reconstruction of Angkor Wat (fig. 9), using Greater Angkor Project excavations as a guide, offers one model of life within temple enclosures. Bas-reliefs depict musicians, dancers, ascetics, soldiers, and people working in markets and cooking food.³⁴ Angkor was a cosmopolitan centre, with people who filled a variety of roles and who were of different social standings.

Determining the status of the Angkorian commoners described in these inscriptions has been difficult. While the Angkorians appear to have been



10 Reconstruction of moated village temple (*prasat*), which formed the nucleus of rural Angkorian hamlets.

concerned with hierarchy,³⁵ their terminology also implies that many commoners were not free.³⁶ There appear to have been different types of slaves. Zhou Daguan mentioned that only the poorest families at Angkor did not have slaves, and that the slaves in Angkorian homes were ethnic minorities captured from upland regions. There were also religious slaves, who worked for a temple and may have had more autonomy and status.³⁸

Temples and religion appear to have been an important component of Angkorian life. Part of this is due to the bias of the material record: religious structures and inscriptions associated with temples and sanctuaries were made or inscribed in stone, much of which is still visible on the landscape. Large state temples, like those frequently visited by tourists to Angkor, were dedicated to Hindu divinities, or the practice of Buddhism, and required the labour of thousands of individuals, as discussed above. Smaller village temples, however, also dotted the landscape (fig. 10).³⁹ Zhou Daguan described the practice of Buddhism in the capital as well as a variety of monthly festivals.⁴⁰ Additionally, it is likely that ancient Angkorians, like Cambodians today, worshipped local spirits and ancestors.⁴¹

In addition to professions related to the temple, archaeological research in the past twenty years has added much to our knowledge of other parts of the Angkorian economy, especially the production of different crafts. Approximately ten stoneware-ceramics kilns have been identified around the Greater Angkor area, which produced a variety of glazed and unglazed ceramics in a wide range of forms: from architectural ornaments to small covered boxes and large storage jars (fig. 11).⁴² The ancient Angkorians used a variety of techniques, including the slow wheel, coiling, hand modelling, and moulding to shape ceramics before firing them. Some potters incised

9 Reconstruction of the Angkor Wat enclosure, looking south.





11

Examples of Khmer stoneware ceramic vessels and roof tiles (brown-glazed, green-glazed) recovered from recent APSARA excavations at sites in and around the Angkor Archaeological Park.

designs on the lids, necks, or shoulders. Many ceramics were also glazed using a dark, chocolate-brown glaze and a lighter green glaze. Ceramics were then stacked into kilns, with small hunks of clay used to support them, and fired at a high temperature, approximately 1100–1300°C. These high-fired stonewares were extensively traded across the Angkorian Empire and seemingly used every day for a variety of functions, including the storage of food and liquids, holding materials for chewing betel, as well as ritual purposes.⁴³

Recent excavations near the royal palace of Angkor Thom have uncovered a stone and bronze sculpture workshop.⁴⁴ Numerous sandstone chips, metalworking slag, crucibles and clay moulds, and unfinished or broken stone sculptures were found in excavations. The highly skilled artisans in this workshop appear to have been producing sculptures and ritual objects, seemingly for the royal palace situated next door.

Many of the sculptures of the gods and goddesses depict deities wearing beautiful textiles from the waist down and elaborate jewellery (Cats. 107, 109). Zhou Dagan wrote that people at all levels of society were similarly clothed from the waist down and wore their hair in a topknot. Textiles had a wide variety of patterns and styles, but only the king could wear textiles with a flower pattern and a golden crown. According to Zhou, Cambodians did not know how to weave silk, but some silk weavers from Siam lived in the capital.⁴⁵ Studies of depictions of textiles on Angkorian sculptures and bas-reliefs have revealed a strong Indian influence in both the textile patterns and costume forms.⁴⁶

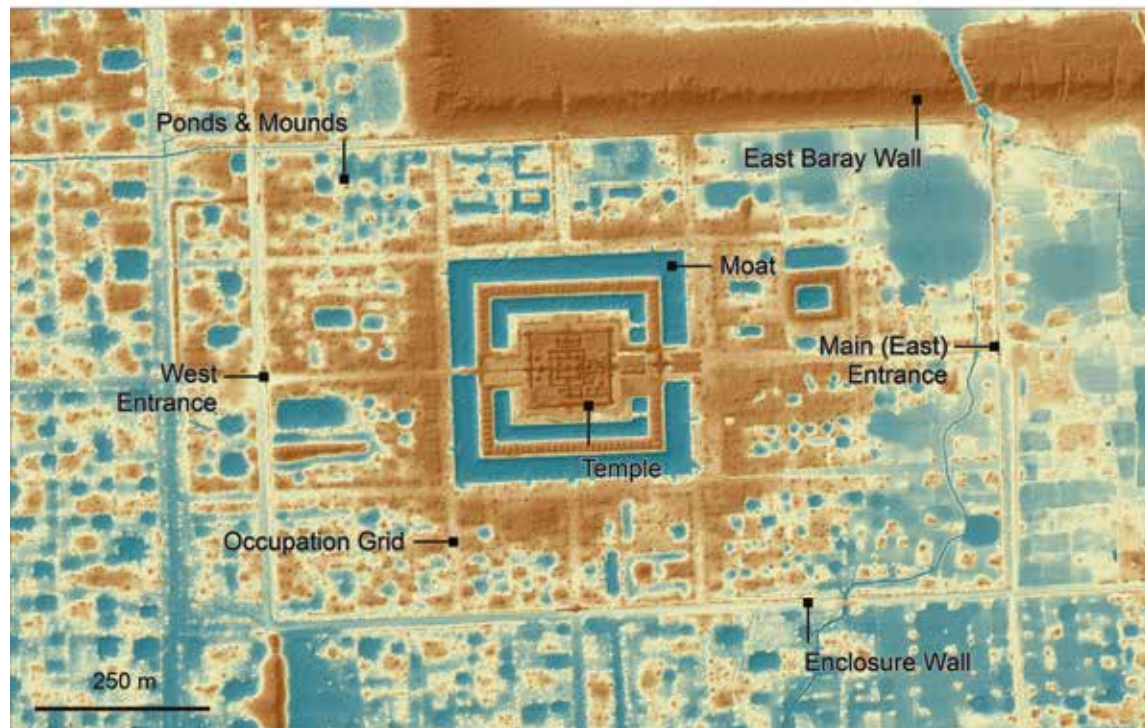
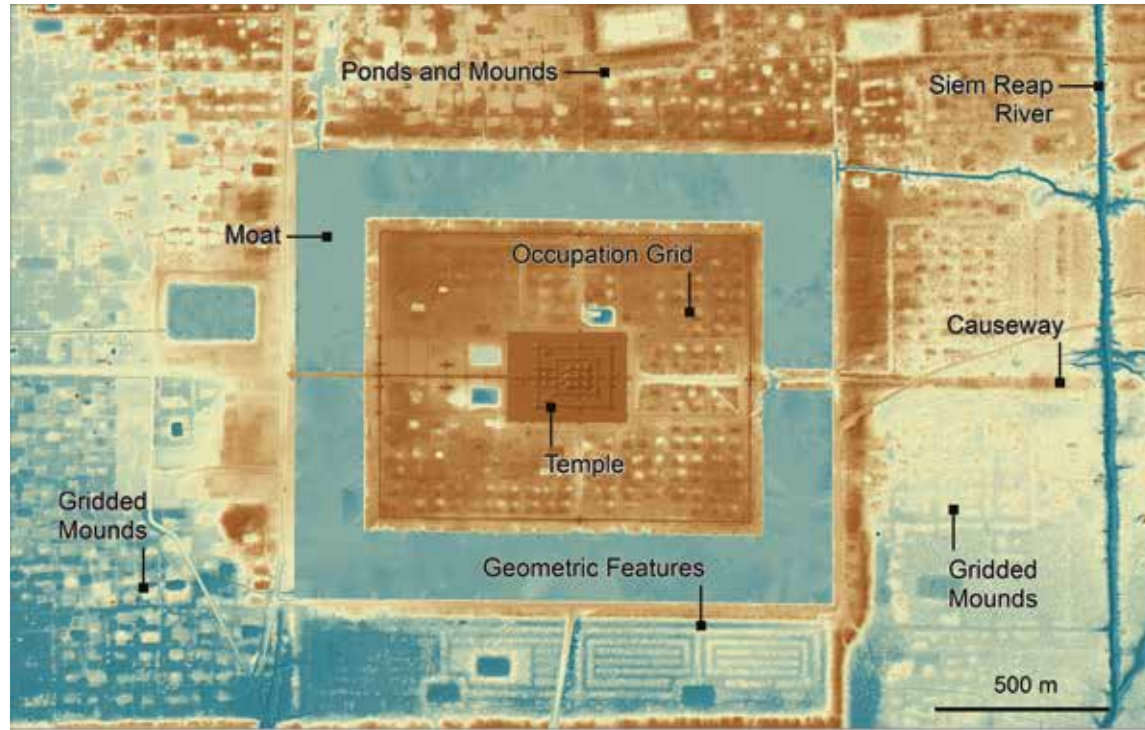
Zhou Dagan noted that even ordinary women would wear gold bracelets and rings.⁴⁷ Recent excavations from the stone and bronze sculpture workshop at Angkor Thom, as well as around the ninth-century royal palace site of Prei Monti at Hariharalaya, have identified numerous glass beads.⁴⁸ The function of these beads is not clear; they may have been sewn into clothing, worn as jewellery, or served another purpose. During the ninth century, the majority of the glass beads appear to have come from the Middle East, while just a few centuries later many beads were small, coiled types from China. There was not a local tradition of glass-bead making, but these beads demonstrate the long-distance connections that people in Angkor had.

Ancient Angkorians subsisted largely on freshwater fish and rice, which remain staples of the Cambodian diet today. But Zhou Dagan described a wide variety of vegetables grown by the Angkorians, including onions, eggplants, gourds, and radishes.⁴⁹ Archaeological excavations have also begun to uncover the remains of additional foods from the ginger/turmeric family, as well as a citrus fruit that may be a pomelo.⁵⁰ Excavations in Angkor Thom have identified other plants and crops, including mung bean and sesame seeds from the late Angkorian and post-Angkorian periods.⁵¹

Identifying where Angkorian people lived has been a challenge.

Zhou Dagan observed that high-status people lived in large houses, parts of which were covered in roof tiles, but that commoners lived in smaller houses with thatched roofs.⁵² Additionally, houses were built on stilts so that the living floor was above the ground, and eating utensils, sleeping mats; and mosquito nets were made out of organic materials, but these have not been preserved in the archaeological record.⁵³ Archaeological field projects in and around the Angkor Park have begun to yield evidence for occupation. Jacques Gaucher's long-term research programme at Angkor Thom recovered a stratigraphic layer with carbon, local stoneware ceramics, and imported (Chinese) porcelains.⁵⁴ So did excavations by the Greater Angkor Project at the Tumnap Barang embankment.⁵⁵ French National Institute for Preventive Archaeological Research (INRAP) excavations at the Siem Reap airport have also produced habitation evidence at the Trapeang Ropou archaeological site.⁵⁶

Recent LIDAR surveying of the Angkor region has accelerated our ability to study the archaeological record of Angkorian life.⁵⁷ LIDAR has been able to peel back the tree layer covering a large portion of the Angkorian urban core, enabling us to clearly see the landscape modifications underneath. In many cases this has revealed mounds that we believe were where people were living. The areas surrounding temples seems to have been an important location for residential occupation. LIDAR surveys around Angkor Wat and Ta Prohm have revealed a series of mounds and depressions within the enclosures that are arranged according to the cardinal directions (fig. 12).



12 LIDAR-based digital elevation maps of the Angkor Wat (upper) and Ta Prohm (lower) temple enclosures, illustrating occupation grids within and beyond enclosure walls relative to the central temples.



13 Greater Angkor Project archaeologists drawing profiles at Angkor Wat excavations, July 2015.



14 Examples of ceramics in-situ during excavation at Angkor Wat Trench, 19 July 2013.

Fieldwork by the Greater Angkor Project has focused on investigating the mounds at Angkor Wat and Ta Prohm to understand the nature of occupation in ritual spaces (fig. 13). A series of one-by-two-metre excavations at multiple locations within these temple enclosures has provided evidence that these were places where people were living. At Ta Prohm our team has found a hearth, ceramics concentrations, and a trash pit that contained a sandstone spice mortar. Our Angkor Wat excavations produced similar trash pits and concentrations of ceramics that include cooking pots and water storage jars (fig. 14).

In 2015, we returned to a single mound within the Angkor Wat temple enclosure to more intensively study where people may have been living. We found possible postholes related to a structure and a series of large sandstone pieces that may have been floor surface or pathways (fig. 15). Some of these pieces are decorated and were likely recycled from the construction of the Angkor Wat temple. Radiocarbon dates and ceramics indicate the mounds were constructed around the same time that the construction began on the temples. At Ta Prohm, occupation seems to have ceased by the fourteenth century, but at Angkor Wat there is evidence that people continued to use the mounds during the post-Angkorian period (15th–17th century).



15 Bird's-eye view of Angkor Wat trenches, facing west.

Our ongoing work aims to better understand the daily lives of non-elite Angkorians. We are not sure who lived on these house mounds, but due to the large numbers of people needed to keep the temples running, we suspect that many people who lived on the mounds also worked for the temples. We hope that future work will better inform us about the house structures, the types of activities that took place in and around houses, and the daily lives of the ancient Angkorians.

CONCLUSIONS

After more than a century of research, scholars likely all agree that there was no monolithic Angkorian city. Our understanding of Angkorian urbanism changes each time researchers bring new techniques to the field, translate newly discovered inscriptions, and run new field projects that probe both digital and physical limits of our ability to interpret the archaeological record. Within this dynamic context, however, are also continuities in urban structure and morphology. Cambodia in 1200 bore some similarities to Cambodia today. Angkor was a largely rural society, with higher population densities in the 35-square-kilometre civic ceremonial centre. Many Angkorians were farmers, and most of their lives revolved around the temple institution, the maintenance of which absorbed labour and capital, and formed a moral and social ballast for society. Angkorians expected each ruler who ascended the throne to serve his nation and its gods. Rulers varied considerably in their political and ideological efficacy; polities waxed and waned; yet the Angkorian state persisted for six centuries on the banks of the Tonle Sap. At its core was always the Angkorian city.

NOTES

1. Coe 2005.
2. Clémentin-Ojha and Manguin 2007.
3. Miksic 2000.
4. Stark 2006.
5. Frelat and Souday 2015; Frelat et al. 2016; Pottier et al. 2004; Reinecke 2012.
6. Carter 2015; Carter and Kim 2017; Stark 2006a.
7. Heng 2016.
8. Fletcher et al. 2003.
9. Zhou 2007.
10. World Bank Group 2015, p. 146.
11. Evans et al. 2007; Fletcher et al. 2003.
12. Fletcher et al. 2003, p. 116.
13. Hendrickson 2011.
14. Stark 2015.
15. Evans et al. 2013, p. 12596.
16. Penny et al. 2006; Polkinghorne 2013; Pottier and Bolle 2009; See also Heng and Lavy essay in this volume.
17. Lavy 2003.
18. Pottier and Bolle 2009, p. 68.
19. Acker 1998.
20. Polkinghorne 2013, p. 215.
21. Pottier and Bolle 2009.
22. Fletcher et al. 2015, p. 1394.
23. Coedès 1906.
24. Coedès 1906, p. 7.
25. Coedès 1906, p. 7.
26. Evans et al. 2013, p. 12598.
27. Gaucher 2004, p. 74.
28. Hanus and Evans 2016, p. 91.
29. Brown 2004, pp. 359–63.
30. Coedès 1941, pp. 264–66.
31. Zhou 2007.
32. Kapur and Sahai 2007, p. 21.
33. See discussion in Lustig and Lustig 2013.
34. See Roveda 2007 for a discussion of scenes at the Bayon.
35. See Lustig and Lustig 2013, p. 72; Martin 1998, pp. 287–89.
36. See discussions in Jacques 1976; Khin Sok 1998; Lustig and Lustig 2013; Mabbett 1985; Martin 1998; Sahai 2012, pp. 218–43; Vickery 1998.
37. Zhou 2007, pp. 58–59.
38. Jacques 1976.
39. Evans et al. 2007.
40. Zhou 2007, pp. 52–53, 62–63.
41. See Forest 1982.
42. For example, Chhay et al. 2013; Chhay 2011; Ea 2013; Ea et al. 2008; Miksic and Chhay 2010.
43. Rooney 2000.
44. Polkinghorne et al. 2014.
45. Zhou 2007, pp. 77–78.
46. Green 2000.
47. Zhou 2007, p. 55.
48. See Carter et al. 2017.
49. Zhou 2007, p. 73.
50. Castillo, personal communication 2017.
51. Castillo et al. 2018.
52. Zhou 2007, pp. 49–50.
53. Zhou 2007, pp. 76–77.
54. Gaucher 2004, p. 71.
55. Fletcher et al. 2003, pp. 109–10.
56. For example, Bâty et al. 2014.
57. Evans et al. 2013; Evans 2016.