

# What's new in Chaco research?

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*This special section of Antiquity reports on new research on Chaco Canyon and its surrounding region in the northern U.S. Southwest. Two of the contributions are based on new excavations within Chaco Canyon—one at the largest great house of Pueblo Bonito by Patricia Crown and W.H. Wills (2018), and the other on Chaco's water management by Vernon Scarborough et al. (2018). The second pair of articles are based on the regional data compilation and analyses of great houses and great kivas, which form part of the larger Chaco World. The article by Mills et al. (2018) applies social network analysis to a large database of ceramics to look at changing connectivity in the Chaco World over three*

*centuries. Katherine Dungan et al. (2018) use an innovative total viewshed approach to examine when and to what degree great houses and great kivas were placed in visually prominent locations. This introduction reviews new findings of the past decade and contextualises the following four articles within the current literature. It does not provide a comprehensive review of the Chaco literature, and the reader is referred to other reviews, most recently by Plog (2010, 2018), Schachner (2015) and Plog et al. (2017). These can be compared with earlier syntheses (Mills 2002; Lekson 2006, 2009) to underscore the pace of new research.*

Chaco Canyon and its surrounding region is an iconic North American archaeological area. The canyon's cluster of monumental architecture—especially Pueblo Bonito (Figure 1)—is a UNESCO World Heritage site and an archaeological crown jewel of the U.S. National Park Service. But what makes Chaco so intriguing to the public and archaeologists alike? Fowles (2013: 79–81) characterises three main features that distinguish Chaco from other areas of the Southwest: its regionalism, extravagance and differentiation. While there are certainly continuities with antecedent societies of the Basketmaker III Period (c. AD 400–750) and those that followed in the post-Chaco period (c. AD 1120/1130–1300), it is the combination of these three characteristics that makes Chaco of the Bonito Phase (AD 800–1120/1130) of such great interest.

## Regionalism

Chaco's distinctive regionalism is defined by the evidence for extensive ties to the dense cluster of great and small houses within Chaco Canyon. This includes great houses dispersed over an area of more than 100 000km<sup>2</sup> (Figure 2). Most of these are surrounded by smaller

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Figure 1. Multi-storey section in the East Wing of Pueblo Bonito (Room 242), Chaco Canyon National Historic Park. This room lies within the last major addition to the 800-room building, a construction episode that dates from AD 1077–1084. Dateable *Pinus ponderosa* roof beams and lintels in this room were cut between AD 1080 and 1082 and transported to Chaco from surrounding highlands. Two of the building's seven corner doorways lead diagonally out of the second storey of this room to adjacent rooms, which made it one of the most connected rooms in Pueblo Bonito. The height of the ceiling of the second storey from the floor ledge (above the first-storey roof) is 2.9m (photograph by Barbara J. Mills).

settlements, and may be associated with large-scale community architecture called great kivas and an array of other features (Gilpin 2003; Lekson 2006; Van Dyke 2008). Road segments, causeways and staircases are found throughout the area, but are not continuous, raising questions about their purpose. Interpretations range from the transport of goods and people (including pilgrimage) to symbolic connectivity (e.g. Kantner & Vaughn 2012; Lekson 2015; Friedman *et al.* 2017; Till 2017). Shared decorative designs on pottery, wood, stone and textiles were reproduced over this broad area, especially all-over hachure (known as Dogoszhi style), which Plog (2003) interprets as a metaphor for the colour turquoise.

Many of the items found within the canyon were imported, revealing Chaco's connectivity with surrounding areas at different intensities and scales: pottery, flaked stone and trees from other parts of the San Juan Basin (e.g. Toll 2006; Duff *et al.* 2012; Guiterman *et al.* 2015; Crown 2016a); turquoise and shell from more distant Southwestern locations (e.g. Mills & Ferguson 2008; Thibodeau *et al.* 2012); and parrots, cacao and copper bells from Mesoamerica (Crown & Hurst 2009; Crown *et al.* 2015; Watson *et al.* 2015; Crown 2016b; Nelson *et al.* 2017). The latter are interpreted as important for the symbolic

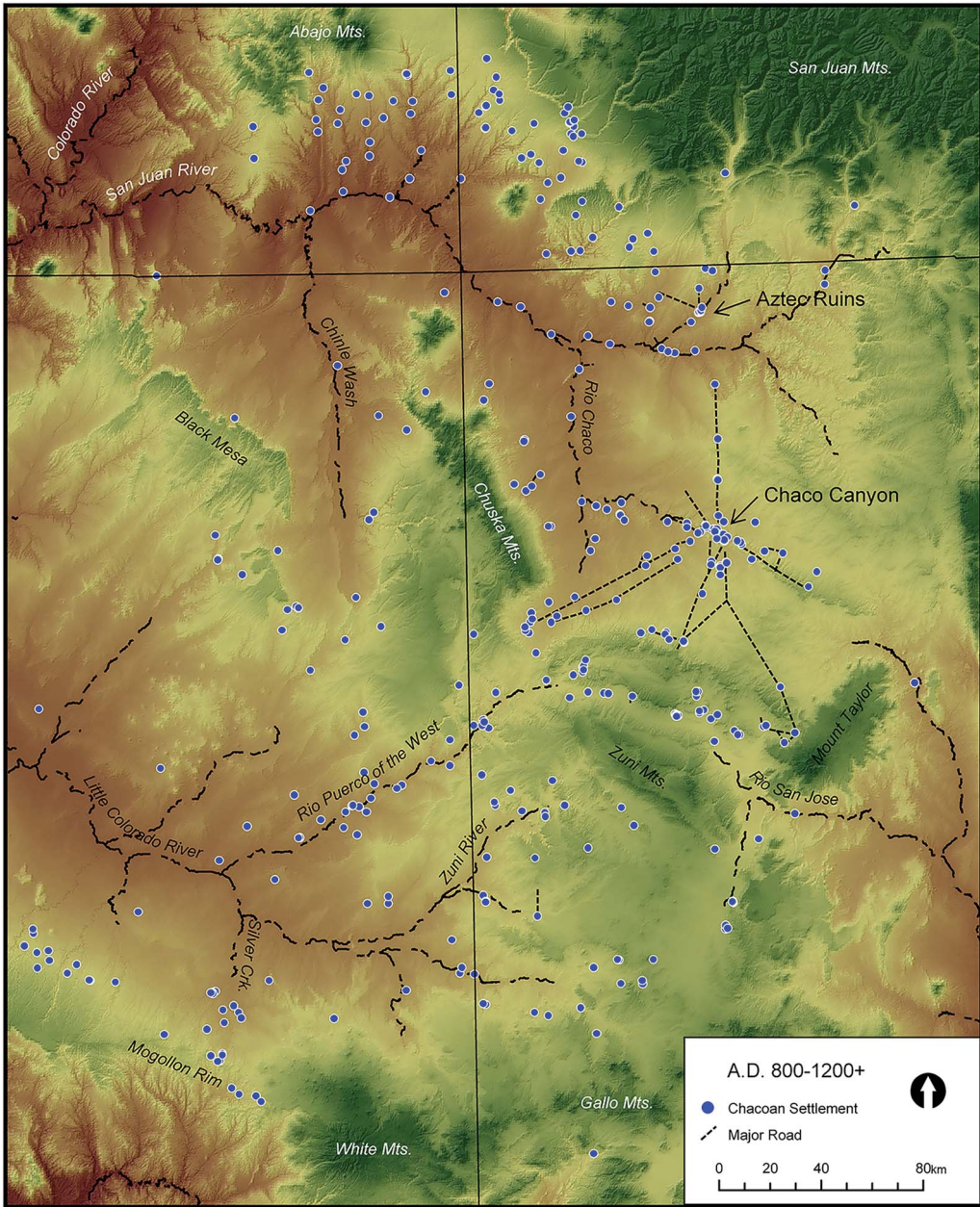


Figure 2. Spatial extent of the Chaco World showing the distribution of great houses and great kivas (figure by Matthew A. Peeples).

legitimation of Chaco's leaders or aspirational leaders, who probably made the journey themselves to procure the goods (Nelson *et al.* 2017).

The extensive nature of Chaco's reach has led to the usage of the term 'Chaco World' (Kantner 2003a; Kantner & Kintigh 2006). Starting with Kantner's original compilation of

great houses—now a part of the Chaco Research Archive (<http://www.chacoarchive.org/cra/>)—archaeologists working in the region have continued to collaborate on regional-scale databases of great houses and great kivas. Van Dyke *et al.* (2016), for example, have deployed regional data in a GIS-platform to suggest that the intervisibility of landscape features, such as shrines, promoted regional connections, especially with Chaco Canyon. Bernardini and Peeples (2015) show how ‘sight communities’ formed through shared views of distant topographic features (Figure 3). In this special section, Dungan *et al.* (2018) combine data on great houses and great kiva locations with total viewshed analyses to evaluate whether these structures were situated to promote more local, intracommunity visibility. They find that visibility was an important variable in great house placement, especially during the expansive AD 1000s. Their findings compare well with Kantner and Hobgood’s (2016) viewshed analysis of tower kivas, which concluded that towers were built to be seen within, but not between, great house communities. Also in this section, Mills *et al.* (2018) add material culture to a regional database to assess the changing structure of Chaco’s social networks.

## Extravagance

Chaco’s extravagance is expressed through the consumption of larger quantities of materials than found in other Southwestern regions, and in the overbuilt character of its architecture (Figure 4). They are ‘overbuilt’ in the sense that great houses have core-veneer walls, carefully fitted masonry elements and multiple storeys. Our understanding of artefact density is based on materials from the two largest sites in the Chaco World—Pueblo Bonito in Chaco Canyon, and Aztec Ruins on the Animas River, 75km to the north. Pueblo Bonito’s Room 33 alone contained as much worked and unworked turquoise as recovered from any other site in the Southwest (Neitzel 2003), and nearby Room 28 held more whole pottery vessels than any other single Southwestern context (Crown 2018). More shell trumpets and macaws were recovered at Pueblo Bonito than at any contemporaneous Puebloan or non-Puebloan sites (Mills & Ferguson 2008; Watson *et al.* 2015; Crown 2016b; Nelson *et al.* 2017). Even corn pollen was present in higher quantities within Chaco Canyon’s great and small sites than at other contemporaneous sites within the region (Geib & Heitman 2015).

The labour used in architectural construction was also at a scale unprecedented in the Ancestral Pueblo area. Many of the construction episodes for great houses within and outside of Chaco Canyon were planned in advance, with timbers procured over long distances and stockpiled before construction, and buildings were multi-storeyed (Lekson 2007). As Crown and Wills (2018) discuss in this special section, Pueblo Bonito was being remodelled almost constantly. Such extravagance can be interpreted as building to impress both community members and visitors (Van Dyke 2008). Architectural extravagance included the construction of great kivas (10m or more in diameter) (Figure 5), which required large labour pools to procure the massive roof beams used in each structure. Dungan and Peeples (2018) show how a 17m-diameter great kiva in the southern Chaco area could have held as many as 189 people, approximately the number of people living in the dispersed communities surrounding the structure. Many of the unroofed Chaco kivas were even larger, holding 400–500 people (Dungan & Peeples 2018). Coffey and Ryan (2017) interpret Chaco great kivas as the physical instantiation of Ancestral Pueblo communities.



Figure 3. Katherine Dungan recording a small house in the Kin Bineola community with Hosta Butte in background left (photograph by Barbara J. Mills).

But what we now view as ‘extravagant’ may not have been viewed as such for those living at Chaco. The procurement of items from distant sources, their incorporation into buildings through dedication and termination, and the ceremonial closure of what appear to be storerooms of items used in religious ritual were all practices consistent with a society deeply connected to place (Mills 2008; Plog & Heitman 2010). They are consistent with depositional practices that honoured ancestors and created a variety of regional social ties at varying distances and intensities. They must also be viewed in the context of significant social differentiation within the Chaco World, a process starting in the AD 800s and continuing for 300 years.

## Differentiation

Chaco’s differentiation is both internal and external. Internally, it deviates from the organisation found in other contemporaneous Ancestral Pueblo regions, with evidence for early and sustained social inequality. Hierarchy is interpreted from the burial treatment of individuals within Pueblo Bonito compared with contemporaneous sites (Plog & Heitman 2010). Room 33’s collective interments—one of the few examples of collective burials in the Southwest—comprised 14 individuals interred with the copious funerary objects noted above. Two individuals were placed beneath a wooden plank floor, and above the floor was an array of co-mingled and disarticulated human remains. One of these individuals was polydactyl, as were two other individuals from Pueblo Bonito. Crown *et al.* (2016) suggest that this was regarded as a sign of status. They document several cases of polydactylism among

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Figure 4. Kin Bineola, a great house west of Chaco Canyon (photograph by Barbara J. Mills).

individuals in the Chaco World, depicted in rock art, painted on pottery and shaped into stone and ceramic objects. A set of six-toed footprints was embedded in the plastered walls of Room 28 (one of two rooms that accessed Room 33), where a unique assemblage of cylinder jars was found, and which were used for ceremonial drinking before the room was ceremonially burned (Sturm & Crown 2015; Crown 2018).

There is increasing evidence that social inequality at Chaco began earlier than widely believed starting in the AD 800s for Room 33's burials (Coltrain *et al.* 2007; Plog & Heitman 2010; Watson *et al.* 2015; Kennett *et al.* 2017). Marden (2015) suggests that the co-mingling of remains resulted from repeated access to the room for burial and possibly for the subfloor burials; offerings were deposited in the space above the plank floor for another two centuries. Recent aDNA analyses have revealed that individuals throughout the room were related through a single matriline that gained prominence in the AD 800s, continuing into the late AD 1000s, and perhaps the early AD 1100s (Kennett *et al.* 2017). A second burial cluster in the western part of Pueblo Bonito may also have begun in the AD 800s (Plog 2018). This cluster, too, had substantial burial accompaniments, suggesting the presence of a dual hierarchical organisation (Ware 2014; Whiteley 2015). Adjacent storage rooms containing items that were used in religious rituals clearly demonstrate that some of the authority of these elites came through their role as religious specialists (Mills 2004, 2008; Ainsworth *et al.* 2018).

One aspect of Chaco's heterogeneity that most archaeologists agree on is that people with different origins and backgrounds participated in the Chaco World. Migration and population replacement have been proposed for the central canyon (Wills 2009). Archaeologists have long analysed variation among the outlying great houses in size, construction, layout and clustering,



Figure 5. Great kiva (Kiva Q) at Pueblo Bonito (photograph by Barbara J. Mills).

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and emphasise that Chaco was not a single system, but multiple systems formed by the historical trajectories of individual communities (Kantner & Mahoney 2000; Kantner 2003b; Cameron & Duff 2008; Reed 2008; Safi & Duff 2016; Van Dyke *et al.* 2016).

It is increasingly apparent that 'Chaco' does not refer to a single ethnic or political group (Cameron 2005). The Chaco World included people with different backgrounds, agricultural technologies, leadership strategies, religious practices and, probably, languages. The use of the term 'Chaco' is usually in reference to the shared use of monumental architecture (great houses and great kivas), the presence of social inequality and some overarching religious and technological practices. These attributes were not evenly distributed and changed over the 300-year occupation. Understanding how migrants from different areas came together in Chaco communities is the subject of extensive research focused on technological and religious practices and their relationship to identities at various scales (Mills 2008, 2015; Wills 2009; Duff & Nauman 2010; Clark & Reed 2011; Reed 2011a & b; Webster 2011; Windes 2014; Brown & Paddock 2015; Jolie & Webster 2015; Mattson 2016).

Several archaeologists suggest that Chaco's early great houses resulted from the migration of Northern San Juan residents (Wilshusen & Van Dyke 2006; Windes & Van Dyke 2012; Wilshusen 2015; Windes 2015). Human isotopic variation, however, suggests that Chaco Canyon's populations came from multiple areas, but probably not from the Northern San Juan (Price *et al.* 2017). Others point out that the earlier Basketmaker III (*c.* AD 500–750) occupation of Chaco Canyon has been underestimated (Wills *et al.* 2012), and that there are similarities in the forms and technological styles of Basketmaker III ritual objects from Pueblo Bonito and contemporaneous sites to the west and south-west (Webster *et al.* 2014). Even Chaco communities outside of the canyon are considered multi-ethnic (Murrell & Unruh 2016).

Two papers in this special section directly address Chaco's origins and diversity. Crown and Wills's (2018) excavations at Pueblo Bonito, combined with their careful perusal of prior excavation records, point to an earlier Basketmaker III occupation underneath the building, suggesting local continuity. Mills *et al.* (2018) also examine Chaco origins, through ceramic networks, concluding that there is little evidence for northern founders. Instead, they suggest areas south and west, as have researchers working on the provenance of timbers (Guiterman *et al.* 2015). While people from the Northern San Juan may not have founded Chaco, evidence supports their incorporation into the Chaco World by the AD 1000s, and later migration into the central canyon (Wills 2009; Mills *et al.* 2018).

## Feeding Chaco

While Chaco's extravagance has fostered archaeological interpretations of religious ritual, it is clear that religion, politics and economics should be integrated in a holistic approach. How Chaco families in the canyon and in the surrounding areas provisioned themselves is an important topic. Fundamentally, Chacoans were farmers who needed to understand climate, water flow, the interaction of storage and periodicity of drought, and when to move or stay in place (Cordell *et al.* 2007). The programmes of great house additions and new outlier constructions, especially prominent in the AD 1000s, would have required large labour pools. Population estimates, however, are widely divergent (Minnis 2015; Plog 2018); the degree of local contribution to



labour is therefore unknown. It is also uncertain whether Chaco Canyon was a destination for pilgrims (Toll 2001; Van Dyke 2008; Kantner & Vaughn 2012) or not (Plog & Watson 2012). Regardless, hospitality during ceremonial events would have been an important part of life in the canyon, given the density of evidence for hierarchy and religious ritual. Chaco Canyon gatherings may have included ritualised gaming practices, such as gambling (Weiner 2018).

It has long been assumed that the highlands defining the San Juan Basin offered greater potential to support crops and animals than Chaco Canyon. Along with the importation of timber and pottery (Toll 2006; Guiterman *et al.* 2015), it is suggested that corn and game animals were also transported to the canyon (e.g. Benson 2012; Grimstead *et al.* 2016). Re-analyses of the isotope data have challenged the transport of corn and small mammals, however, because of the presence of significant geological, hydrological and elevational variation within the canyon and its surroundings (Hamilton *et al.* 2017; Price *et al.* 2017). Furthermore, it does not appear that salinity would have been a problem for Chaco farmers (Tankersley *et al.* 2016; but see Benson 2017). Nonetheless, the procurement of large animals from upland areas is indicated by rainfall and isotopic variation (Grimstead *et al.* 2016, 2017). New research modelling the maize niche from a large-scale dendroclimatological database (Bocinsky *et al.* 2016) offers potential for future studies of human-environment interaction.

Other research on Chaco technology and productivity focuses on the agricultural potential of the central canyon and surrounding areas. It is argued that sufficient food production was achieved by employing technologies, such as water-diversion features, canals, sand dune farming, *ak chin* fields and gridded gardens (Worman & Mattson 2010; Dorshow 2012; Wills & Dorshow 2012; Wills *et al.* 2014, 2016; Vivian & Watson 2015; Sturm 2016; Wills 2017). Wills (2017) suggests that the evidence for agricultural features combined with dispersed fields surrounding the canyon would have been sufficient to support the labour required for great house construction, without needing to generate large surpluses. It was in the granting of permission to farm that the relations of production were built, rather than in extracting surplus. While Wills's interpretation balances what seems to be limited evidence for large-scale agricultural features with the canyon's architectural density, Scarborough *et al.* (2018) provide documentation of a previously unrecognised larger canal system. They conclude that this irrigation system would have required coordination and, importantly, it represented a strategy for increasing resilience in an unpredictable climate.

## Chaco in comparative perspective

Lekson (2009) and Drennan *et al.* (2010) have chastised Southwest archaeologists for claims of exceptionalism and called for more comparative studies (Schachner 2015: 57–59). Schachner (2015: 57) points out that Drennan *et al.*'s (2010) study compares Chaco to Early Olmec, Moundville and Formative Oaxaca, among other New World societies. Lekson (2009, 2017) is the most vociferous in his support for differences between Chaco and descendant Pueblo societies, rejecting the use of ethnographic analogy as a comparative tool. By contrast, Ware (2014) argues that we will never comprehend Chaco until archaeologists better understand contemporaneous Pueblo social organisation—especially kinship (see also Hays-Gilpin & Ware 2015; Whiteley 2015). Many of these reconstructions are dependent on

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population size, which remains difficult to evaluate (Plog 2018); current estimates range from 10 000–200 000 (with most between 20 000–50 000) persons in the entire Chaco World at its peak in the tenth and eleventh centuries AD (Minnis 2015).

In its degree of hierarchy, social organisation during the Chaco period *was* different from later Pueblos, and from Chaco's contemporaries in other areas of the Southwest. This is one of the most important changes in Chaco scholarship of recent years (including my own). Models that take this into account include small-scale states occupied by kings and queens, chiefdoms and Lévi-Strausseau house societies (Heitman & Plog 2005; Heitman 2007, 2015; Mills 2008, 2015; Lekson 2009; Plog & Heitman 2010; Plog *et al.* 2017). As a key global case study in the emergence of inequality, Chaco has much to contribute to comparative studies. What are needed, however, are data on many of the variables that go into analysing such comparisons. The papers in this special section help move Chaco archaeology towards that goal.

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