



McDONALD INSTITUTE CONVERSATIONS

The Evolution of Fragility: Setting the Terms

Edited by Norman Yoffee



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of Fragility:
Setting the Terms



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Published by:
McDonald Institute for Archaeological Research
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Downing Street
Cambridge, UK
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www.mcdonald.cam.ac.uk



McDonald Institute for Archaeological Research, 2019

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ISBN: 978-1-902937-88-5

Cover design by Dora Kemp and Ben Plumridge.
Typesetting and layout by Ben Plumridge.

Cover image: Ta Prohm temple, Angkor. Photo: Dr Charlotte Minh Ha Pham. Used by permission.

Edited for the Institute by James Barrett (*Series Editor*).

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Acknowledgements

I thank Tim Potts, Director of the Getty Museum, for the grant that funded my residency at the Getty in autumn 2017, and for funding the ‘fragility’ conference. Thanks also to Cyprian Broodbank, director of the McDonald Institute for Archaeological Research, Cambridge, for providing funding for the conference. Lisa Guzzetta, senior public programmes specialist at the Getty Museum at the Getty Villa, along with her staff, organized the logistics for the conference. I could not wish for a more efficient and graceful colleague.

I also want to thank Alexa Sekyra, Sabine Schlosser and their staff in the Getty Research Institute for their support during my stay at the Getty Center. Finally, I thank Ben Plumridge for his skill and patience in producing this volume and Emma Jarman for supervising the process. James Barrett accepted the volume, after two reviews, on behalf of the McDonald Institute as an online, open-source and hence easily accessible publication.

Norman Yoffee, 2019

Chapter 6

Fragile Cahokian and Chacoan Orders and Infrastructures

Timothy R. Pauketat

Two sprawling early urban or proto-urban complexes – Cahokia and Chaco – developed at about the same time far apart from each other in pre-Columbian North America (Fig. 6.1). The construction of each was based to a significant extent on maize agriculture supplemented by other native plant foods, terrestrial game and, in the case of Cahokia, waterfowl, fish, and other aquatic animals (for overviews, see Dalan et al. 2003; Kantner 2004a; Lekson 2006; Noble 2004; Pauketat 2004; Pauketat & Alt 2015). Both were overbuilt complexes of (politicized) religious activity and, in that form, likely acted as magnets for pilgrims and immigrants, shaping the histories of everyone and everything caught up in their webs (Pauketat 2013; Van Dyke 2007). Yet neither survived the end of the Medieval Climate Anomaly, about AD 950–1250, with major monumental constructions and human habitations dating to circa AD 1050–1250 for Cahokia and AD 850–1130 for Chaco.

As a consequence of their relatively short durations, many researchers have asked *why* these great monumental complexes were organized in ways that could be undone after less than 15 human generations. Unfortunately, such ultimate questions have tended to encourage overgeneralizations, drawing on abstract models of society and overlooking the very real, local, material and infrastructural underpinnings of each case. They typically characterize entire societies as either populous or sparsely settled, hierarchical or communal, political or religious, and rational or animistic and then model the long-term implications of said societies, all while requiring little historical detail about the cases in question.

Instead of such a model-heavy approach to questions of fragility, I would argue that we should be asking proximate, historical questions about specific human, other-than-human, and material relationships. *How* did maize and other non-human agencies, maize-growing agriculturalists, and localized soil and climate

regimes help to produce early urban phenomena? *How* – in material-relational and historical terms – did they or did they not attract human populations? Did they become stratified and *how*? *What* were the political and material histories of their demise?

In my own answers to these questions here, I will focus on the properties and histories of cultural order and infrastructure at Cahokia and Chaco, particularly as entangled through maize agriculture, ceramic production, monumental experience, and water management. I will locate very little of the historical dynamism of the two complexes in communal, urban, ritual, or hierarchical structures per se, which have proven remarkably intractable to archaeologists (in part because they are artificial analytical constructs). Doubtless, both Cahokia and Chaco were variably communal, urban, ritual, and hierarchical – these are dimensions of most human social experience – in ways that were closely tethered to their order and infrastructure as these developed through time.

Their fragility, in the end, was therefore dependent in some ways on their material qualities, on their inclusive or exclusive and intensive or extensive peculiarities, and on the extent to which their boundaries were either heavily incised on the landscape or, alternatively, permeable and susceptible to being transgressed. In the following sections, I first outline and compare Cahokian and Chacoan social and material histories. Then, I stress those immanent qualities of maize, pottery production, monumental construction, and water management key to appreciating the fragility of Cahokia and Chaco.

Cahokian social and material history (AD 950 to 1250)

A millennium ago, a century after the beginning of the Medieval Climate Anomaly (c. AD 950) and the coeval



Figure 6.1. Location of the Greater Cahokia and Chaco regions (map by T. Pauketat).

addition of maize fields to Midwestern landscapes, a city of some 15,000 or more living souls covering 15–20 sq. km – Greater Cahokia – coalesced along an extraordinary stretch of the Mississippi River (Fig. 6.2; Table 6.1). The process produced a cultural region of some 30,000-plus sq. km (Pauketat & Alt 2015). At the centre of it was a complex of three sprawling precincts planned and built around AD 1050 at a scale never before imagined in pre-Columbian North America (Fig. 6.3). Extensive new excavation data from the

second largest of the precincts, East St. Louis, reveals clear neighbourhood patterning, among other things, with official (political or religious) buildings in one area laid out on a grid pattern amid numerous other pole-and-thatch domiciles (Betzenhauser & Pauketat 2018; Brennan 2018; Emerson et al. 2018).

Simultaneously, Cahokian emissaries or converts established shrine complexes and apparent support settlements up and down major waterways across the American Midwest and Mid-South – 1000 river

and overland km to the north at places such as Trempealeau, and 750 river-km to the south at places such as Carson – all as part of a short-lived but far-flung colonial moment during the second half of the eleventh century (e.g., Delaney-Rivera 2004; Douglas 1976; Emerson, Millhouse et al. 2008; Harn 1991; Johnson 1987; Pauketat, Boszhardt et al. 2015). By the twelfth century, Cahokia was a clear presence in the middle Mississippi River valley, with locals in all directions disposed in some ways to adopt, acknowledge, or confront the political, religious, cultural and military challenges emanating from the American Bottom (Emerson 2007, 2012).

As a late eleventh and twelfth century city, Greater Cahokia was a ‘distanciated’ entity, with open water in between the major precincts (see Amin & Thrift

2002). Within an area of about 20 sq. km, each precinct (Cahokia, St. Louis, and East St. Louis) appears to have been built according to a slightly different orthogonal grid. A few buildings or monuments within each seem to reference still other celestial, terrestrial, and substantial referents (Pauketat 2013). Besides water, prominent referents included the moon and the night (Alt 2018b, 2019; Baires 2017; Pauketat 2013; Pauketat et al. 2017; Romain 2015). Sarah Baires (2017) has argued that a central causeway in the Cahokian precinct – part and parcel of its founding design – was a virtual avenue to the dead (built of earth, through standing water), while Susan Alt (2019) adds that this realm was both a nightly experience and an actual subterranean landscape south and west of the city, superimposed by and accessed via sinkholes built into the St. Louis precinct.

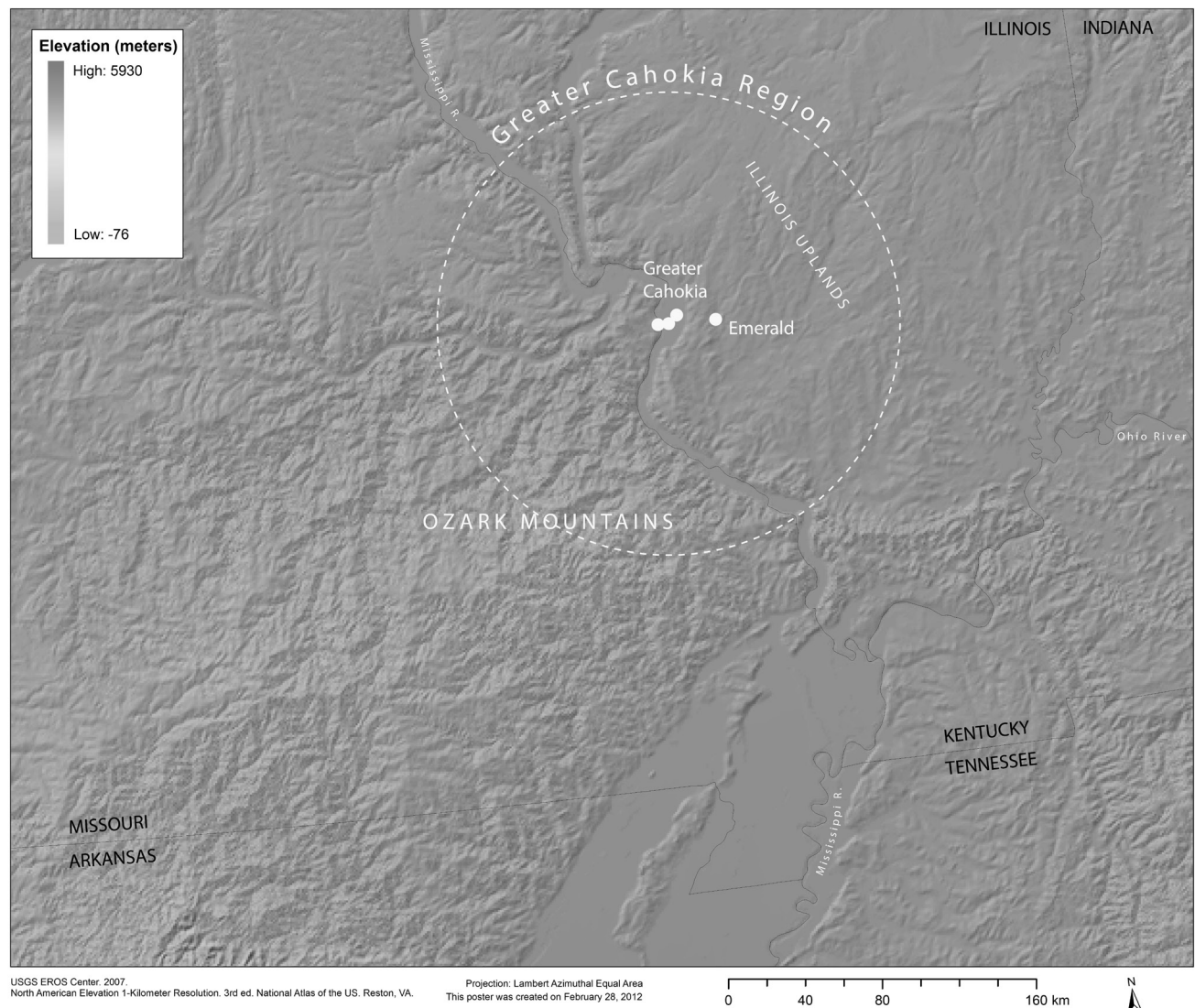


Figure 6.2. *The physiography of the Greater Cahokia region (map by T. Pauketat).*

Table 6.1. A comparison of Cahokian and Chacoan histories. References: Cahokia (Alt 2018; Benson et al. 2009; Emerson 1989, 1997a, b; Pauketat 1994; Pauketat and Alt 2017; Pauketat et al. 2015); Chaco (Lekson 2007; Lekson et al. 2006; Toll 2006; Van Dyke 2004; Vivian et al. 2006a, b; Wilshusen and Van Dyke 2006).

Date AD	Cahokia	Chaco	Climate
1340	Depopulation	Small isolated sites in defensive positions	Periodic droughts
1300			
1260			
1220	Reduced scale; reorientation; palisade construction Burning and contraction of East St. Louis precinct	Remodelled Great Kivas Pueblo III reoccupation of Chaco Canyon	
1180	Upland farming district depopulation	Depopulation and emigration Reduced scale; McElmo reorientation Pueblo Bonito termination deposit	
1140			
1100	Ramey pottery and carved figurines; oversized posts	Chaco Wash aggradation; water-control features Regional expansion; maize and deer dietary focus	Wetter
1060	Standardization of pottery and craft production Long-distance outreach and shrine establishment		
1020	Massive constructions; immigration; theatrical mortuaries		
1020	Emerald shrine centre	Massive constructions	Warmer
980	Development of Terminal Late Woodland villages Adoption of maize (and nixtalamization)	Great House construction pulses	
940			
900	Mixed Late Woodland horticultural villages	Chaco Wash channel degradation Pueblo Bonito room 33 burial Earliest Great Houses and BMIII-PI pueblos; population concentration in northern San Juan	
860			

There were five ridge-top shaped ‘corporate-elite’ mortuary mounds at the end of or around the causeway. One of these was the well-known Mound 72, found to be the likely eleventh-century resting place both of Cahokia’s founding men and women and of a series of mass human graves and artefact offerings (Emerson et al. 2016; Fowler et al. 1999). Given the more than a dozen such mounds in the Greater Cahokia region, which date as late as the early 1200s, it seems plausible that several leading families may be implicated in the social history of the city and its immediate environs (Baires 2017; Kelly 2005; Pauketat 2010).

As Greater Cahokia’s design and monumentality suggest, fundamental experiences (life and death), pervasive substances (water), and experiential

phenomena (moonlight and darkness) are among the most ‘immanent’ (and thereby religious) of a host of celestial, terrestrial, and substantial referents (*sensu* Deleuze & Guattari 1987). They exist in multiple states and at multiple scales of experience. They have ‘vibrant’ qualities that might affect people in spiritual ways (Bennett 2010; Ingold 2007). As incorporated into urban contexts via infrastructure, they have long-term historical implications (Pauketat 2019).

In the Greater Cahokia region, lesser precincts and outlying religious shrines appear to have been established in the early to mid-eleventh century to position that city-under-construction at the centre of these various imminences (Alt 2018a; Emerson 1997a; Pauketat et al. 2017; Pauketat, Boszhardt et al. 2015).

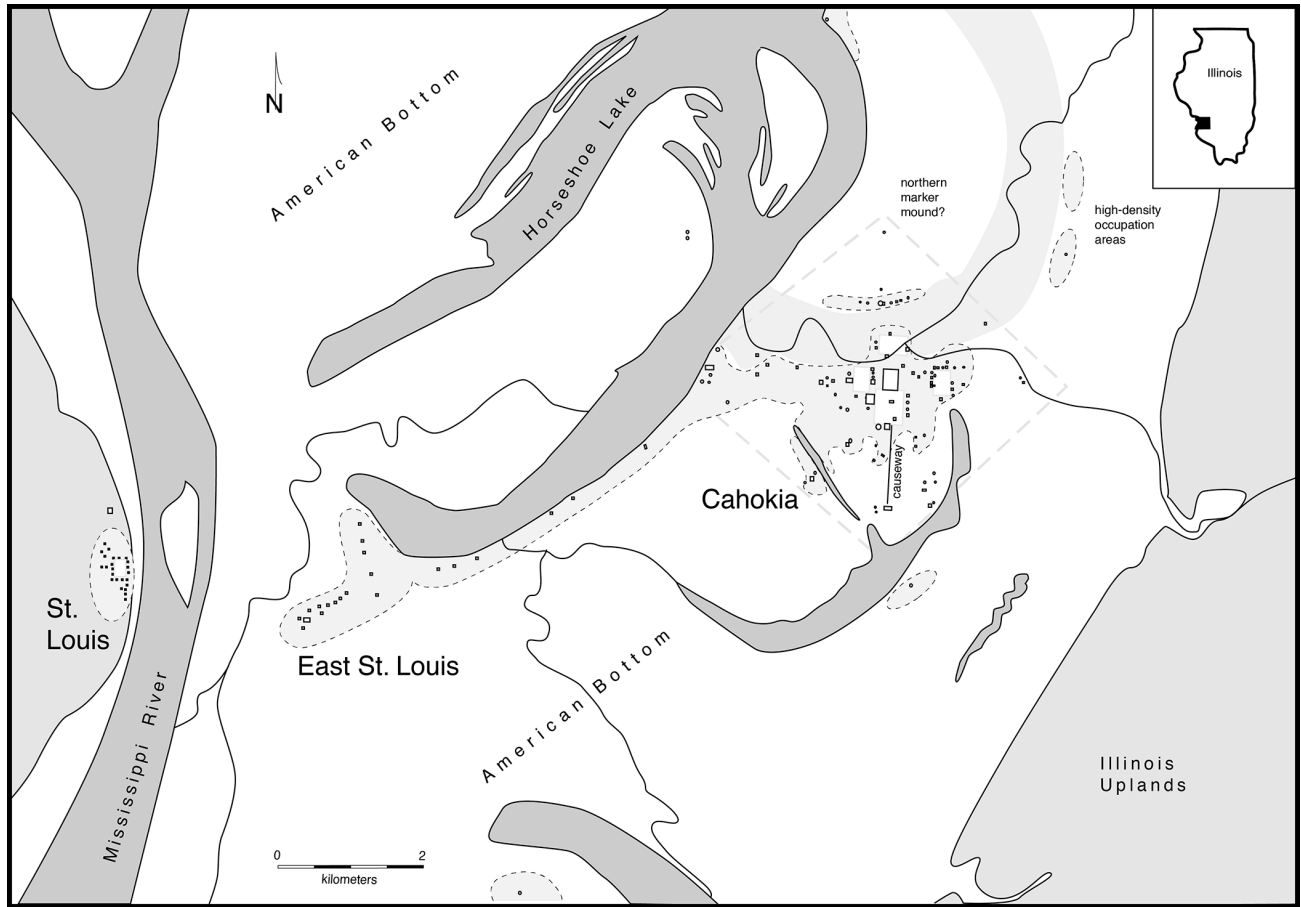


Figure 6.3. The city of Greater Cahokia, showing its primary precincts: Cahokia, East St. Louis, and St. Louis (map by T. Pauketat).

Maize, water, the moon, and feminine lifeforces seem implicated at key ceremonial locations (Alt 2018c). The largest of these was a 10-m-high ‘water-hill’ in the open prairie uplands 24 km east of the Cahokia precinct. Known as the Emerald Acropolis, a few dozen ‘shrine’ houses likely sat atop the hill in the early days. It would be expanded after AD 1050 by levelling the summit and adding a dozen earthen platforms. Afterwards, individual ceremonials witnessed the construction of hundreds of temporary pole-and-thatch buildings covering an area of up to 60 ha (Pauketat et al. 2017).

People came to see the events here and across the region. Immigrants, who had been trickling into the American Bottom early in the eleventh century, poured into the city and its expanding cultural region around the year 1050. The regional population that identified with Greater Cahokia may have reached upwards of 40,000 to 50,000 people in relatively short order (Milner 1998). Many would have moved into one of the ‘wall-trench’ domiciles constructed, probably by work crews, around Greater Cahokia. Others emulated

the wall-foundation style and retained traditional architectural features (Alt 2002; Alt & Pauketat 2011).

Significant numbers of locals were likely relocated within the region, now incorporating the moderately dissected ‘Richland Complex’ uplands both east and west of the ‘American Bottom’ – the stretch of black, humic Mississippi River floodplain that sat at the heart of the region (cf. Pauketat 2003; Pauketat et al. 1998; Schroeder 2004). In the uplands, as in the American Bottom proper, maize agriculture depended on rainfall, and the wetter, warmer conditions of the early 1000s (Benson, Pauketat et al. 2009). Across the reorganized agricultural landscape of both uplands and bottomlands, people grew subsistence goods necessary to fund the great ceremonial events of the bustling new city (Alt 1999, 2018a; Pauketat et al. 2002).

Maize and the medieval warming

The construction of Greater Cahokia had been preceded by a series of large, pre-urban, Late Woodland mounded complexes hundreds of km away in the

Mid-South, the largest being the unfortunately named Toltec site at the centre of the Arkansas River valley's Plum Bayou culture (*c.* AD 700–1050, see Fig. 6.1). Toltec's impressive concentration of 18 four-sided, flat-topped earthen pyramids sat astride an oxbow lake, surrounded by a semi-circular embankment, and aligned to a once-in-a-generation southern maximum moonrise (Nassaney 2001; Rolingson 1998; Romain 2015). The Plum Bayou people may have begun farming maize as early as the eighth century, perhaps adapting imported strains of the plant from the American Southwest/Northwest Mexico (Rolingson 1998).

Based on limited data, it seems possible that small contingents of Plum Bayou and Coles Creek culture peoples from Arkansas, Mississippi and Louisiana, along with larger numbers of Varney culture people from southeastern Missouri and Yankeetown people from southwestern Indiana, migrated northward during the tenth and eleventh centuries (Alt 2018a; Pauketat & Alt 2003). By then, after AD 900, maize agriculture had taken root in the American Bottom (Simon 2014, 2017).

Maize grows well under the humid, moist conditions of the central Mississippi valley, and maize agriculture likely rearranged Late Woodland village life into a regional social-territorial order dubbed 'Terminal Late Woodland' by archaeologists (Fortier & McElrath 2002). Terminal Late Woodland maize farmers, *c.* AD 900–1050, were becoming thoroughly entangled with backswamp, bottomland, Mississippi River biomes characterized even today by periodic inundation, organic detritus, mussel shells and smells, and aquatic life generally (Pauketat & Alt 2017). They were also engaged in increasingly intensive intervillage relationships seen archaeologically as assemblages of pots or contingents of potters from one locality in other localities.

Understanding the impacts of maize agriculture in the pre-urban region between AD 900–1050 requires us to recognize the assemblage potential not of the maize plant alone but of the process of nixtamalization. That is, the adoption of this Mesoamerican cultigen seems to have arrived along with knowledge of how to process maize kernels in lye produced from burned limestone and ash (Kelly 1980; McElrath et al. 2000; Pauketat 2018). This linked process – growing and processing maize – is that which likely reconfigured the social relationships between people and landscape. This is because limestone outcrops only along the margins of the American Bottom proper. Maize-growing villagers would have necessarily altered everyday routines and relationships in order to acquire a steady supply of the rock and, as a consequence, complex supra-village networks of people-maize-limestone emerged during

the tenth and early eleventh century. Out of these were born a regional phenomenon: limestone- and shell-tempered pottery-making, mound-building, and maize-agricultural peoples who would become the first 'Mississippians' (Alt 2018a; Baires 2016; Pauketat & Alt 2017).

With the 1050 construction of the new city, such relationships were firmly emplaced in the form of this planned, monumentalized, multi-precinct complex (Alt et al. 2010; Baires 2017; Pauketat, Alt et al. 2015; Pauketat et al. 2017; Pauketat, Emerson et al. 2015). The three principal contiguous precincts noted earlier crisscrossed marsh and river. Indeed, the inner pyramid-and-plaza core of the largest precinct may have been quite intentionally sited between marshes in the wide, central portion of the American Bottom such that it might be regularly bathed in mists, a common morning and evening feature of humid low-lying lands in the Midwest during warm summer months (June–September). Certainly, a kilometre-long earthen causeway was built at the precinct's foundation to connect its central monumental core to a prominent corporate-elite burial mound at the south end of the Cahokia precinct (a.k.a. the Rattlesnake Mound [66]). In reaching the location, the causeway traversed black backswamp clays and murky standing water (Fig. 6.4).

Interestingly, if one adds burned and crushed mussel shells to the clayey and watery mix, one has the recipe for early Mississippian pottery (Pauketat & Alt 2017; Porter 1964). Thus, the watery relations linking people and other-than-human powers were also assembled in the hands of people via the manufacture of the city's pottery wares. Not everyone was making the readily identifiable 'Red-Rim' and 'Powell Plain' cooking jars (e.g., Holley 1989). Ample macroscopic and microscopic evidence exists in the form of multiple assemblages of broken Cahokian pottery to argue that the production of cooking jars made from backswamp clays at the beginning of the urban-construction phase of Greater Cahokia around AD 1050 was restricted to certain times and people (Brennan et al. 2018; Pauketat 2018; Stoltman 2014; Stoltman et al. 2008). Basket loads and sod blocks of the same black, soggy sediment served as the construction materials for earthen pyramids and causeways, and were likely mined from the same waterlogged locations as one might dig pottery clay (Baires 2015, 2017).

Near or overlooking these same wet areas were circular rotundas and steam baths or, simply, water shrines. These pole-and-thatch buildings included both large and small varieties (with floor areas from 5 to 500 sq. m), some apparently occupying the summits of circular platforms, unknown before the Lohmann phase, *c.* AD 1050–1100. Such platforms were built in

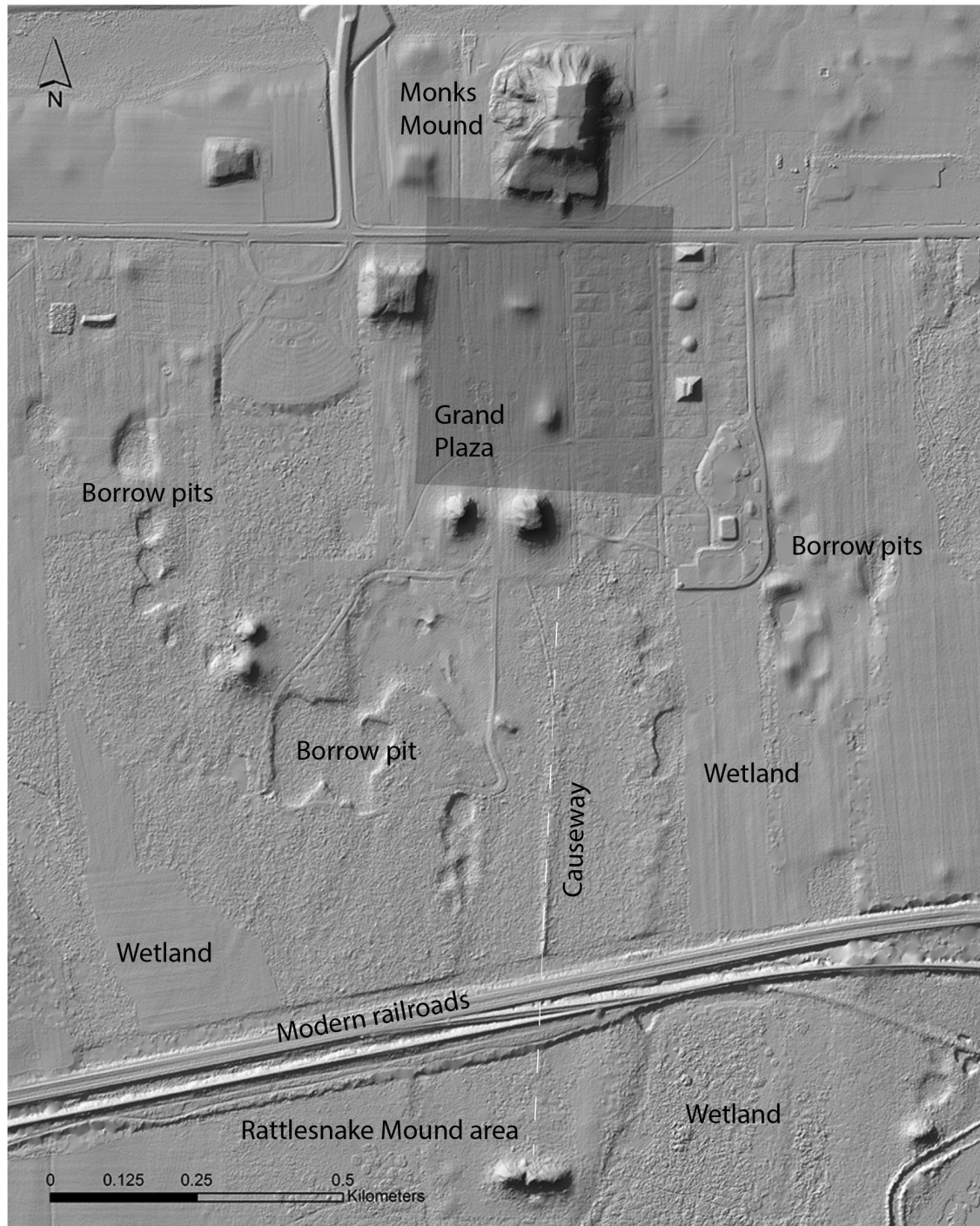


Figure 6.4. LiDAR plan map of the Cahokia precinct, highlighting monumental features that date to the Lohmann phase (AD 1050–1100, map by T. Pauketat and Jeffery Kruchten using public domain data from the Illinois State Geological Survey).

a series of rows overlooking seeps or bodies of water both at Cahokia’s outlying Emerald Acropolis and at its St. Louis precinct (Alt 2019; Pauketat et al. 2017). Emerald’s platforms and pole-and-thatch buildings

were also aligned to major moonrises, as were some at Cahokia proper, tethering the 18.6-year cycle of the moon to the earth, as Cahokia’s Plum Bayou precursors had done before them (Romain 2015, 2018).

There were other official Cahokian buildings and features as well, dating to the period AD 1050–1200, including large square council houses or temples, T- and L-shaped residences (or medicine lodges), and great free-standing posts (Alt 2018a; Emerson 1997a; Emerson, Alt et al. 2008; Pauketat 2013; Skousen 2012). Of these, the latter were cypress logs up to a metre in diameter, probably standing more than 10 m tall. It is unclear whether such great posts were floated upriver from cypress-swamp forests in southern Illinois and Missouri, where they grow today; if so, the labour expenditures involved in hauling many hundreds of such posts in the twelfth century would have been significant (see Lopinot 1992).

When set in rural locations, such special architecture and marker posts define ‘nodal’ farmsteads of various sorts (Emerson 1997a). In larger groupings, these nodal sites appear to define a kind of Cahokian architectural ‘module’ (Alt 2018a). In the central Cahokian precincts, the building module is a defining characteristic of neighbourhoods and other ‘core’ zones (Betzenhauser & Pauketat 2018; Brennan 2018; Emerson et al. 2018). They were also built atop the Emerald Acropolis (Pauketat et al. 2017).

The spatial and temporal correlation between the special architecture and Cahokian urbanity, if you will, is tight and robust, suggesting a causal relationship (Alt 2018a; Emerson 1997a, 1997b; Pauketat, Boszhardt et al. 2015; Pauketat et al. 2013). This causal relationship seems affirmed by two singular region-wide shifts: (1) the introduction of a suite of ritual goods and craft products at the beginning of the so-called Stirling phase (AD 1100–1200); and (2) a political-ritual-demographic contraction and reorientation at the beginning of the Moorehead phase (AD 1200–1275). The former is known for its elaborate carved-stone figures and smoking pipe bowls, along with the introduction of ‘Ramey’ iconography, rich in curvilinear motifs interpreted today as wind, water, and thunder/rain imagery (Cummings 2015; Emerson 1989).

The latter pulse, around AD 1200, brought with it a pervasive downsizing and reorientation of organized social life. Pottery production was simplified, and thirteenth-century corporate feasts were smaller or less often tethered to Cahokia (Baltus 2014). More importantly, the official architecture and associated practices of Greater Cahokia’s steam baths, medicine lodges, and council buildings ceased to be built after AD 1200. These had comprised 17 per cent of the pole-and-thatch buildings in twelfth-century Cahokian precincts (Betzenhauser & Pauketat 2018; Brennan 2018). At the end of the 1200s, however, they were replaced virtually overnight by a class of simple, oversized rectangular houses (Pauketat et al. 2013).

Cahokian fragmentation

Tree-ring (PDSI) data from across the midcontinent reveal that the decades leading up to and immediately following Cahokia’s founding, around AD 1050, saw ample precipitation. Under these conditions, maize crops could have been grown using dry farming techniques in both traditional floodplain settings and upland zones (Benson, Pauketat et al. 2009). That changed, however, after AD 1100, by what may have been periods of drought and downward-trending PDSI values over time (see also Comstock & Cook 2017). An even more severe droughty period followed AD 1150, minimally indicating insufficient rainfall events to sustain upland farming. And, indeed, the second major development in the greater Cahokia region is recognizable in regional survey and excavation data: many upland settlements – which had encompassed thousands of farmers – were abandoned by AD 1150 (Alt 2018a; Benson, Pauketat et al. 2009; Pauketat 2003).

The human population density of the city itself may not have been directly affected until the later 1100s. Then, as early as the 1160s and as late as about AD 1200, the third major development occurred, quite possibly a single event or series of closely related events. A portion of the ritual-residential complex at Cahokia’s East St. Louis precinct was incinerated, likely quite intentionally and in conjunction with the closure of a large corporate-elite mortuary mound.

Generally speaking, this development correlates with the aforementioned disappearance of Cahokia’s official twelfth-century politico-religious architecture – those steam baths, shrine houses, council buildings, and medicine lodges. Seemingly, an entire religious complex was terminated as, perhaps, one or more orders of priests vacated the region. One might presume that a new politico-religious order filled the void, centred on the big rectangular ‘great temple’ atop Cahokia’s principal pyramid, Monks Mound (Reed 2009). Melissa Baltus (2014) has characterized this period, the Moorehead phase, as yet another revitalization, one that may have stabilized the region’s political economy for a few human generations. However, human population concentrations in the Greater Cahokia region never again attained pre-1200 levels. Instead, they slid steadily downward; only a few thousand people would call Greater Cahokia home in the thirteenth century, and only a few hundred at most remained through the first half of the fourteenth century AD.

Chacoan social and material history (AD 800s to 1130)

The ninth century AD witnessed significant social and demographic changes in the San Juan Basin of the

Four Corners region in modern-day northwestern New Mexico (Fig. 6.5). Always susceptible to climatic and environmental perturbations, maize-growing late Basketmaker III and early Pueblo I farmers from the southern San Juan basin relocated northward in the AD 700–800s (Van Dyke 2007:table 4.2; Wilshusen & Van Dyke 2006). Living in scattered pithouse, adobe and jacal homes, the mid-AD 800s witnessed ‘something dramatic ... throughout the San Juan Basin’ (Windes 2007:45). At that time, or within a few years, the first masonry great houses in the region were under construction. Three such ‘proto-great houses’ were built along the 13-km stretch of the high-desert Chaco Canyon (Fig. 6.6): Pueblo Bonito, Peñasco

Blanco, and Una Vida (Van Dyke 2007; Windes 2003, 2007).

In one early interior room (33) of Pueblo Bonito was buried a male who died in his 40s in the ninth century from a ‘lethal blow to the head’ (Kennett et al. 2017; Pepper 1920). A most unusual setting for a burial, the man (Burial 14) was interred with turquoise and shell jewellery, among other things, atop a prepared surface. Covered with clean earth, another individual was placed atop that fill. Then, a dozen more human interments were added to the room up until AD 1130. All appear to have been members of the original man’s matriline (Kennett et al. 2017; Plog & Heitman 2010). Such a matriline likely articulated the powers embodied

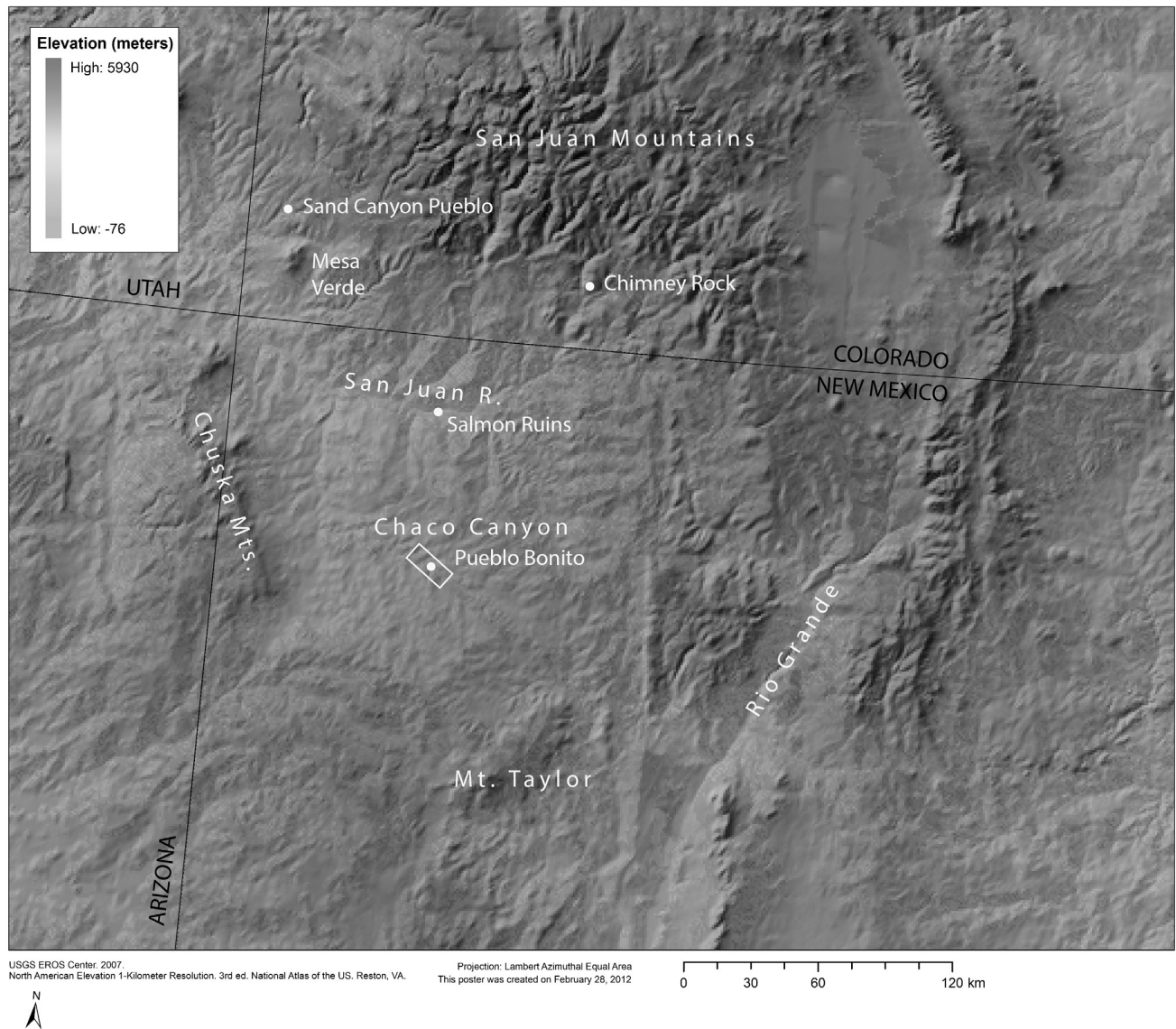


Figure 6.5. *San Juan Basin physiography and the location of Chaco Canyon (map by T. Pauketat).*

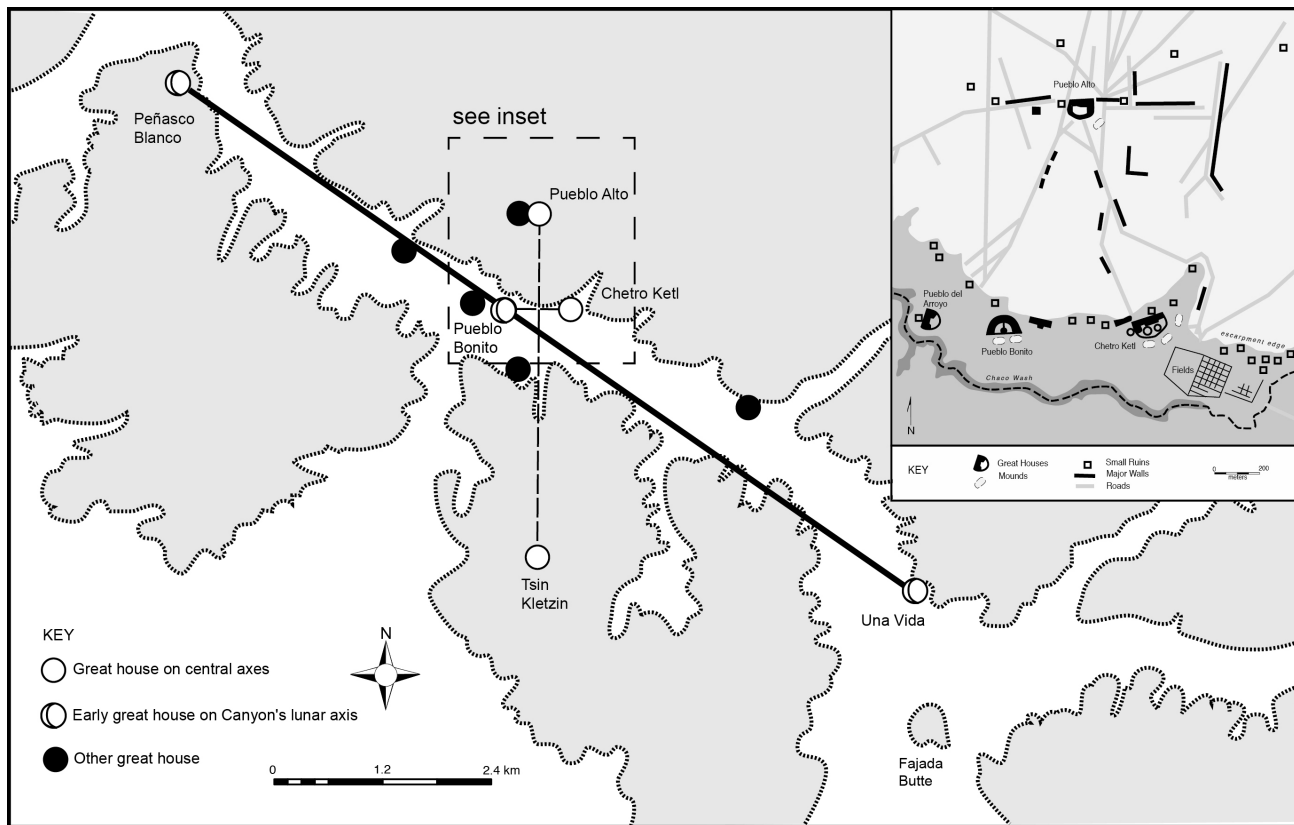


Figure 6.6. Schematic view of Chaco Canyon's great house locations (map by T. Pauketat).

by Pueblo Bonito and Chaco Canyon generally from the beginning.

Some argue that the geological and biological features of the canyon afforded it magnetic qualities even before great house construction and this man's death (Stein et al. 2007; Van Dyke 2007; Weiner 2015; Windes 2004:15). Fossil-bearing rock strata, precariously balanced hanging rocks, and a serendipitously lunar-aligned canyon floor are among the possible attractors. Indeed, the three early great houses are aligned and spaced out in such a way as to suggest a central if not celestially based plan (Fritz 1978; Sofaer 2007).

The alignment and design of the overall canyon aside, each construction iteration of any particular great house is suggestive of some degree of central planning and theatrical or ritualized construction, which is to say monumentality (see Scarre 2011). The evidence of great construction pulses, beginning with a mid-ninth century pulse and continuing through the late Bonito-phase McElmo pulse(s), supports the argument that monumentality was an integral component of Chaco Canyon's social history (Table 6.1). Pueblo Bonito in particular was heavily remodelled through time, with the D-shaped core (Fig. 6.7) and its contiguous Hillside Ruin (not seen in Fig. 6.7) easily

inferred to have been overbuilt and underused (Stein et al. 2007). Thus, it is apparent that Chacoan great houses were more than mere domestic or communal facilities. The same is at least as apparent at a series of Chacoan outliers (see below).

Agricultural production, infrastructure and population

Chaco's great house design and monumentality lies at the heart of the present evaluation of its proto-urban fragility. These overbuilt masonry constructions, both in the central canyon and as part of outlier great house communities, were intimately entangled with the region's agricultural development (Kantner & Mahoney 2000; Lekson 1999). However, the proto-urban dynamics of the Chacoan phenomenon likely cannot be adequately understood only as an *in situ* communal, agricultural development (cf. Tankersley et al. 2016). Then again, this likelihood is the crux of an intellectual disagreement between two scholarly camps today, with some adhering to an *in-situ* developmental model in opposition to what they perceive as 'fashionable' interpretations 'based on vacant cities, festive pilgrims, and... brief but periodic events at canyon great houses' (Vivian 1991:75; cf. Benson 2017; Benson, Stein et al. 2009; McCool et al. 2018).

The two schools of thought both begin with a reconstruction of Chaco Canyon's environment. Today, Chaco Canyon's desert environment has been described as 'bleak' by Frances Mathien (2005:21) and water, she says, 'remains the key variable'. The Chaco Wash, an ephemeral source of water, runs through the canyon. In the past, it has alternately degraded and aggraded its channel, probably in conjunction with the construction of human water management features (Table 6.1). According to one hydrological study, '[d] owncutting seemed to be associated with an increase in discharge and stream power on readily erodible [canyon rock and sediment] material, and it seemed to end when the discharge was adequately handled' by human intervention (Mathien 2005:26). According to another such study, the amount of water flowing through Chaco Canyon might have supported up to 10,000 people (Mathien 2005:34, citing Fisher 1934).

Few scholars in either camp would today infer that 10,000 people lived in Chaco Canyon year round. Rather, a permanent human population of 2000–3000 people is a common estimate. Gwinn Vivian's (1991:74) projection that 5500 residents lived in the canyon is viewed as 'too high' by Stephen Lekson and colleagues (2006:82). Whatever the figure, *in situ* advocates definitely see the Canyon's past environment, including its soils, as capable of sustaining more than 2000 people throughout the year (McCool et al. 2018; Tankersley et al. 2016). These researchers imagine the evidence of water management infrastructure – which includes check dams, retention basins, and water supply and drainage ditches – to indicate a larger year-round population attached to the Canyon's great houses, which they consider less as monuments and more as residential pueblos (Crown & Wills 2018; Scarborough et al. 2018).

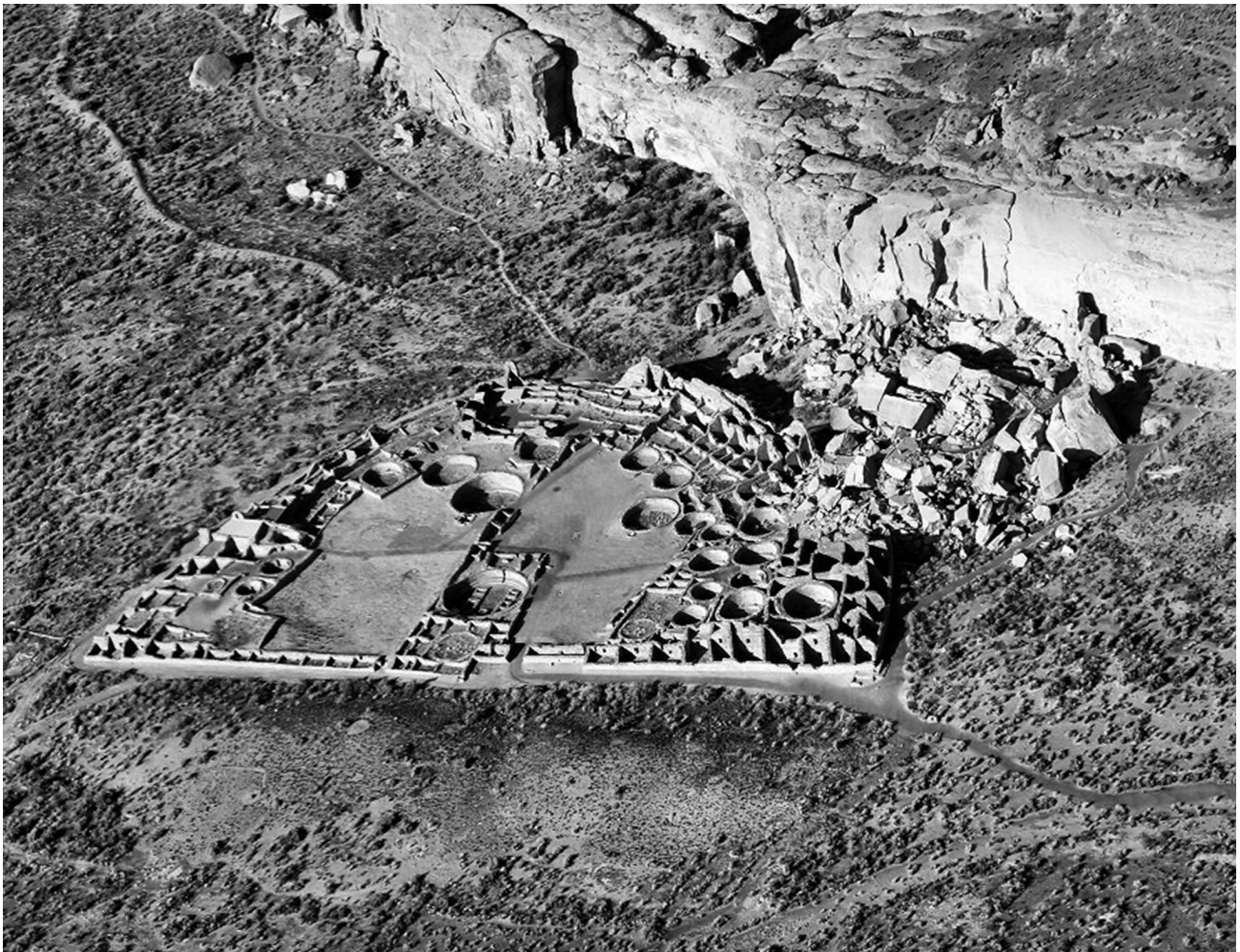


Figure 6.7. Aerial view of the Pueblo Bonito, by Bob Adams, Albuquerque, NM; view to northwest. Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/wiki/File:Pueblo_Bonito_Aerial.JPG.

To be sure, there are both early historical accounts and archaeological evidence of significant water-management infrastructure. A rock-lined sand-dune dam and, perhaps, flood gate occupy the mouth of the Chaco Wash just northeast of the northernmost great house, Peñasco Blanco (Scarborough et al. 2018; Vivian et al. 2006a). In addition, at least one gridded agricultural field exists, likely fed by diverted rainwater and yet visible adjacent to the Chetro Ketl great house (Fig. 6.8). Neither of these necessarily indicates a substantial residential population, though they do point to Chacoan attempts to produce crop yields sufficient to feed sizeable gatherings (probably of both locals and pilgrims).

There are multiple lines of evidence that significant quantities of maize, along with ceramic vessels and other materials, were imported into Chaco Canyon (Benson et al. 2003; Benson, Stein et al. 2009; Grimstead et al. 2015; Mathien 2003; Toll 2004, 2006). Larry Benson (2017) and others argue that much of this maize was grown on the slopes of the Chuska Mountains, more than 60 km (two days walk) to the west of the Canyon. This was the same region from which many of the pots and wooden timbers used in great house ceremonies and constructions originated. Of these, an impressive outlay of public labour would have been

necessary to transport the ‘200,000 trees ... needed to provide ceiling beams for only 10 of Chaco Canyon’s great houses’ (Mathien 2003:133–4). Thomas Windes & Peter McKenna (2001) found that local wood sources were more regularly used through the AD 900s, but by the eleventh-century Classic Bonito phase, Ponderosa pines imported from the Chuska Mountains’ slopes were the building material of choice.

Classic Bonito expansion and Chacoan outliers

Around the year 1040, Chacoan construction and rituality inside and outside the Canyon experienced a marked intensification and expansion. In the six decades of the Classic Bonito phase that followed, new great houses were built and old ones were enlarged horizontally and vertically. In addition, novel, highly standardized, or exotic objects were manufactured and moved into such complexes (Nelson 2006; Toll 2004). Among these were cylinder jars, used in drinking rituals involving imported cacao and yaupon holly (Crown et al. 2015; Crown & Hurst 2009). These jars were originally manufactured in a variety of sizes and shapes around the Chaco world. However, after AD 1040, these vessels became standardized, probably manufactured under the aegis of a leading kin group or sodality. Moreover, they were restricted in their

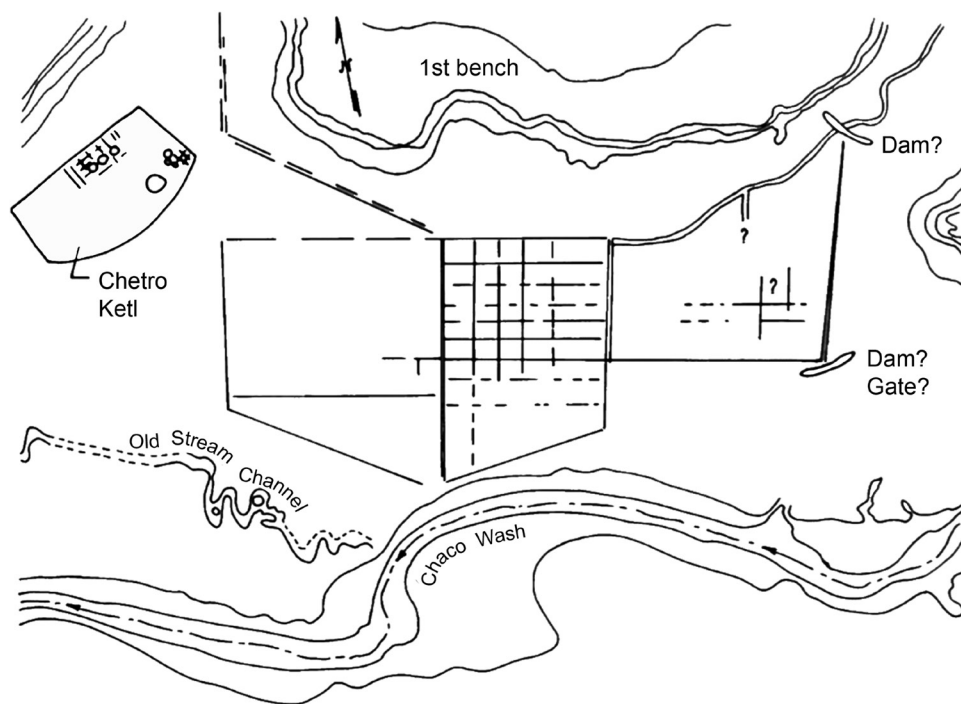


Figure 6.8. Schematic map of original Chetro Ketl field system (adapted from public domain image, National Park Service, via Wikimedia Commons, see https://commons.wikimedia.org/wiki/File:The_Chetro_Ketl_fields.png).

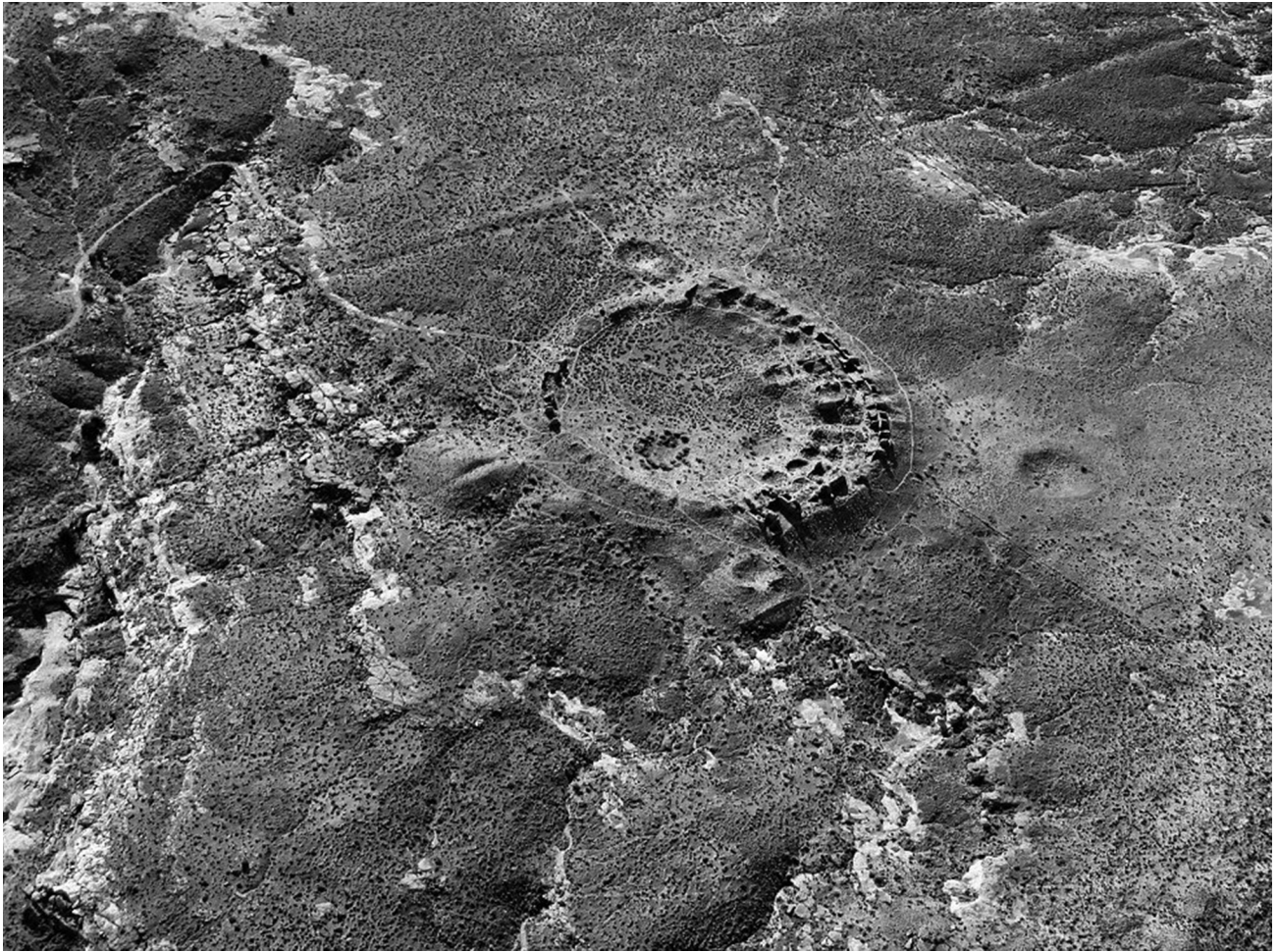


Figure 6.9. Aerial view of the Peñasco Blanco showing four unexcavated great kivas and a Chacoan road segment, by Bob Adams, Albuquerque, NM; view to southwest. Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/wiki/File:Penasco_Blanco.jpg.

usage, with 175 of the 200 known examples associated in some way with Pueblo Bonito (Crown 2018).

At the same time, a ‘highly standardized type’ of subterranean ceremonial building, a ‘great kiva’, was spreading across the Chacoan world (Fig. 6.9).

At least fourteen of the seventeen known canyon great kivas date from the Classic Bonito phase. ... Classic Bonito great kivas are lined with banded masonry, and aboveground portions of the walls are of core-and-veneer construction. Great kiva diameters can range from 10 to 20 m ... [and] are oriented on either a cardinal or a northwest/southeast-trending axis. Entry is often by means of an antechamber.... (Van Dyke 2007:122–125).

All such novel or expanded architectural constructions happened in pulses, with notable ‘waves of great house construction’ taking place in the Canyon at ‘1040 and 1050, and 1070 and 1080, with smaller building and remodelling episodes in intermittent decades’ (Van Dyke 2007:111). Additional insight into the dating of such pulses may be found at other great houses across the San Juan basin and beyond. Presently, there are more than 225 known outlier great houses (Kantner 2004b). At several, such as Salmon Ruins and Chimney Rock, in northern New Mexico and southwestern Colorado, respectively, dendrochronological evidence indicates celestial reasons for major construction pulses (Malville 2004b). This is especially clear at the compact Chacoan great house atop the high, narrow mesa of Chimney Rock. The Chimney Rock great house was positioned to observe the generational appearance of a maximum full moonrise between two great pillars

of rock not unlike that known at Cahokia's Emerald Acropolis. A series of dendrochronological dates on wooden rafters in the Chimney Rock building additions correlate closely to known dates of the lunar events (Malville 2004a; Todd 2012).

Such outlying territories and non-human powers were enmeshed with the central Canyon via a web of roads. The roads leading out from Chaco Canyon might also have celestial alignments in some cases, in addition to alignments to more general terrestrial or directional referents (Van Dyke 2007). In the Canyon proper, stone and wooden staircases climbed rocky escarpments and connected cleared avenues, some sprinkled with small pottery sherds. Some such roads seem to lead to outlier great houses, but others lead nowhere, or were positioned to afford the traveller a visual or phenomenal experience of, or historical connection to, some active or abandoned great house or other landmark. The so-called Great North Road, for instance, is probably a road through time and space to a badlands area thought by Puebloan descendants of Chaco to be a portal to the realm of the dead (Van Dyke 2007). Roads, whether or not intended for the actual physical movements of living people, were also avenues into the spirit world.

Contraction

As the celestial alignments and construction periodicities attest, the infrastructure of the Classic Bonito world was extensive but tightly bound to organized spiritual practices that may have paid few, immediately tangible, material dividends to farmers. This might have been especially noticeable to Puebloan farmers in times of agricultural stress, such as the cooler years and prolonged droughts that followed AD 1100 (Benson & Berry 2009; Vivian et al. 2006a; Vivian et al. 2006b). A major contraction in the social life of Chaco Canyon and many of its outliers happened between about AD 1100 and 1130.

Among other things, certain ritual practices appear to have been removed or ceremoniously terminated at about (or subsequent to) this time. Some kivas were burned and doors and kiva niches sealed (see Mills 2008). Likewise, most of the cylinder jars in existence were buried in a backroom at Pueblo Bonito at about AD 1100, the vessel form itself never to be used again (Crown 2018). The non-Chacoan inhabitants of Chimney Rock left that site in the early 1100s, taking care to avoid Chacoans and their religious practices thereafter (Fowles 2013). Chacoan priests left too, the burial of one found at the site of Ridge Ruin in north-western Arizona dating to the decades after the 1130 depopulation of Chaco (see Fig. 6.1). Erina Gruner (2015, 2018) argues that he was a member of the same

Chacoan sodality or matriline as individuals buried in Room 33 at Pueblo Bonito. Apparently, upon his death, his ritual materials – an assortment of inlaid wands, prayer sticks, and pots – were buried with him, likely because the living were unable or perhaps had decided not to continue the Chacoan practices. Still other Chacoan people became targets: in the early 1200s, a prominent Chacoan descendant appears to have been singled out during an enemy raid on the Sand Canyon Pueblo (Kuckelman 2008).

However Chacoan governance had been constituted before, during, and after the Classic Bonito phase, it seems clear that leaders were always simultaneously religious, hereditary, and powerful. Chacoan hierarchy, suggests Patricia Crown (2018), might have ended with the burial of the cylinder jars (and the last matrilineal descendants) in Pueblo Bonito. As at Ridge Ruin, it was closely tethered to particular persons. It might also have been based on political gamesmanship, given the descendant oral histories and material evidence of gambling, if not a 'Gambler', at Chaco (Weiner 2018). Those same oral histories speak to the intentionality of the descendant decisions not to repeat Chaco in the future (Kuwanwisiwma 2004).

Discussion

If we start the clock of Cahokian and Chacoan urbanism or proto-urbanism with the Lohmann-phase and Classic Bonito-phase transformations at about 1050 and AD 1040, respectively, then we are left with two clear impressions. First, the historical synchronicity of Cahokia and Chaco is remarkable. These two trans-regional phenomena – dissimilar in some ways and surprisingly alike in other ways (Table 6.1) – happened within a decade or two of each other. Second, both urbanizing phenomena ended or were significantly downsized within just a century and a half of their initial expansions. Cahokia's upland Richland Complex ended around AD 1150, and its East St. Louis precinct was partially burned and downsized in the late 1100s as official Cahokian architecture was discontinued; Cahokia continued in a reduced, reconfigured form. Chaco Canyon experienced an even more dramatic termination, though its legacy lasted, and yet lasts, among its descendants.

Order and infrastructure

On the one hand, founders and builders in both instances appear to have assembled cultural order by aligning, arranging, superimposing, and emplacing fundamental, cosmic and animate powers on earth amid the most ordinary movements and experiences of people. On the other hand, the cultural order appears to

have remained relatively open and permeable, perhaps by necessity. Religious shrines or colonial settlements seemingly intended to gather the cosmic or immanent powers of the wider world were likely essential components of Cahokian and Chacoan formations. Perhaps these shored up the positions of both Cahokia and Chaco as legitimate centres of the world in the eyes of people (e.g., Pauketat, Boszhardt et al. 2015).

Whatever the details of the processes whereby Cahokians and Chacoans established themselves at the centre of things, it took time – roughly a century and a half in both cases. At Cahokia, the Terminal Late Woodland juxtaposing of farmers, maize production and processing, terrain and climate affects, and celestial bodies set the stage. At Chaco, the late ninth and tenth centuries witnessed the establishment of the great-house pattern and its personification by a small group of matrilineal kin. In both cases, the principles of cultural order that appealed to people were fundamentally immanent and pervasive, able to be experienced and related in a wide range and at multiple scales: water in its various forms, earth and clay as pots and monuments, the sky and its light and dark objects against the backdrop of the terrain.

Cultural order at both Cahokia and Chaco was literally and figuratively order – linear or stacked alignments and processional, monumentalized arrangements of substances, phenomena, things and people. Cultural order was also infrastructure, although the degree to which the built facilities and materials at Cahokia and Chaco constituted a distinct stratum that might perpetuate itself without constant human intervention (which is part of the definition of infrastructure) – and hence impart resilience – remains unclear. Cahokia's water management infrastructure may have done little more than position people to move through bodies of water or relate to water in its various liquid and vapour forms. Chaco's retention basins, dams, gridded fields, and ditches may have been responsible for the aggradation of the Chaco Wash in the eleventh century, possible evidence of their positive effects on the Canyon's agricultural production. Then again, the presence of imported maize and other products from the Chuska Mountains casts doubt on the extent to which Chaco's infrastructural potential was realized.

Lacking such unambiguous infrastructural effects, the degree to which governing bodies might have deviated from their religious dedication to the management of cosmic, immanent order also remains unclear. Leaders of some form existed in both cases, evident as high-status women and men buried in highly commemorative or theatrical fashion. Such persons are apparent at the beginning, with some evidence in both

cases of priestly or high status lineages or sodalities persisting in some managerial capacities up to the point of official termination rituals (the cessation of ridge-top mound constructions in the case of Cahokia and the end of Pueblo Bonito's room 33 in the case of Chaco).

Conclusion: fragility is a web

As a source of fragility, one might normally lay the blame on agricultural risk and the management by farmers of their own production, as some researchers do, or on the failures of political administrations, as Chaco's gambler narratives seem to do. However, to do either in the absence of a fuller consideration of historical details would be to ignore *what* and *how* leaders administered in each case. In the cases of Cahokia and Chaco, the *what* was cosmic, and the *how* involved a recognizably expansive articulation of the relationships of people and immanent substances, materials, and phenomena.

In evaluating the differences between early Chacoan and later Puebloan artistic traditions, Elizabeth Newsome & Kelley Hays-Gilpin (2011) described the former as outward-looking and uncircumscribed, as opposed to the latter's inwardly turned, plaza-centric, social and political gaze. The same describes the trans-regional relations of Cahokia, at the beginning of the Mississippian world, in contrast to those of later Mississippian peoples (Pauketat 2013). If we combine such relational orientations with the immanent bases of Cahokian and Chacoan order, we may come close to understanding the essence of Cahokian and Chacoan fragility. To wit, the hierarchical and infrastructural strata of both phenomena were simply insufficiently incised into the landscape to protect them from the external human and non-human perturbations to their wider relational webs. That is, if Cahokia's and Chaco's foundations and agricultural economies rested on rain, on the experience of water vapour inside water shrines, on the routine lived relationships between earth and water and life and death, and on the rising and setting of the moon, then how fragile might be the bodies-politic that effloresced around them? At what point might people feel at liberty to walk away?

These questions might be answered with reference to the striking synchronicity of Cahokian and Chacoan histories. Perhaps Cahokians and Chacoans, living in alternately wet and dry environments and located some 1600 km from each other, might have been aware of each other. Regardless, there is currently little archaeological reason to believe that one caused the other to happen in any direct sense. That said, however, it is conceivable that Cahokian and Chacoan histories could have been synchronized by the localized weather patterns of the Medieval Climate

Anomaly. This seems plausible given the immanent significance of water and maize to both, never mind the likely Cahokian and Chacoan perceptions of water and maize as potentially animate or intimately related to animate and ancestral forces.

Such a suggestion is not the same as inferring that climate change caused the rise and fall of these two North American cultural orders. But it is to recognize that the immanence of water and maize, under the historical, infrastructural, and trans-regional circumstances of Cahokia and Chaco from the ninth to the thirteenth centuries, did afford a restricted set of possible outcomes for both. This means that their fragility was not necessarily or simply an internal structural or organizational property, but a potentiality that might be attributed to the open and permeable configurations of both Cahokia and Chaco.

Acknowledgements

The data on Cahokia's East St. Louis Precinct summarized in this paper were generated by the Illinois State Archaeological Survey, under contract with the Illinois Department of Transportation. Much of the other recent data from the Greater Cahokia region were generated under the aegis of grants from the John Templeton Foundation (51485), the National Science Foundation (BCS-0924138, BCS-0219308, SBR-9805053 and SBR-9996169), and the National Endowment for the Humanities (RZ-517699-14). My understanding of the Chaco phenomenon has been disproportionately shaped by Larry Benson, Patricia Crown, Stephen Lekson, and Ruth Van Dyke, and I would like to thank Susan Alt, co-PI on two of the aforementioned grants, and Katelyn Jo Bishop, Thomas Emerson, and Norman Yoffee for their comments on earlier versions of this chapter. An additional thank-you goes to Norm for inviting me to be a part of this important comparative project.

References

- Alt, Susan M., 1999. Spindle Whorls and Fiber Production at Early Cahokian Settlements. *Southeastern Archaeology* 18:124–133.
- Alt, Susan M., 2002. Identities, Traditions, and Diversity in Cahokia's Uplands. *Midcontinental Journal of Archaeology* 27:217–236.
- Alt, Susan M., 2018a. *Cahokia's Complexities: Ceremonies and Politics of the First Mississippian Farmers*. University of Alabama Press, Tuscaloosa.
- Alt, Susan M., 2018b. The Emerald Site, Mississippian Women, and the Moon. In *Archaeology of the Night: Life After Dark in the Ancient World*, edited by N. Gonlin and A. Nowell, pp. 223–246. University of Colorado Press, Boulder.
- Alt, Susan M., 2018c. Putting Religion Ahead of Politics: Cahokian Origins as Viewed through Emerald's Shrines. In *Big Data and Ancient Religion in the North American Midcontinent*, edited by B. Koldehoff and T. R. Pauketat, pp. in press. University of Alabama Press, Tuscaloosa.
- Alt, Susan M., 2019. From Weeping Hills to Lost Caves: A Search for Vibrant Matter in Greater Cahokia. In *New Materialisms Ancient Urbanisms*, edited by T. R. Pauketat and S. M. Alt. Routledge, London (in press).
- Alt, Susan M., Jeffery D. Kruchten and Timothy R. Pauketat, 2010. The Construction and Use of Cahokia's Grand Plaza. *Journal of Field Archaeology* 35(2):131–146.
- Alt, Susan M. and Timothy R. Pauketat, 2011. Why Wall Trenches? *Southeastern Archaeology* 30(1):108–122.
- Amin, Ash and Nigel Thrift, 2002. *Cities: Reimagining the Urban*. Polity Press, Cambridge, UK.
- Baires, Sarah E., 2015. The Role of Water in the Emergence of the Pre-Columbian Native American City of Cahokia. *WIREs Water* 2:489–503. <https://doi.org/410.1002/wat1002.1094>.
- Baires, Sarah E., 2016. A Microhistory of Human and Gastropod Bodies and Souls During Cahokia's Emergence. *Cambridge Archaeological Journal* 27(2):245–260.
- Baires, Sarah E., 2017. *Land of Water, City of the Dead: Religion and Cahokia's Emergence*. University of Alabama Press, Tuscaloosa.
- Baltus, Melissa R., 2014. *Transforming Material Relationships: 13th Century Revitalization of Cahokian Religious-Politics*. Unpublished Ph.D. dissertation, Department of Anthropology, University of Illinois, Urbana.
- Bennett, Jane, 2010. *Vibrant Matter: A Political Ecology of Things*. Duke University Press, Durham, North Carolina.
- Benson, Larry V., 2017. The Chuska Slope as an Agricultural Alternative to Chaco Canyon: A Rebuttal of Tankersley et al. (2016). *Journal of Archaeological Science: Reports* 16:456–471.
- Benson, Larry V. and M. Berry, 2009. Climate Change and Cultural Response in the Prehistoric American Southwest. *Kiva* 75:89–119.
- Benson, Larry V., Linda Cordell, Kirk Vincent, Howard Taylor, John Stein, G. Lang Farmer and Kiyoto Futa, 2003. Ancient Maize from Chacoan Great Houses: Where Was It Grown. *Proceedings of the National Academy of Sciences* 100:13111–13115.
- Benson, Larry V., Timothy R. Pauketat and Edward Cook, 2009. Cahokia's Boom and Bust in the Context of Climate Change. *American Antiquity* 74:467–483.
- Benson, Larry V., John R. Stein, H. E. Taylor, Richard Friedman and Thomas C. Windes, 2009. The Agricultural Productivity of Chaco Canyon and the Source(s) of Pre-Hispanic Maize Found in Pueblo Bonito. In *Histories of Maize*, edited by J. E. Staller, R. H. Tykot and B. F. Benz, pp. 289–314. Academic Press, New York.
- Betzenhauser, Alleen M. and Timothy R. Pauketat, 2018. Elements of Cahokian Neighborhoods. In *Neighborhoods in the Perspective of Anthropological Archaeology*, edited by D. Pacifico and L. Truex. vol. (in press). Archeological Papers of the American Anthropological Association, Washington, DC.

- Brennan, Tamira K. (editor), 2018. *East St. Louis Precinct Mississippian Features*. Illinois State Archaeological Survey, Research Report 43, University of Illinois, Urbana-Champaign.
- Brennan, Tamira K., Michael Brent Lansdell and Alleen M. Betzenhauser (editors), 2018. *East St. Louis Precinct Mississippian Ceramics*. Illinois State Archaeological Survey, Research Report 45, University of Illinois, Urbana-Champaign.
- Comstock, Aaron R. and Robert A. Cook, 2017. Climate Change and Migration along a Mississippian Periphery: A Fort Ancient Example. *American Antiquity* 83(1):91–108.
- Crown, Patricia L., 2018. Drinking Performance and Politics in Pueblo Bonito, Chaco Canyon. *American Antiquity* 83(3):387–406.
- Crown, Patricia L., Jiyun Gu, W. Jeffrey Hurst, Timothy J. Ward, Ardith D. Bravenec, Syed Ali, Laura Kerbert, Marlaine Berch, Erin Redman, Patrick D. Lyons, Jamie Merewether, David A. Phillips, Lori S. Reed and Kyle Woodson, 2015. Ritual Drinks in the Pre-Hispanic US Southwest and Mexican Northwest. *Proceedings of the National Academy of Sciences* 112(37):11436–11442.
- Crown, Patricia L. and W. Jeffrey Hurst, 2009. Evidence of Cacao Use in the Prehispanic American Southwest. *Proceedings of the National Academy of Sciences* 106(7):2110–2113.
- Crown, Patricia L. and W. H. Wills, 2018. The Complex History of Pueblo Bonito and Its Interpretation. *Antiquity* 92:890–904.
- Cummings, Marisa Miakonda, 2015. An Umonhon Perspective. In *Medieval Mississippians: The Cahokian World*, edited by T. R. Pauketat and S. M. Alt, pp. 43–46. School for Advanced Research Press, Santa Fe, New Mexico.
- Dalan, Rinita A., George R. Holley, William I. Woods, Harold W. Watters, Jr. and John A. Koepke, 2003. *Envisioning Cahokia: A Landscape Perspective*. Northern Illinois University Press, DeKalb.
- Delaney-Rivera, Colleen, 2004. From Edge to Frontier: Early Mississippian Occupation of the Lower Illinois River Valley. *Southeastern Archaeology* 23(1):41–56.
- Deleuze, Gilles and Felix Guattari, 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Translated by B. Massumi. University of Minnesota Press, Minneapolis.
- Douglas, John G., 1976. *Collins: A Late Woodland Ceremonial Complex in the Woodfordian Northeast*. Unpublished Ph.D. dissertation, Department of Anthropology, University of Illinois, Urbana.
- Emerson, Thomas E., 1989. Water, Serpents, and the Underworld: An Exploration into Cahokia Symbolism. In *The Southeastern Ceremonial Complex: Artifacts and Analysis*, edited by P. Galloway, pp. 45–92. University of Nebraska Press, Lincoln.
- Emerson, Thomas E., 1997a. *Cahokia and the Archaeology of Power*. University of Alabama Press, Tuscaloosa.
- Emerson, Thomas E., 1997b. Reflections from the Countryside on Cahokian Hegemony. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by T. R. Pauketat and T. E. Emerson, pp. 190–228. University of Nebraska Press, Lincoln.
- Emerson, Thomas E., 2007. Cahokia and the Evidence for Late Pre-Columbian War in the North American Midcontinent. In *North American Indigenous Warfare and Ritual Violence*, edited by R. J. Chacon and R. G. Mendoza, pp. 129–148. University of Arizona Press, Tucson.
- Emerson, Thomas E., 2012. Cahokia Interaction and Ethnogenesis in the Northern Midcontinent. In *The Oxford Handbook of North American Archaeology*, edited by T. R. Pauketat, pp. 398–409. Oxford University Press, Oxford.
- Emerson, Thomas E., Susan M. Alt and Timothy R. Pauketat, 2008. Locating American Indian Religion at Cahokia and Beyond. In *Religion, Archaeology, and the Material World*, edited by L. Fogelin, pp. 216–236. Center for Archaeological Investigations, Occasional Paper No. 36, Southern Illinois University, Carbondale.
- Emerson, Thomas E., Kristin M. Hedman, Eve A. Hargrave, Dawn E. Cobb and Andrew R. Thompson, 2016. Paradigms Lost: Reconfiguring Cahokia's Mound 72 Beaded Burial. *American Antiquity* 81(3):405–425.
- Emerson, Thomas E., Brad H. Koldehoff and Tamira K. Brennan (editors), 2018. *Revealing Greater Cahokia, North America's First Native City: Rediscovery and Large-Scale Excavations of the East St. Louis Precinct*. Illinois State Archaeological Survey, University of Illinois, Studies in Archaeology 12, Urbana.
- Emerson, Thomas E., Phillip G. Millhouse and Marjorie B. Schroeder, 2008. The Lundy Site and the Mississippian Presence in the Apple River Valley. *The Wisconsin Archeologist* 88(2):1–123.
- Fisher, Reginald G., 1934. *Some Geographic Factors that Influenced the Ancient Population of Chaco Canyon, New Mexico*. University of New Mexico Bulletin 244, Archaeology Series 3 (1), Albuquerque.
- Fortier, Andrew C. and Dale L. McElrath, 2002. Deconstructing the Emergent Mississippian Concept: The Case for the Terminal Late Woodland in the American Bottom. *Midcontinental Journal of Archaeology* 27:171–215.
- Fowler, Melvin L., Jerome C. Rose, Barbara Vander Leest and Steven R. Ahler, 1999. *The Mound 72 Area: Dedicated and Sacred Space in Early Cahokia*. Illinois State Museum, Reports of Investigations, no. 54, Springfield.
- Fowles, Severin M., 2013. *An Archaeology of Doings: Secularism and the Study of Pueblo Religion*. School for Advanced Research Press, Santa Fe, NM.
- Fritz, John M., 1978. Paleopsychology Today: Ideational Systems and Human Adaptation in Prehistory. In *Social Archaeology: Beyond Subsistence and Dating*, edited by C. L. Redman, W. T. Langhorne, Jr., M. J. Berman, N. M. Versaggi, E. V. Curtin and J. C. Wanser, pp. 37–59. Academic Press, New York.
- Grimstead, Deanna N., Sharon M. Buck, Bradley J. Vierra and Larry V. Benson, 2015. Another Possible Source of Archeological Maize Found in Chaco Canyon, NM: The Tohatchi Flats Area, NM, USA. *Journal of Archaeological Science: Reports* 3:181–187.
- Gruner, Erina, 2015. Replicating Things, Replicating Identity: The Movement of Chacoan Ritual Paraphernalia Beyond the Chaco World. In *Practicing Materiality*, edited by R. Van Dyke, pp. 56–78. University of Arizona Press, Tucson.

- Gruner, Erina, 2018. The Mobile House: Religious Leadership at Chacoan and Chacoan Revival Centers. In *Religion and Politics in the Ancient Americas*, edited by S. B. Barber and A. A. Joyce, pp. 27–50. Routledge, London.
- Harn, Alan D., 1991. The Eveland Site: Inroad to Spoon River Mississippian Society. In *New Perspectives on Cahokia: Views from the Periphery*, edited by J. B. Stoltman, pp. 129–153. Prehistory Press, Madison, Wisconsin.
- Holley, George R., 1989. *The Archaeology of the Cahokia Mounds ICT-II: Ceramics*. Illinois Cultural Resources Study No. 11, Illinois Historic Preservation Agency, Springfield.
- Ingold, Tim, 2007. Earth, Sky, Wind, and Weather. *Journal of the Royal Anthropological Institute* (N.S.):S19–S38.
- Johnson, Jay K., 1987. Cahokia Core Technology: The View from the South. In *The Organization of Core Technology*, edited by J. K. Johnson and C. A. Morrow, pp. 187–206. Westview Press, Boulder, Colorado.
- Kantner, John, 2004a. *Ancient Puebloan Southwest*. Cambridge University Press, Cambridge.
- Kantner, John, 2004b. Great House Communities in the Chaco World. In *In Search of Chaco: New Approaches to an Archaeological Enigma*, edited by D. G. Noble, pp. 70–77. School of American Research Press, Santa Fe, NM.
- Kantner, John and Nancy M. Mahoney (editors), 2000. *Great House Communities Across the Chacoan Landscape*. Anthropological Papers of the University of Arizona, Number 64, University of Arizona Press, Tucson.
- Kelly, John E., 1980. *Formative Developments at Cahokia and the Adjacent American Bottom: A Merrell Tract Perspective*. Unpublished PhD dissertation, Department of Anthropology, University of Wisconsin, Madison, Wisconsin.
- Kelly, John E., 2005. The Archaeology of the East St. Louis Mound Center: Past and Present. In *The Archaeology of the East St. Louis Mound Center, Part I: The Southside Excavations*, edited by T. R. Pauketat, pp. 1–43. Transportation Archaeological Research Reports, No. 21, Illinois Transportation Archaeological Research Program, University of Illinois, Urbana.
- Kennett, Douglas J., Stephen Plog, Richard J. George, Brendan J. Culleton, Adam S. Watson, Pontus Skogland, Nadin Rohland, Swapnil Mallick, Kristin Stewardson, Logan Kistler, Steven A. LeBlanc, Peter M. Whiteley, David Reich and George H. Perry, 2017. Archaeogenomic Evidence Reveals Prehistoric Matrilineal Dynasty. *Nature Communications* DOI: 10.1038/ncomms14115.
- Kuckelman, Kristin A., 2008. An Agent-Centered Case Study of the Depopulation of Sand Canyon Pueblo. In *The Social Construction of Communities: Agency, Structure, and Identity in the Prehispanic Southwest*, edited by M. D. Varien and J. M. Potter, pp. 109–121. AltaMira Press, Walnut Creek, CA.
- Kuwanwisiwma, Leigh J., 2004. Yupköyvi: The Hopi story of Chaco Canyon. In *In Search of Chaco: New Approaches to an Archaeological Enigma*, edited by D. G. Noble, pp. 41–47. School for Advanced Research Press, Santa Fe, NM.
- Lekson, Stephen H., 1999. *The Chaco Meridian: Centers of Political Power in the Ancient Southwest*. AltaMira Press, Walnut Canyon, California.
- Lekson, Stephen H., 2006. *The Archaeology of Chaco Canyon: An Eleventh-Century Pueblo Regional Center*. School for Advanced Research Press, Santa Fe, NM.
- Lekson, Stephen H., Thomas C. Windes and Peter J. McKenna, 2006. Architecture. In *The Archaeology of Chaco Canyon: An Eleventh-Century Pueblo Regional Center*, edited by S. H. Lekson, pp. 67–116. School of American Research Press, Santa Fe, NM.
- Lopinot, Neal H., 1992. Spatial and Temporal Variability in Mississippian Subsistence: The Archaeobotanical Record. In *Late Prehistoric Agriculture: Observations from the Midwest*, edited by W. I. Woods, pp. 44–94. Studies in Illinois Archaeology, No. 8, Illinois Historic Preservation Agency, Springfield, IL.
- Malville, J. McKim, 2004a. Ceremony and Astronomy at Chimney Rock. In *Chimney Rock: The Ultimate Outlier*, edited by J. M. Malville, pp. 131–151. Lexington Books, Lanham, Maryland.
- Malville, J. McKim, 2004b. Sacred Time in Chaco Canyon and Beyond. In *In Search of Chaco: New Approaches to an Archaeological Enigma*, edited by D. G. Noble, pp. 84–92. School of American Research Press, Santa Fe, New Mexico.
- Mathien, Frances Joan, 2003. Artifacts from Pueblo Bonito: One Hundred Years of Interpretation. In *Pueblo Bonito: Center of the Chacoan World*, edited by J. E. Neitzel, pp. 127–142. Smithsonian Institution Press, Washington, DC.
- Mathien, Frances Joan, 2005. *Culture and Ecology of Chaco Canyon and the San Juan Basin*. Publications in Archeology 18H, Chaco Canyon Studies, National Park Service, U.S. Department of the Interior, Santa Fe, NM.
- McCool, Jon-Paul, Samantha G. Fladd, Vernon L. Scarborough, Stephen Plog, Nicholas P. Dunning, Lewis A. Owen, Adam S. Watson, Katelyn J. Bishop, Brooke E. Crowley, Elizabeth A. Haussner, Kenneth B. Tankersley, David Lentz, Christopher Carr and Jessica L. Thress, 2018. Soil Analysis in Discussions of Agricultural Feasibility for Ancient Civilizations: A Critical Review and Reanalysis of the Data and Debate from Chaco Canyon, New Mexico. *PLoS ONE* 13(2):e0198290 <https://doi.org/10.1371/journal.pone.0198290>.
- McElrath, Dale L., Thomas E. Emerson and Andrew C. Fortier, 2000. Social Evolution or Social Response? A Fresh Look at ‘Good Gray Cultures’ after Four Decades of Midwest Research. In *Late Woodland Societies: Tradition and Transformation across the Midcontinent*, edited by T. E. Emerson, D. L. McElrath and A. C. Fortier, pp. 3–36. University of Nebraska Press, Lincoln, Nebraska.
- Mills, Barbara J., 2008. Remembering While Forgetting: Depositional Practices and Social Memory at Chaco. In *Memory Work: Archaeologies of Material Practices*, edited by B. J. Mills and W. H. Walker, pp. 81–108. School for Advanced Research Press, Santa Fe, NM.
- Milner, George R., 1998. *The Cahokia Chiefdom: The Archaeology of a Mississippian Society*. Smithsonian Institution Press, Washington, DC.
- Nassaney, Michael S., 2001. The Historical-Processual Development of Late Woodland Societies. In *The Archaeology of Traditions: History and Agency Before and*

- After Columbus*, edited by T. R. Pauketat, pp. 157–173. University Press of Florida, Gainesville.
- Nelson, Ben A., 2006. Mesoamerican Objects and Symbols in Chaco Canyon Contexts. In *The Archaeology of Chaco Canyon: An 11th Century Pueblo Regional Center*, edited by S. H. Lekson, pp. 339–371. School for Advanced Research Press, Santa Fe, New Mexico.
- Newsome, Elizabeth A. and Kelley Hays-Gilpin, 2011. Spectatorship and Performance in Mural Painting, 1250–1500: Visuality and Social Integration. In *Religious Transformation in the Late Pre-Hispanic Pueblo World*, edited by D. M. Glowacki and S. Van Keuren. University of Arizona Press, Tucson.
- Noble, David Grant (editor), 2004. *In Search of Chaco: New Approaches to an Archaeological Enigma*. School for Advanced Research Press, Santa Fe, NM.
- Pauketat, Timothy R., 2003. Resettled Farmers and the Making of a Mississippian Polity. *American Antiquity* 68:39–66.
- Pauketat, Timothy R., 2004. *Ancient Cahokia and the Mississippians*. Cambridge University Press, Cambridge.
- Pauketat, Timothy R., 2010. The Missing Persons in Mississippian Mortuaries. In *Mississippian Mortuary Practices: Beyond Hierarchy and the Representationist Perspective*, edited by L. P. Sullivan and R. C. Mainfort, pp. 14–29. University Press of Florida, Gainesville.
- Pauketat, Timothy R., 2013. *An Archaeology of the Cosmos: Rethinking Agency and Religion in Ancient America*. Routledge, London.
- Pauketat, Timothy R., 2018. Thinking Through the Ashes, Architecture, and Artifacts of Ancient East St. Louis. In *Revealing Cahokia's Urbanism: Rediscovery and Large-Scale Excavations of the East St. Louis Precinct*, edited by T. E. Emerson, B. H. Koldehoff and T. K. Brennan. Illinois State Archaeological Survey, University of Illinois, Studies in Archaeology 12, Urbana.
- Pauketat, Timothy R., 2019. Introducing New Materialisms, Rethinking Ancient Urbanisms. In *New Materialisms Ancient Urbanisms*, edited by T. R. Pauketat and S. M. Alt. Routledge, London (in press).
- Pauketat, Timothy R. and Susan M. Alt, 2003. Mounds, Memory, and Contested Mississippian History. In *Archaeologies of Memory*, edited by R. M. Van Dyke and S. E. Alcock, pp. 151–179. Blackwell, Oxford.
- Pauketat, Timothy R. and Susan M. Alt, 2015. *Medieval Mississippians: The Cahokian World*. School for Advanced Research Press, Santa Fe, NM.
- Pauketat, Timothy R. and Susan M. Alt, 2017. Water and Shells in Bodies and Pots: Mississippian Rhizome, Cahokian Poiesis. In *Relational Identities and Other-than-Human Agency in Archaeology*, edited by E. Harrison-Buck and J. Hendon. University of Colorado Press, Boulder.
- Pauketat, Timothy R., Susan M. Alt and Jeffery D. Kruchten, 2015. City of Earth and Wood: Cahokia and Its Material-Historical Implications. In *Early Cities in Comparative Perspective, 4000 BCE–1200 CE*, edited by N. Yoffee, pp. 437–454. Cambridge University Press, Cambridge.
- Pauketat, Timothy R., Susan M. Alt and Jeffery D. Kruchten, 2017. The Emerald Acropolis: Elevating the Moon and Water in the Rise of Cahokia. *Antiquity* 91:207–222.
- Pauketat, Timothy R., Robert F. Boszhardt and Danielle M. Benden, 2015. Trempealeau Entanglements: An Ancient Colony's Causes and Effects. *American Antiquity* 80:260–289.
- Pauketat, Timothy R., Thomas E. Emerson, Michael G. Farkas and Sarah E. Baires, 2015. An American Indian City. In *Medieval Mississippians: The Cahokian World*, edited by T. R. Pauketat and S. M. Alt, pp. 20–31. School for Advanced Research Press, Santa Fe, New Mexico.
- Pauketat, Timothy R., Andrew C. Fortier, Thomas E. Emerson and Susan M. Alt, 2013. A Mississippian Conflagration at East St. Louis and its Historical Implications. *Journal of Field Archaeology* 38:208–224.
- Pauketat, Timothy R., Lucretia S. Kelly, Gayle J. Fritz, Neal H. Lopinot, Scott Elias and Eve Hargrave, 2002. The Residues of Feasting and Public Ritual at Early Cahokia. *American Antiquity* 67:257–279.
- Pauketat, Timothy R., Mark A. Rees and Stephanie L. Pauketat, 1998. *An Archaeological Survey of Horseshoe Lake State Park, Madison County, Illinois*. Illinois State Museum, Report of Investigations, No. 55, Springfield.
- Pepper, George H., 1920. *Anthropological Papers of the American Museum of Natural History XXVII*, New York.
- Plog, Stephen and Carrie Heitman, 2010. Hierarchy and Social Inequality in the American Southwest, AD 800–1200. *Proceedings of the National Academy of Sciences* 107(46):19619–19626 (doi: 19610.11073/pnas.1014985107).
- Porter, James W., 1964. *Thin Section Descriptions of Some Shell Tempered Prehistoric Ceramics from the American Bottoms*. Research Report No. 7, Lithic Laboratory, Southern Illinois University Museum, Carbondale.
- Reed, Nelson A., 2009. Excavations on the Third Terrace and Front Ramp of Monks Mound, Cahokia: A Personal Narrative. *Illinois Archaeology* 21(1–89).
- Rolinson, Martha Ann, 1998. *Toltec Mounds and Plum Bayou Culture: Mound D Excavations*. Arkansas Archeological Survey Research Series No. 54, Fayetteville, Arkansas.
- Romain, William F., 2015. Moonwatchers of Cahokia. In *Medieval Mississippians: The Cahokian World*, edited by T. R. Pauketat and S. M. Alt, pp. in press. School for Advanced Research Press, Santa Fe, New Mexico.
- Romain, William F., 2018. Ancient Skywatchers of the Eastern Woodlands. In *Archaeology and Ancient Religion in the American Midcontinent*, edited by B. H. Koldehoff and T. R. Pauketat, pp. 304–341. University of Alabama Press, Tuscaloosa.
- Scarborough, Vernon L., Samantha G. Fladd, Nicholas P. Dunning, Stephen Plog, Lewis A. Owen, Christopher Carr, Kenneth B. Tankersley, Jon-Paul McCool, Adam S. Watson, Elizabeth A. Haussner, Brooke Crowley, Katelyn J. Bishop, David L. Lentz and R. Gwinn Vivian, 2018. Water Uncertainty, Ritual Predictability and Agricultural Canals at Chaco Canyon, New Mexico. *Antiquity* 92(364):870–889.
- Scarre, Chris, 2011. Monumentality. In *The Oxford Handbook of the Archaeology of Ritual and Religion*, edited by T. Insoll, pp. 9–23. Oxford University Press, Oxford.
- Schroeder, Sissel, 2004. Power and Place: Agency, Ecology, and History in the American Bottom, Illinois. *Antiquity* 78:812–827.

- Simon, Mary L., 2014. Reevaluating the Introduction of Maize into the American Bottom and Western Illinois. *Midwest Archaeological Conference, Occasional Papers* 1:97–134.
- Simon, Mary L., 2017. Reevaluating the Evidence for Middle Woodland Maize from the Holding Site. *American Antiquity* 82(1):140–150.
- Skousen, B. Jacob, 2012. Posts as Ancestors: New Insights into Monumental Posts in the American Bottom. *Southeastern Archaeology* 31:57–69.
- Sofaer, Anna, 2007. The Primary Architecture of the Chacoan Culture: A Cosmological Expression. In *The Architecture of Chaco Canyon, New Mexico*, edited by S. H. Lekson, pp. 225–254. University of Utah Press, Salt Lake City.
- Stein, John, Richard Friedman, Taft Blackhorse and Richard Loose, 2007. Revisiting Downtown Chaco. In *The Architecture of Chaco Canyon, New Mexico*, edited by S. H. Lekson, pp. 199–223. University of Utah Press, Salt Lake City.
- Stoltman, James B., 2014. Cultural Interaction Between the American Bottom and the Upper Mississippi Valley as Reflected in the Compositional Analysis of Pottery, Appendix A. In *The Pelkey Site (47Tr415): 2010 Discovery and Investigation of an Early Middle Mississippian Midden at Trempealeau, Wisconsin*, by R. Boszhardt, D. Benden, and T. Pauketat. Report submitted to the Wisconsin Historical Society, Madison.
- Stoltman, James B., Danielle M. Benden and Robert F. Boszhardt, 2008. New Evidence in the Upper Mississippi Valley for PreMississippian Cultural Interaction with the American Bottom. *American Antiquity* 73:317–336.
- Tankersley, Kenneth B., Nicholas P. Dunning, Jessica Thress, Lewis A. Owen, Warren D. Huff, Samantha G. Fladd, Katelyn J. Bishop, Stephen Plog, Adam S. Watson, Christopher Carr and Vernon L. Scarborough, 2016. Evaluating Soil Salinity and Water Management in Chaco Canyon, New Mexico. *Journal of Archaeological Science: Reports* 9:94–104.
- Todd, Brenda K., 2012. *Chimney Rock, An Eleventh Century Chacoan Great House: Export, Emulation, or Something Else?* Ph.D. Dissertation, Department of Anthropology, University of Colorado, Boulder, Colorado.
- Toll, H. Wolcott, 2004. Artifacts in Chaco: Where They Came From and What They Mean. In *In Search of Chaco: New Approaches to an Archaeological Enigma*, edited by D. G. Noble, pp. 32–39. School for Advanced Research Press, Santa Fe, NM.
- Toll, H. Wolcott, 2006. Organization of Production. In *The Archaeology of Chaco Canyon: An Eleventh-Century Pueblo Regional Center*, edited by S. H. Lekson, pp. 117–151. School of American Research Press, Santa Fe, NM.
- Van Dyke, Ruth M., 2007. *The Chaco Experience: Landscape and Ideology at the Center Place*. School for Advanced Research Press, Santa Fe, NM.
- Vivian, R. Gwinn, 1991. Chacoan Subsistence. In *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest*, edited by P. L. Crown and W. J. Judge, pp. 57–75. School of American Research Press, Santa Fe, NM.
- Vivian, R. Gwinn, Carla R. Van West, Jeffrey S. Dean, Nancy J. Akins, Mollie S. Toll and Thomas C. Windes, 2006a. Ecology and Economy. In *The Archaeology of Chaco Canyon: An Eleventh-Century Pueblo Regional Center*, edited by S. H. Lekson, pp. 45–65. School of American Research Press, Santa Fe, NM.
- Vivian, R. Gwinn, Carla R. Van West, Jeffrey S. Dean, Nancy Akins, Mollie Toll and Tom Windes, 2006b. Appendix B: Chacoan Ecology and Economy. In *The Archaeology of Chaco Canyon: An Eleventh-Century Pueblo Regional Center*, edited by S. H. Lekson, pp. 429–457. School of American Research Press, Santa Fe, NM.
- Weiner, Robert S., 2015. A Sensory Approach to Exotica, Ritual Practice, and Cosmology at Chaco Canyon. *Kiva* 81(3–4):220–246.
- Weiner, Robert S., 2018. Sociopolitical, Ceremonial, and Economic Aspects of Gambling in Ancient North America: A Case Study of Chaco Canyon. *American Antiquity* 83(1):34–53.
- Wilshusen, Richard H. and Ruth M. Van Dyke, 2006. Chaco's Beginnings. In *The Archaeology of Chaco Canyon: An Eleventh-Century Pueblo Regional Center*, edited by S. H. Lekson, pp. 211–259. School of American Research Press, Santa Fe, NM.
- Windes, Thomas C., 2003. This Old House: Construction and Abandonment at Pueblo Bonito. In *Pueblo Bonito: Center of the Chacoan World*, edited by J. E. Neitzel, pp. 14–32. Smithsonian Books, Washington, DC.
- Windes, Thomas C., 2004. The Rise of Early Chacoan Great Houses. In *In Search of Chaco: New Approaches to an Archaeological Enigma*, edited by D. G. Noble, pp. 14–21. School of American Research Press, Santa Fe, New Mexico.
- Windes, Thomas C., 2007. Gearing Up and Piling On: Early Great Houses in the Interior San Juan Basin. In *The Architecture of Chaco Canyon, New Mexico*, edited by S. H. Lekson, pp. 45–92. University of Utah Press, Salt Lake City.
- Windes, Thomas C. and Peter J. McKenna, 2001. Going Against the Grain: Wood Production in Chacoan Society. *American Antiquity* 66(1):119–140.