

Sandals from the Center Place, Footprints on the Pots: Continuity and Change in Twined Sandal Tread Designs from Chaco, Aztec, and Beyond

(Intro Slide)

Aztec Ruins played a pivotal role during both the Chaco and Post-Chaco eras. When it was constructed in the early 1100s it appears to have functioned as an important outlier of the Chaco regional system in the Middle Sand Juan. After the collapse of the Chaco system in the mid-1100s, Aztec took on a new role as the largest civic-ceremonial center in the San Juan Basin and played a key role in the region's social, religious, and political reorganization. Scholars have debated the nature of Chaco's influence at Aztec, and based on a number of architectural attributes and similar types of artifacts that were made in similar ways, researchers have argued that Aztec was initially constructed either by, or under the direction of, individuals or groups from Chaco Canyon.

(Intro Sandal Slide)

Around the world, clothing is used to express, legitimate, and recreate social identities on many levels simultaneously, thus the study of consistency and changes in clothing fashions at these two centers has the potential to significantly advance our understanding of Chaco's influence at Aztec and the influence of both sites in the larger region. While few types of garments are available in sufficient quantities to address questions about regional and inter-regional variability in clothing fashions, hundreds of yucca sandals have been recovered. In this presentation, I outline ongoing analyses of shaped-toe cupped-heel twined sandals from Bonito, Aztec, and the larger region. By documenting attributes of these sandals, the contexts of their recovery, and their similarity to other datable media, I hope to understand the role twined sandals played at Pueblo Bonito, Aztec, and other sites in the region.

(SLIDE of Twined Sandals History)

Of the various types of sandals used in the northern Southwest, twined sandals represent one of the most long-lived footwear and most complexly woven textile traditions in the region. They were costly to make as each sandal required roughly 110 feet of prepared yucca warp and weft yarns, and they are so intricate that they were probably made by expert weavers. The twined sandal tradition first appears during the Basketmaker II period and reaches its highest level of stylistic and technological complexity during Basketmaker III. Little is known about the distribution and use of twined sandals during the Pueblo I period, but at least 280 twined sandals have been recovered from Pueblo II and Pueblo III contexts—almost exclusively from community centers with great house architecture in the central San Juan Basin, but by A.D. 1250, they were no longer produced.

(SLIDE of Raised Tread Footprints)

Throughout their history of use, most twined sandals had complexly woven raised geometric tread and colored pattern designs. The raised, geometric patterned treads on the bottom surfaces of these sandals would have left footprints with these geometric designs when they were worn, and this appears to have been a key part of their function. Kelley Hays-Gilpin suggests that, the raised tread designs, functioned to “simultaneously identify the wearer with a group that shares a way of making sandals and differentiate the wearer through decorative patterns unique to each ... pair of sandals” (1998a:5). This ability to produce uniquely designed footprints, then, transformed twined sandals into stamps of some level or levels of social identity.

Due to their common occurrence at Chaco and post-Chaco style great houses, recent discussions have proposed that twined sandal manufacture, ownership, and use, were restricted, and that they functioned in connection with some type of high status display, as ceremonial dance footwear, in processions, or as footwear worn in public footraces.

(SLIDE Polydactyly and Toe-Jog sandals)

Recently, Crown and her colleagues (2016), argued that the toe-jogs on many of the twined sandals dating to the Pueblo II period and later, may have functioned as symbolic representations of a sixth-toe, a genetic anomaly found among several individuals in high-status burials in Pueblo Bonito, and elsewhere. These researchers go further, suggesting that individuals with six toes were seen as powerful and possibly divine, and that by dressing themselves in sandals with the distinctive toe-jog attribute, individuals of high rank could connect with and embody fictive or divine ancestors with six toes. Recent research by Kennet et al. (2017), argues that Pueblo Bonito, and possibly the larger Chaco system, were ruled by at least one elite matrilineal lineage, and that at least one six-toed individual, may have been one of the founding members of this lineage. If members of this elite lineage wore the most grandiose and elaborate clothes, as members of elite social classes commonly did elsewhere in the world, then they likely wore the most expensive and highly ornate clothing, namely twined yucca sandals. The presence of twined sandals with toe-jogs at Aztec and elsewhere in the region may indicate that local elites or visiting dignitaries may have worn these sandals to legitimate their roles by signaling ties to real or fictive ancestors from Bonito.

(SLIDE Sandal Wear and Repair)

Even though these sandals were time consuming and resource heavy to make, they were used intensively, even after they were in tatters. Most of the sandals are heavily worn in the heel area. Some are crudely patched with leather or other pieces of twined sandals, sometimes using fancy and expensive four strand braided cotton cord. The patching is always crude, never involves complicated reworking or reweaving, and suggests that the individuals who patched these sandals may not have actually been familiar with the techniques needed to make them.

(SLIDE Sandal Collections Research)

With help from Laurie Webster and Lynn Teague, I have compiled a dataset of almost 300 shaped-toe twined sandals from Pueblo II and III contexts, housed in collections at the museums throughout the country. Last fall, Dr. Webster and I conducted a pilot study examination of 75 twined sandals from the collections at the American Museum of Natural History. Most of the sandals we inspected were recovered by the Hyde Expedition in the late 1800s, or Earl Morris' excavations at Aztec West in the 1920s and 30s. With the addition of seven sandals I analyzed from SE Utah in collections at the Edge of the Cedars State Park Museum, and 32 sandals from photographs compiled by Lynn Teague and Dorothy Washburn, I was able to compile a preliminary dataset on 111 shaped-toe twined sandals from Bonito, Aztec West, and sites in Canyon del Muerto and southeastern Utah for this presentation.

(SLIDE of Bonito MAP w/ Sandal Occurrence)

At Bonito, 23 twined sandals were recovered from 12 rooms and a kiva that were constructed and occupied during the long and storied history of the pueblo between the late 800s and mid-1100s.

(SLIDE of AZTEC MAP w/ Sandal Occurrence)

Forty-one twined sandals were recovered from 15 rooms from Aztec West Ruin, including 32 from “Chacoan” deposits in the oldest rooms, in northeastern portion of the pueblo that were built between A.D. 1110 and 1120.

(SLIDE of AZTEC PIII SANDAL)

Two different sandals were also recovered from Pueblo III deposits in rooms in the northwestern part of the pueblo in Room 139.

(SLIDE Important Low Visibility Attributes of Sandals)

To understand the systemic contexts in which twined sandals functioned in the Chaco and post-Chaco eras, I am examining three scales of technological and emblematic style that are important for understanding how they were produced, distributed, and used. Tracking consistencies and variability in these attributes can help us understand aspects of twined sandal production because they can tell us about the nature of the communities of practice that made the sandals. By comparing technological to the more visible emblematic attributes of these sandals, we hope to determine whether the examples from the two great houses were made by the same communities of practice or whether weavers at Aztec were simply emulating sandal styles in use in Chaco Canyon.

(Slide of Bonito W/ BMIII Sandal)

One sandal from Room 111 at Pueblo Bonito shares many attributes of Basketmaker III sandals common in NE Arizona and has a round-toe and puckered heel. Room 111 was constructed sometime between about 860-935, and abandoned in the early-Pueblo II period, and this is the only known example of a Basketmaker III-like sandal from Bonito or Aztec.

(SLIDE: PRELIM LOW VIS ANALYSIS)

Initial analysis of the low visibility attributes of the rest of the sandal collections shows that there is a remarkable degree of homogeneity in the ways that these sandals were made across the region. Most of the sandals were made with plain weft-twining, but about ten were made with twill-twining, and several include slat-tapestry weaves. Raised tread designs were nearly ubiquitous in the plain weft-twined sandals, but was not achievable in the twill-twined sandals. Both of these rarer types of weaving allowed the incorporation of more complex colored geometric designs.

(HEEL Selvage Slide)

Heel selvages, were also only made in two main primary ways. Where present, more than half of the heel selvages used vertical warp wrapping, and the remainder were made using a variation of compact 2-strand weft-twining or weft-wrapping.

(SLIDE Tread Designs Variability)

The most variable attribute of the sandals from all parts of the region appears to be the diversity of the raised tread design layouts, especially from Bonito and Aztec, but even this diversity seems to follow certain themes, and seem to overlap greatly with datable pottery design styles. The variety of raised tread design motifs appearing at Bonito are more diverse than at

Aztec, but not by much. At Aztec, the most popular raised tread design motifs were concentrated in the older sections of the pueblo, but the overall trend at the site is still diversity.

(SLIDE Tread Designs Distribution)

In this preliminary stylistic analysis, I broke up the variety of raised tread designs into eight different layout groups and compared their frequencies to other attributes and between subregions and intra-site contexts where twined sandals have been recovered. The analysis gives an initial glimpse into the relationship of these design motifs between subregions. In terms of raised tread design diversity, the Bonito assemblage has a fairly even distribution. The Aztec assemblage is skewed by the dominance of sandals with the isolated shape and rectilinear scroll motifs, but still has a wide range of different categories of tread designs present in total. A variety of different raised treads design motifs also appear in the assemblages from the other subregions, but those with isolated shapes appear by far the most commonly (though in small frequencies) in all areas, but occur in higher quantities at Bonito and especially Aztec. The second most common style consisted of interlocking rectilinear scrolls (similar to stepped frets), is also particularly common at Aztec.

(SLIDE Intra-Site Patterns of Sandal Design Distribution)

Some interesting spatial relationships are also emerging from the data. For example, all but one of the sandals with the isolated shape motifs and all of the rectilinear interlocking scroll motifs at Aztec, came from a cluster of rooms in the older northeastern part of the site in deposits that Earl Morris called “Chacoan”. This suggests that at least at the time of their discard, there were strong associations between certain styles of tread design with specific areas of the pueblo, and by extension, the specific social groups who used these rooms and wore these styles of sandals in the Chaco era. So far, no similar patterns have revealed themselves in the Bonito assemblage, though the majority of the sandals have been recovered from rooms post-dating the A.D. 1050s, and used into the 1150s, making them roughly contemporaneous with the majority of sandals from Aztec.

(SLIDE: Dating the Sandals)

While none of the twined sandals discussed here have been dated absolutely, some indications of the dating of different sandal attributes can be gleaned by examining the physical context where the sandals were recovered and comparing the sandals and their decorative grammars to depictions in other datable media including rock art, murals, and pottery designs.

(SLIDE: Design Imagery in Other Media)

The raised treads on the bottoms of several sandals from Bonito have rows of stepped parallel lines, similar to those seen on early Pueblo II pottery designs and probably date to this period. Several of the raised design motifs from Bonito and Aztec, are remarkably similar to Pueblo II and III painted pottery decoration styles, including the preoccupation with triangles and diamonds and “dripping line” motifs.

(SLIDE: BONITO Sandals and Sandal Imagery Provenience)

Bonito contains two rooms with incised plaster mural depictions of twined sandals. Room 33 was built sometime in the late 800s or early 900s and was reused over the course of the pueblo’s history. Room 251, however, was likely built sometime after A.D. 1050, and continued

to be used into the mid 1100s. These dates provide a range within which the incised sandal designs with dripping line motifs were likely created. To date, no sandal depictions in wall plaster or rock art have been identified at Aztec.

(SLIDE AZTEC Rectilinear Scrolls Motif)

At Aztec in particular, sandals with interlocking rectilinear scrolls are the second most common raised tread design motifs. These interlocking rectilinear scrolls on the bottoms of the sandals were comprised of bands of dashed lines that appear very similar to Chaco-style hatched designs on cylinder jars, bowls, pitchers, and other vessels carrying the Chaco design repertoire. In fact, these designs appear to compare most closely with other materials at Salmon Pueblo and Aztec that Dorothy Washburn suggests were a more simplified local Middle San Juan version of the Chaco design repertoire that developed in the area during Chaco's florescence.

(SLIDE-Diagonally Oriented Raised Tread Design Distribution)

Sandal tread motifs from the Pueblo III period seem to follow different design frameworks, but use design styles common on McElmo style pottery, with thick diagonally oriented raised tread design elements and motifs. Even though examples of these sandals are rare at Bonito and Aztec, they were very common in southeastern Utah.

(SE UTAH SANDAL SLIDE)

Recently, I compiled a dataset of over 450 depictions of sandals in rock art panels and building murals in southeastern Utah, many of which are presumed to depict shaped-toe twined sandals with toe-jogs. Tree-ring dating of the roofs and intramural beams of over a dozen kivas and habitation rooms with sandal images in this area, indicate that the buildings with sandal imagery were built, decorated, and remodeled in the early-mid 1200s.

(SLIDE: Discussion)

The overall trends in the data are interesting. Both the high and low visibility attributes appear to show a high degree of similarity across the region, particularly from the Bonito and Aztec. The shape and presence of toe-jogs in particular, are very consistent over time and space, but may have been made in different ways. With a few exceptions, shape, color schemes, and the presence of toe-jogs were virtually identical at both Bonito and Aztec, and only sandals at these two sites have toe and heel ties made of braided cotton cord, and only two sandals made entirely with cotton weft yarns are from Bonito.

The remarkable similarities within and between the twined sandal collections from Bonito and Aztec, reiterate the very close connection between these sites. Since both Bonito and Aztec had similar roles as regional gathering places and civic-ceremonial centers, it should not surprise us that similar activities took place at both sites. The level of their similarity, however, suggests even closer ties between these two central great houses, supporting Laurie Webster's findings that "Chacoan leaders and members of particular religious societies" came to Aztec West in the early A.D. 1100s "with their ceremonies and paraphernalia in tow" (Webster 2011:165). Given the remarkable similarity between the Bonito and Aztec assemblages, it seems likely that these sandals were one of the ways that segments of these societies identified themselves, at least in certain contexts. Thus, not only were individuals and groups from Chaco present and influential at Aztec, but they also wore the same types of footwear and preformed similar actions with them.

This situation appears to support a scenario where some communities who periodically visited Bonito and Aztec may have used the sandals to distinguish themselves from other one another, participated in the Chaco regional system through inclusion of toe-jogs, and signaled their participation in regional traditions of twined sandal use harking back to Basketmaker times.

References in Text:

Crown, Patricia L., Kerriann Marden, and Hannah V. Mattson

2016 Foot Notes: The Social Implications of Polydactyly and Foot-Related Imagery at Pueblo Bonito, Chaco Canyon. *American Antiquity* 81(3): 426–448.

Hays-Gilpin, Kelley

1998 Prologue: The Anthropology of Dress. In *Prehistoric sandals from northeastern Arizona: the Earl H. Morris and Ann Axtell Morris research*, edited by Kelley Hays-Gilpin, Ann Cordy Deegan, and Elizabeth Ann Morris, pp. 1–14. Anthropological papers of the University of Arizona No. 62. University of Arizona Press, Tucson.

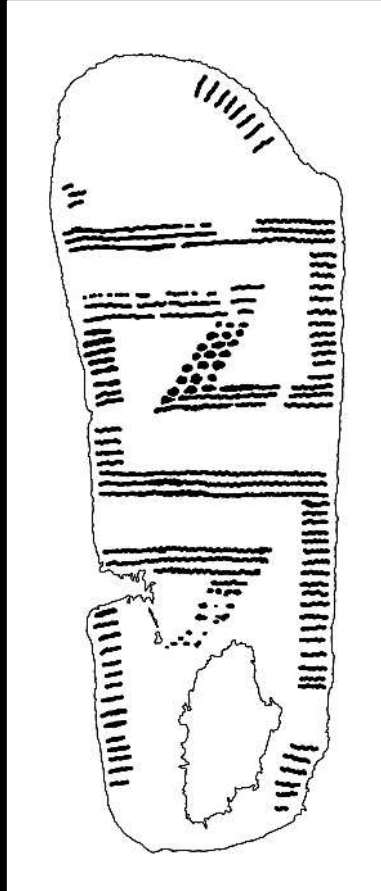
Kennett, Douglas J., Stephen Plog, Richard J. George, Brendan J. Culleton, Adam S. Watson, Pontus Skoglund, Nadin Rohland, Swapan Mallick, Kristin Stewardson, Logan Kistler, Steven A. LeBlanc, Peter M. Whiteley, David Reich, and George H. Perry

2017 Archaeogenomic Evidence Reveals Prehistoric Matrilineal Dynasty. *Nature Communications* 8: 14115.

Sandals from the Center Place, Footprints on the Pots: Continuity and Change in Twined Sandal Tread Designs from Chaco, Aztec, and Beyond

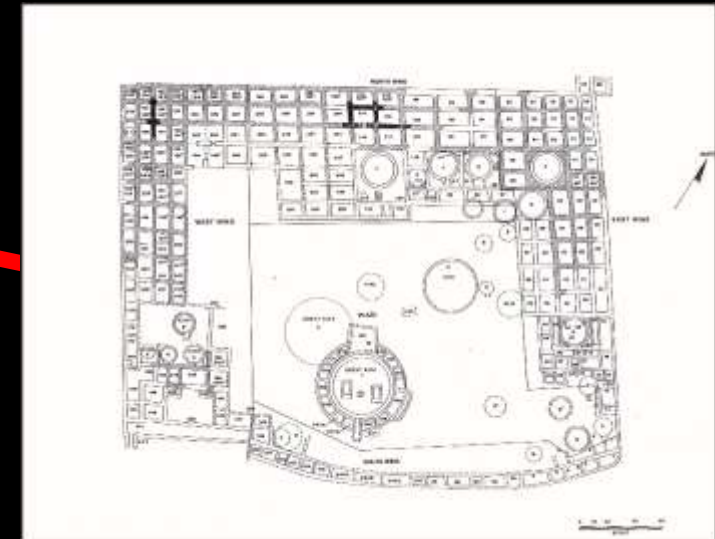
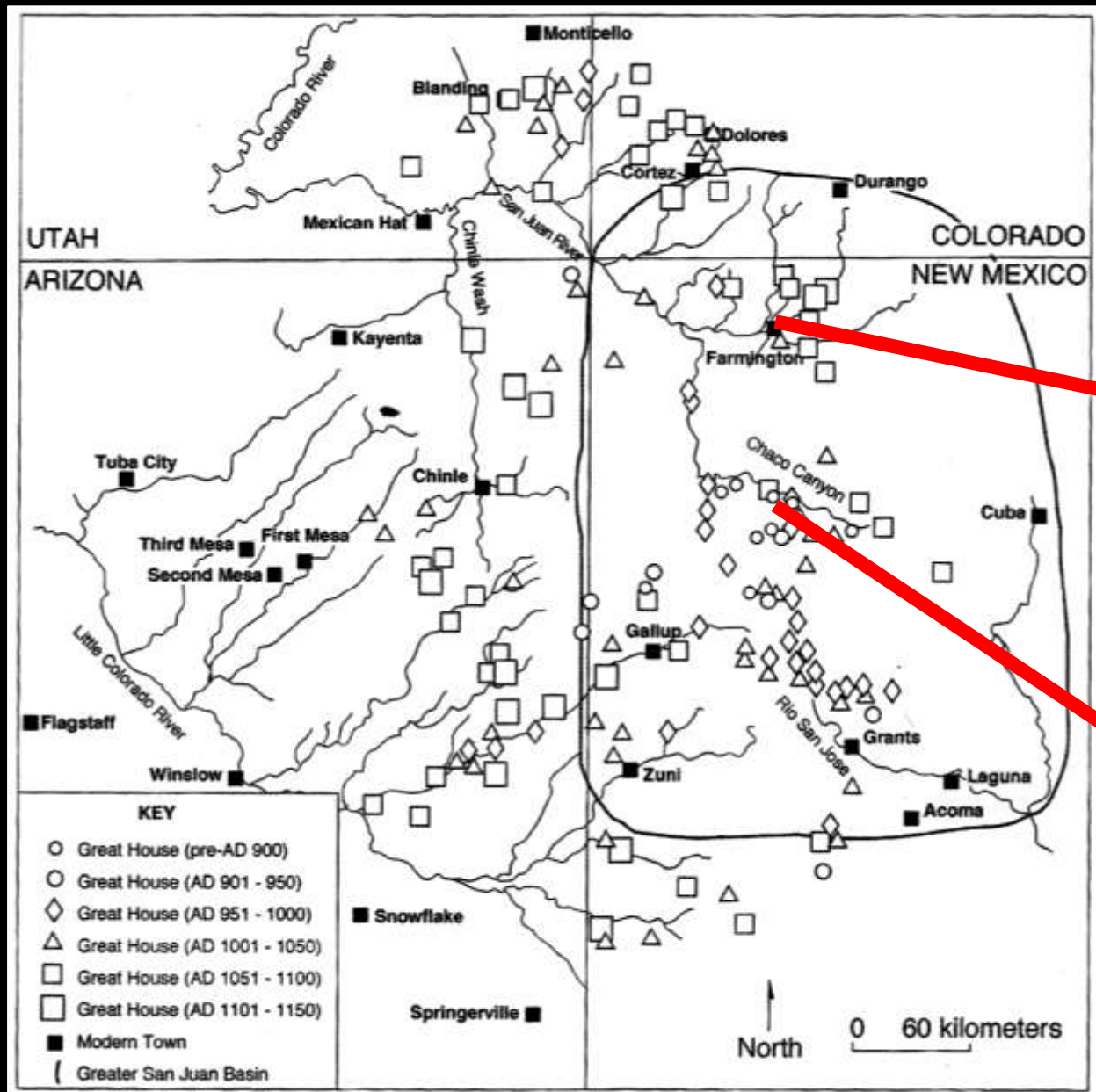
By Benjamin A. Bellorado, M.A.

University of Arizona

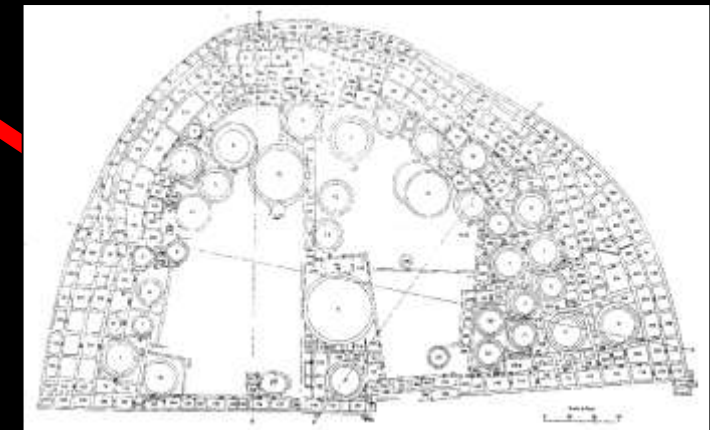


COLLEGE OF SOCIAL & BEHAVIORAL SCIENCES
School of Anthropology

Pueblo Bonito, Aztec, and the Chaco Regional System

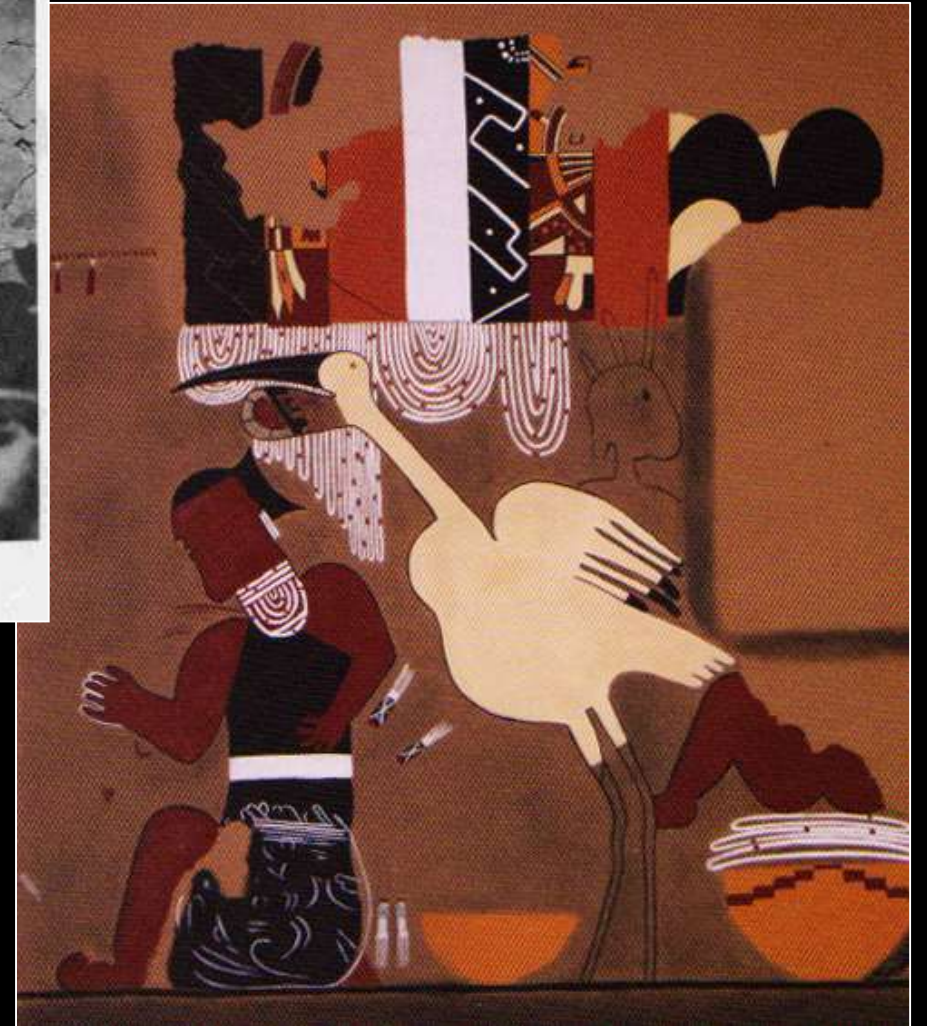


Aztec West



Pueblo Bonito

Clothing and Social Identities



History of Twined Sandals in the Northern Southwest



**Fringe Toe-
Square Heel
BMII**



**Scalloped Toe-
Puckered Heel,
Late BMIII**



**Round Toe-
Puckered Heel,
Late BMIII/PI**



**Shaped/Jog-Toe-
Cupped Heel
PII**



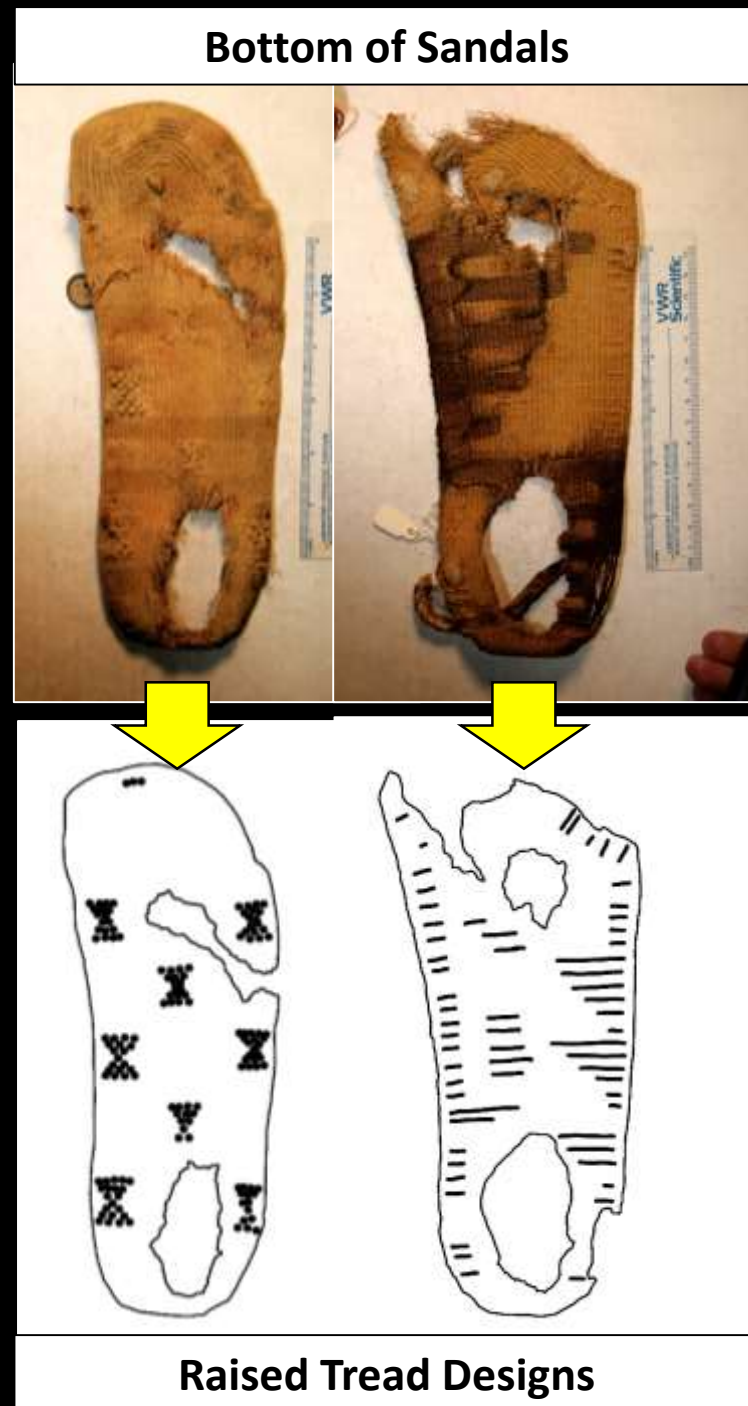
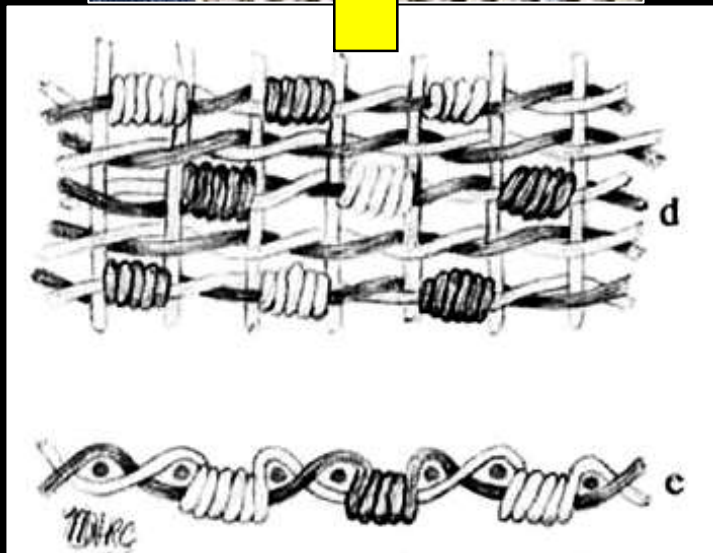
**Shaped/Jog-Toe-
Cupped Heel
PIII**

Time

Raised Tread Designs and Stamps of Identity



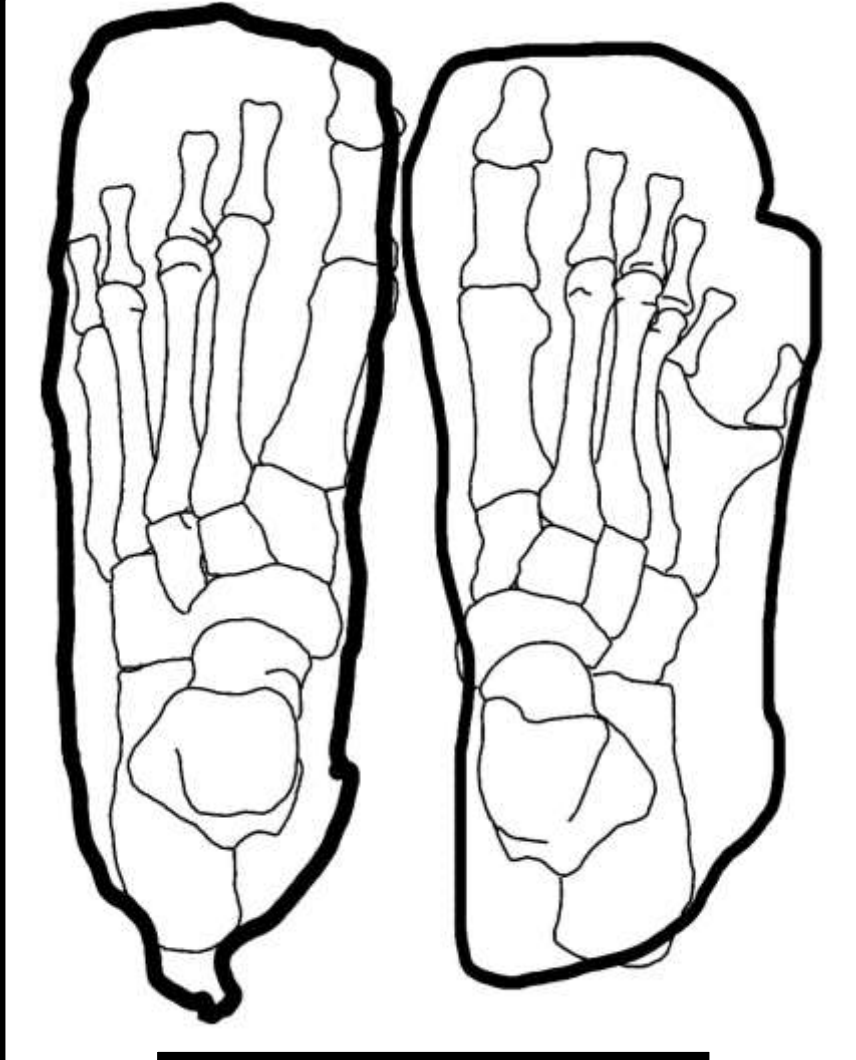
A Modern Example of Sandals that Leave Distinctive Footprints



Bottom of Sandals

Raised Tread Designs

Twined Sandals, Toe-Jogs, and Polydactyly



Crown et al. 2016: Fig. 9b



Twined Sandal Wear and Repair



Bottom



Bottom



Bottom

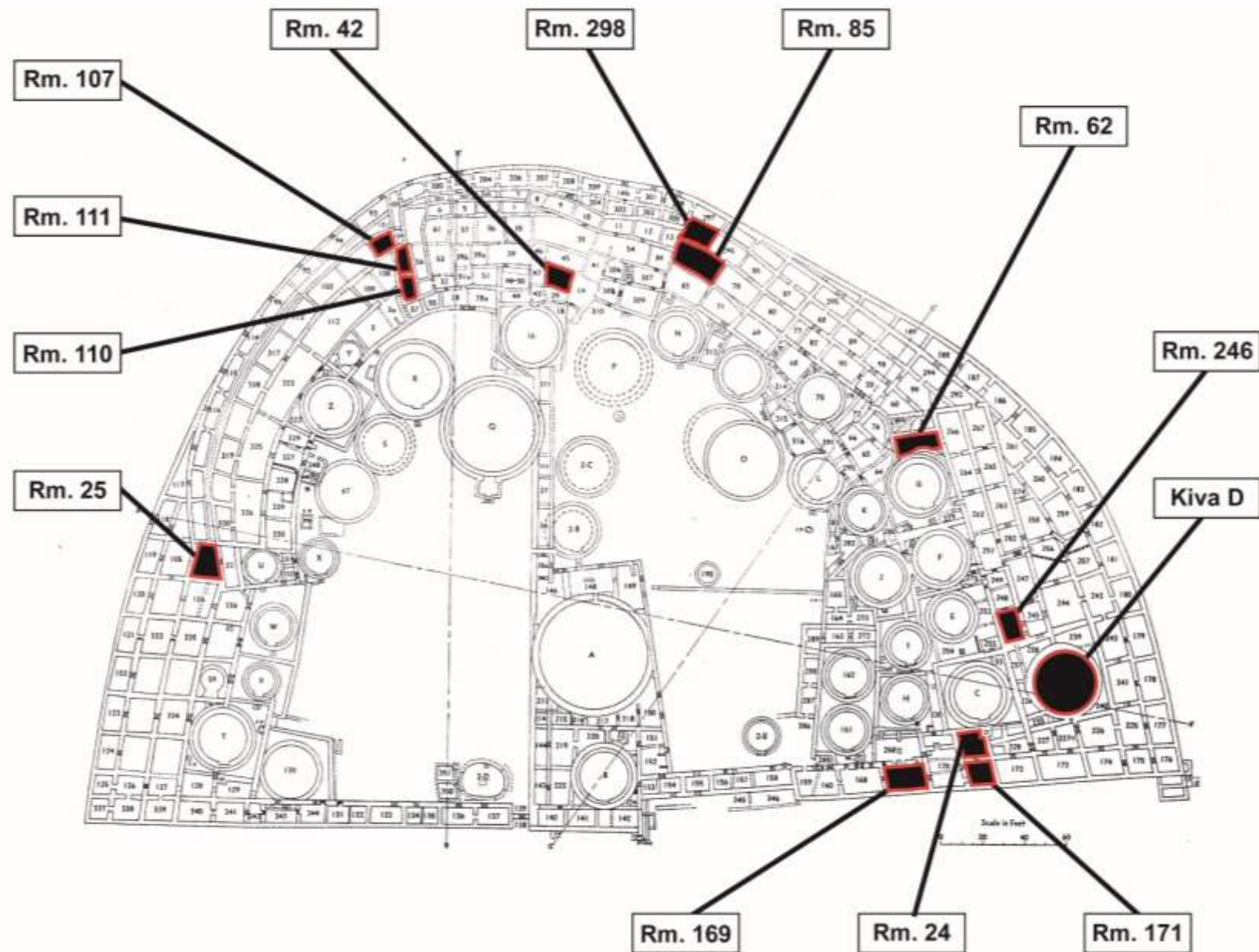


Top

Collections Research

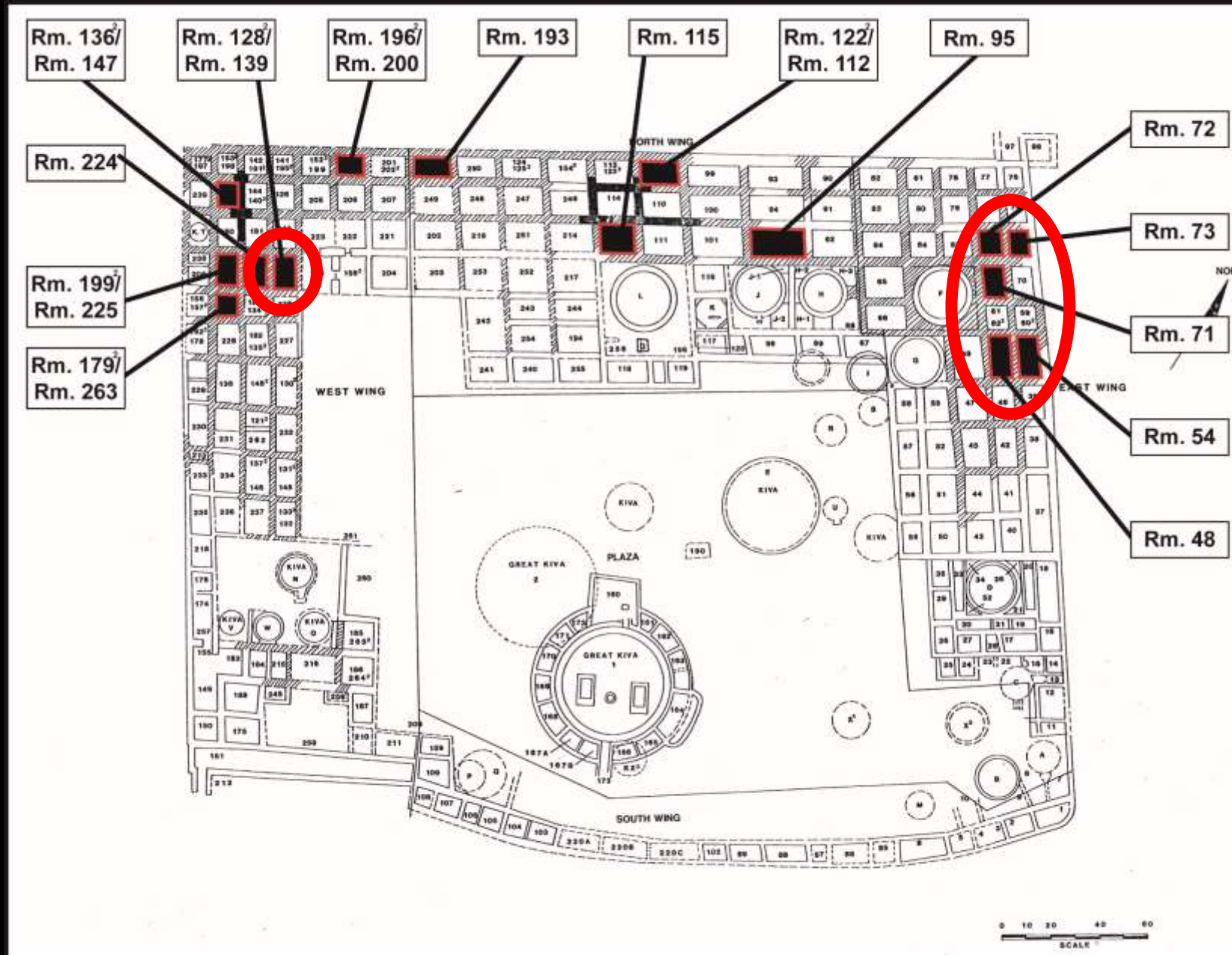
- ~300 Pueblo II & III Shaped-Toe Twined (aka “Cloth”) Sandals
- Dr. Webster and I visited collections at AMNH
 - Documentation of 75 sandals
- 7 sandals from EOC
- 32 from Teague and Washburn (2012)
- Documentation of Low, Mid-level, and High Visibility Sandal Attributes





Twined Sandals from Pueblo Bonito

- 23 recovered by Pepper and Judd
- 12 Rooms and a Kiva with twined sandals

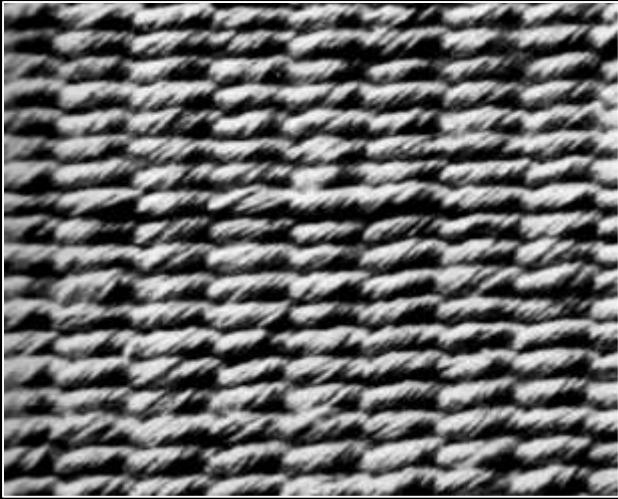


Twined Sandals from Aztec West

- Recovered from 15 rooms
- 41 recovered by Earl Morris's and Boundy's excavations
- 32 from "Chaco" deposits in cluster of 5 rooms in oldest NE wing
- 2 from Pueblo III "Mesa Verdean" deposits in room 139

Important Low, Mid-Level, and High Visibility Attributes of PII/III Twined Sandals

Low Visibility



Weave Structure

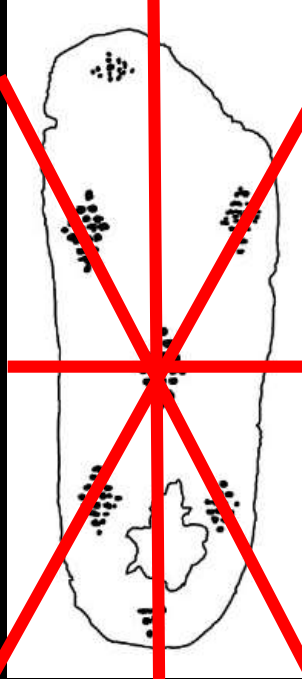


Heel Finish

Mid-Level Visibility



Design Elements



Design Symmetry

High Visibility



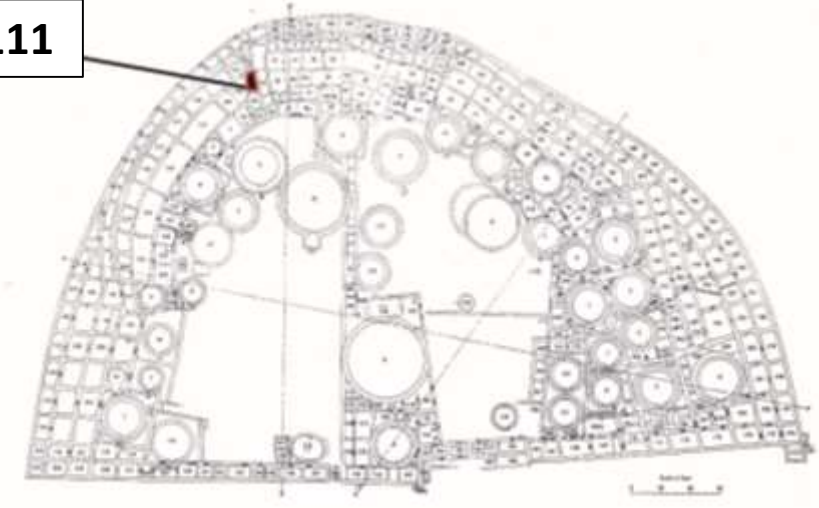
Color & Shape



Toe-Loop Strap Composition

Round-Toe Puckered Heel Sandals

Room 111



Top



Bottom

Antelope House Area



Top

Bottom

Pueblo Bonito, Rm. 111

- One round toe-puckered heel found in Room 111, Pueblo Bonito
- Early part of the pueblo built between A.D. 850-935, abandoned in 900s or 1000s
- Room used into
- Common in Late Basketmaker III Period
- Common to NE Arizona



Plain Weave or Simple
Weft-Twining



Twill-Twining



Slat-Tapestry

Trends in Low Visibility Attributes

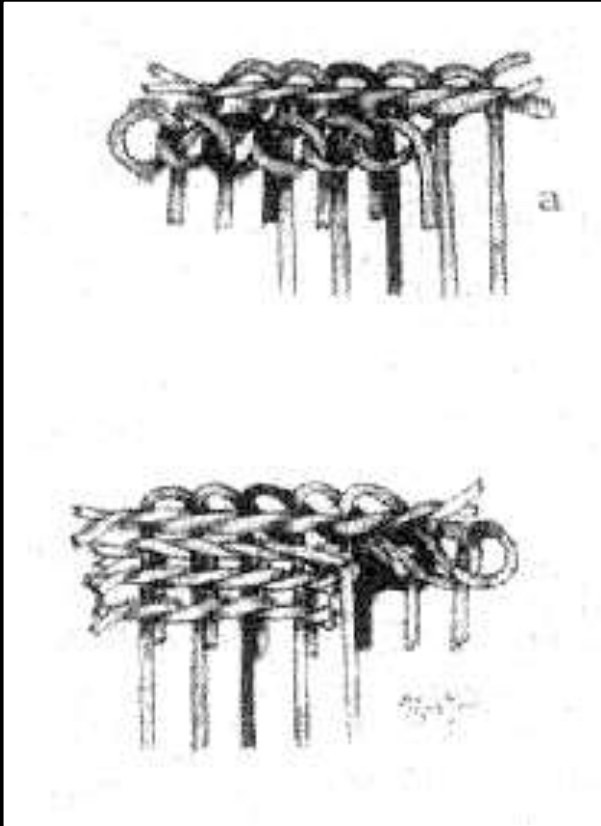
Exterior



Interior



Square Heel Finishing-
Vertical Warp Wrapping

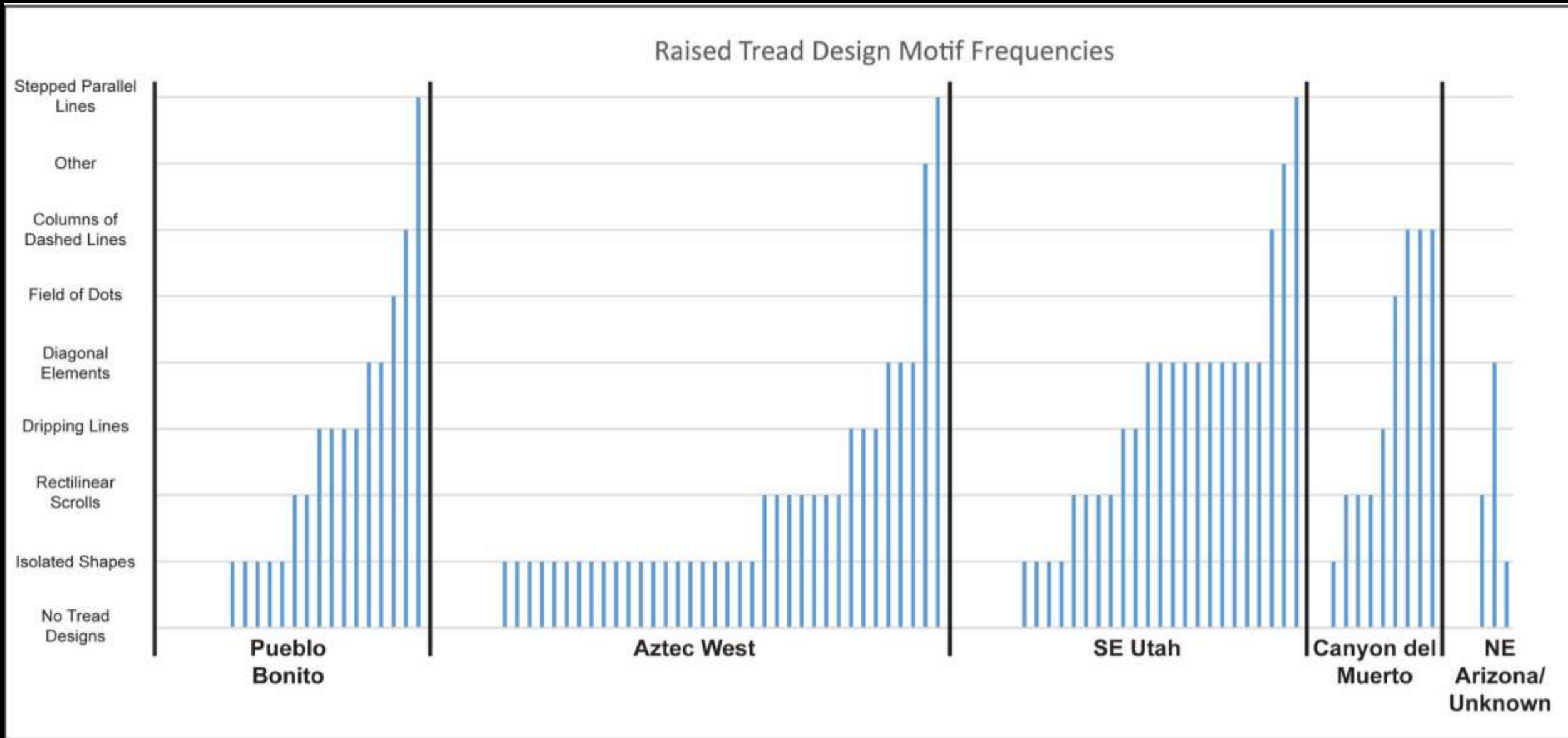


Cupped Heel Finishing-Horizontal
Weft Wrapping and Weft Twining
(Four different versions)

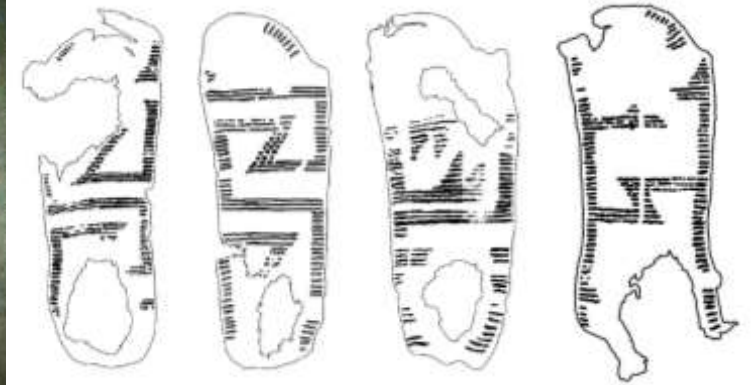
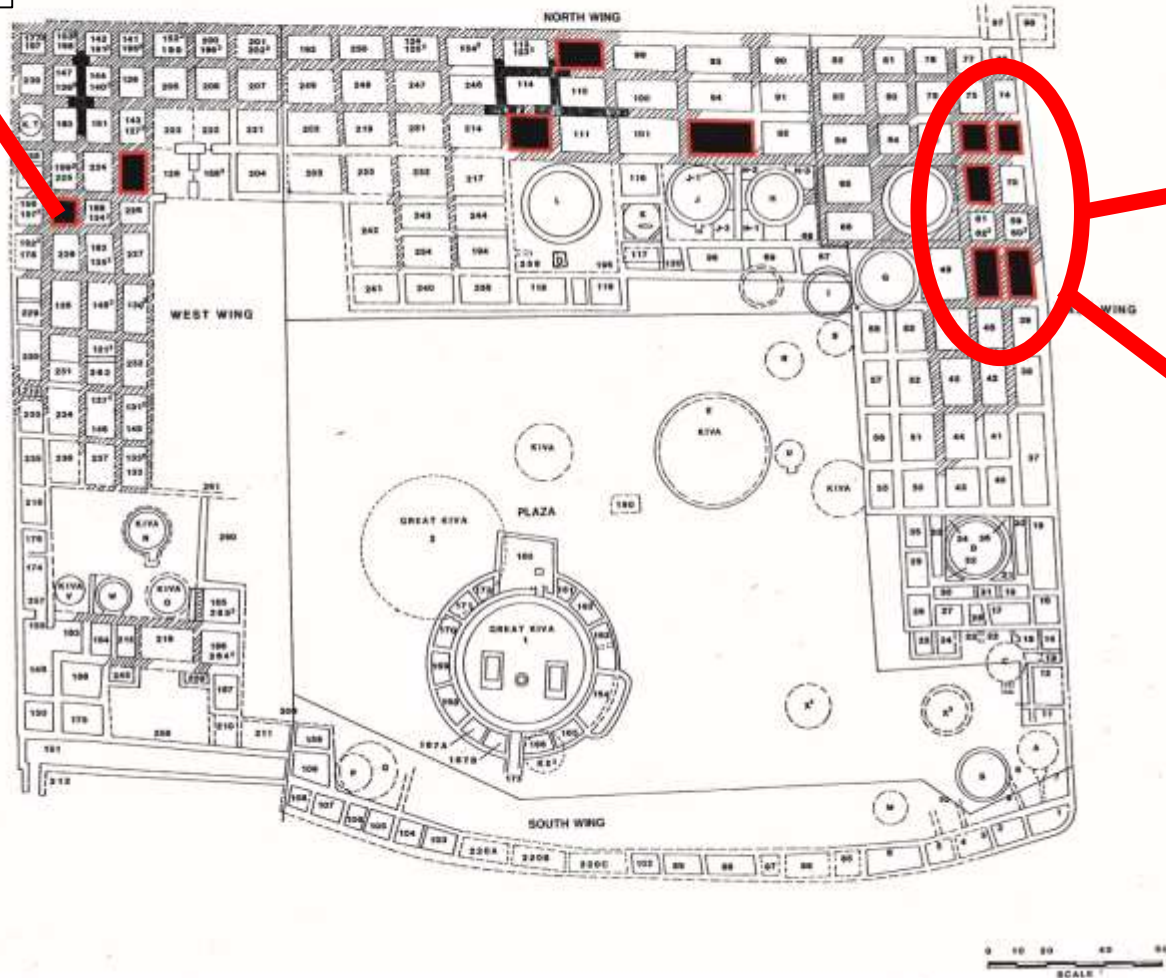
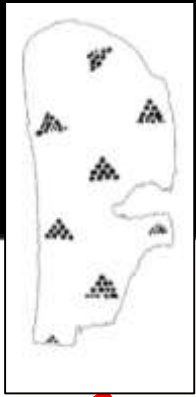
Raised Tread Design Variability (A Sample)



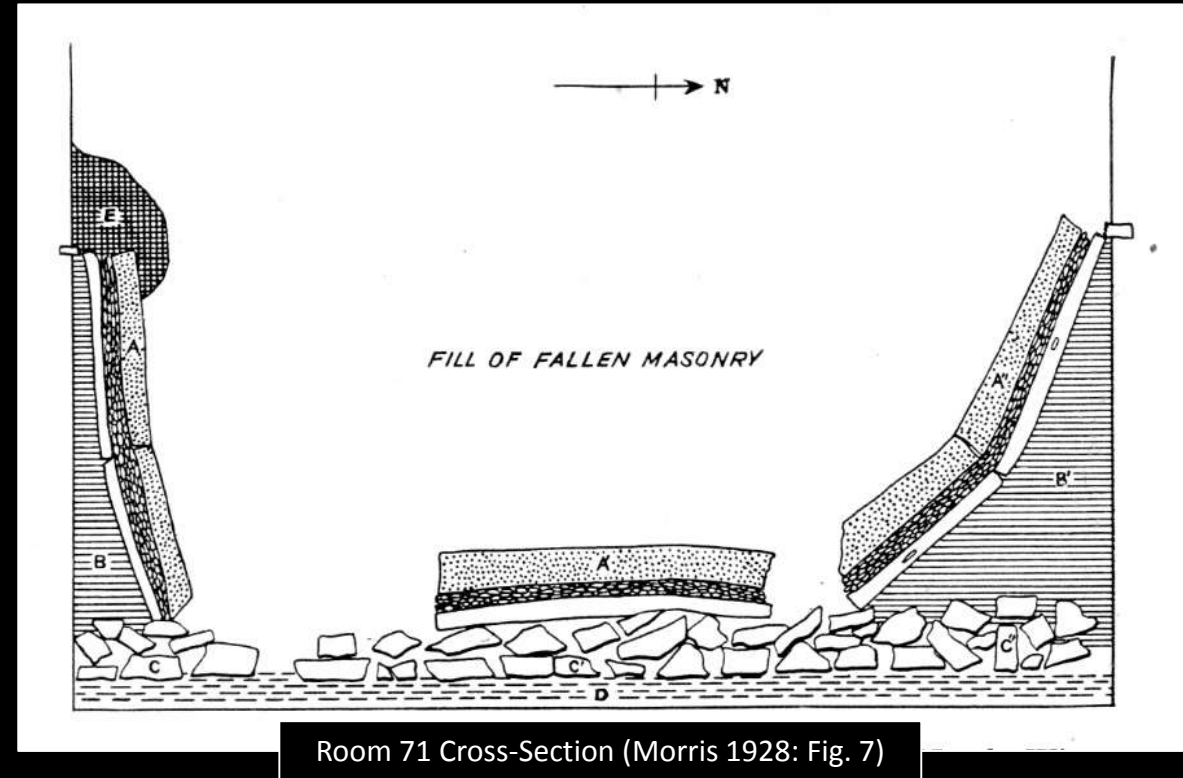
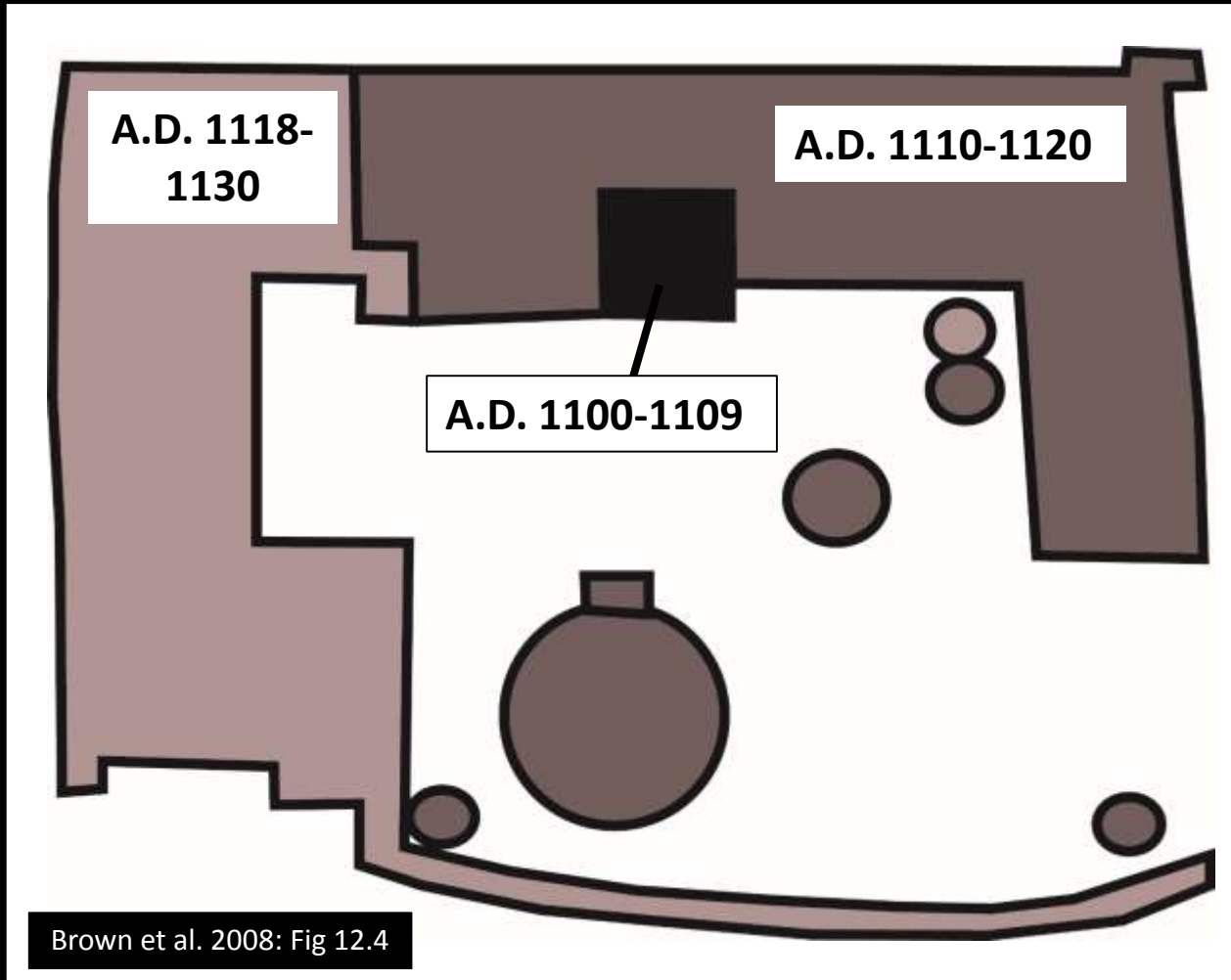
Trends in Raised Tread Design Motif Frequencies in the Region



Spatial Distributions of the Most Common Raised Tread Motifs at Aztec

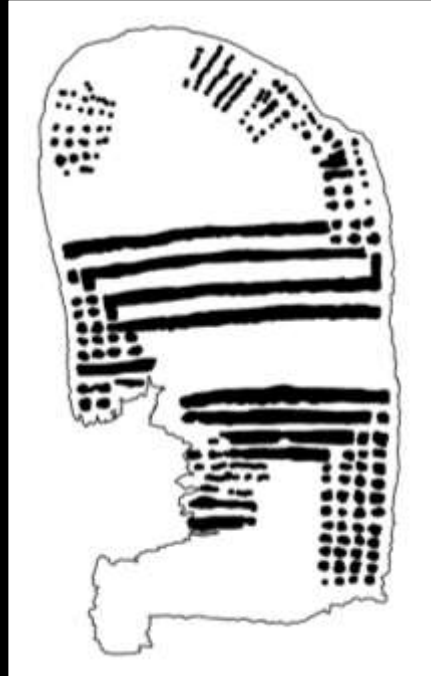
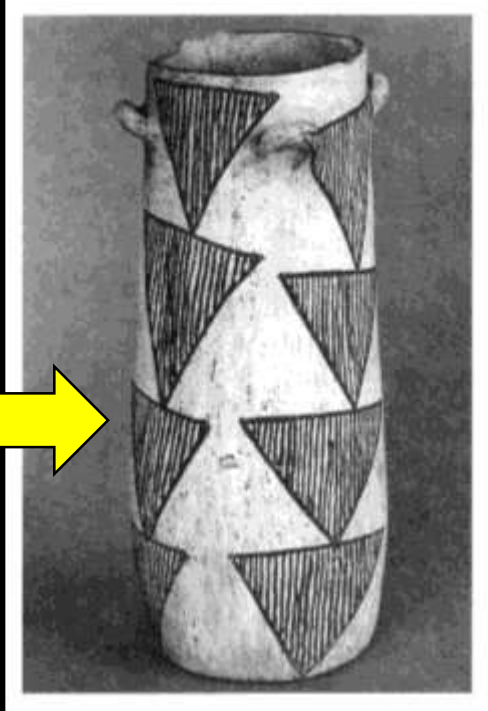
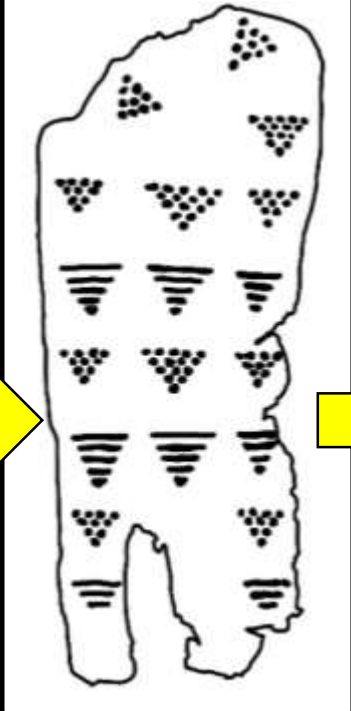


Contextual Dating of Sandals at Aztec West



- Most twined sandals recovered older section of pueblo
- Most recovered from “Chacoan” refuse deposits

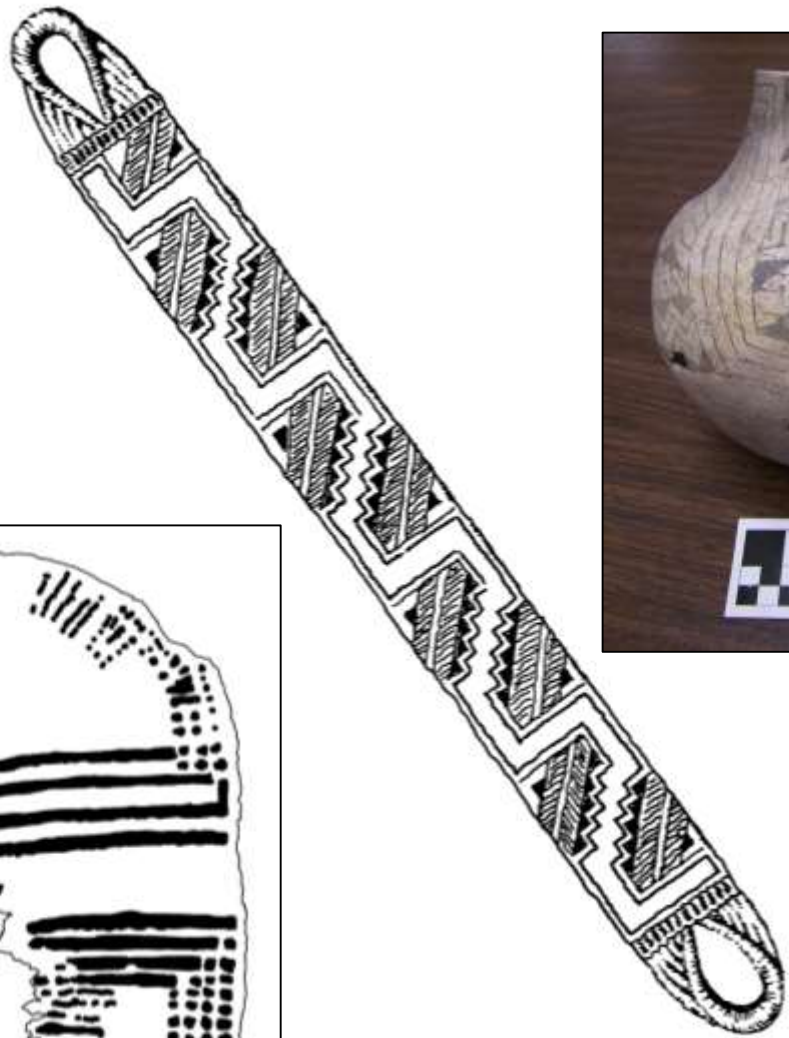
Cross-Media Motif Analysis



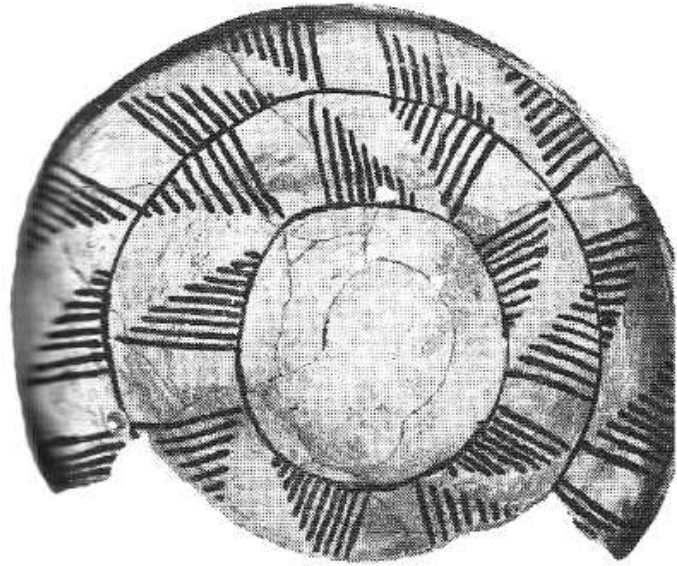
Aztec Ruins Twined
Sandal-AZRU 956.1 & 2

Cylinder Jar-
Pueblo Bonito Room 28

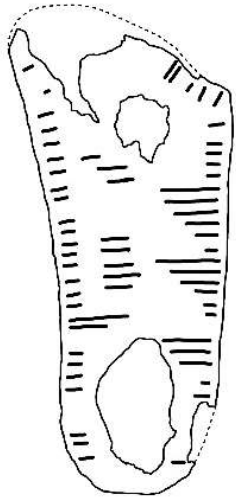
Painted Tumpband (Pueblo I)



Dripping-Line Motif



Rm. 111

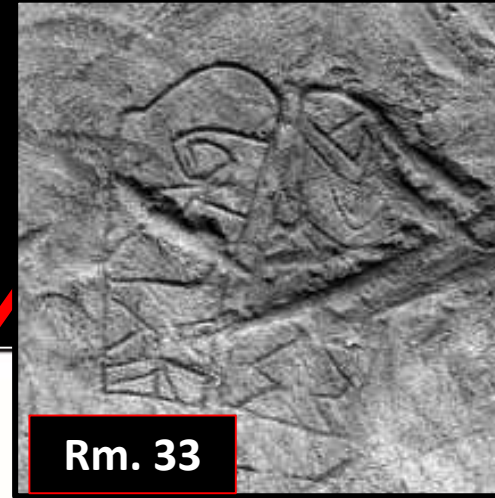


Rm. 25

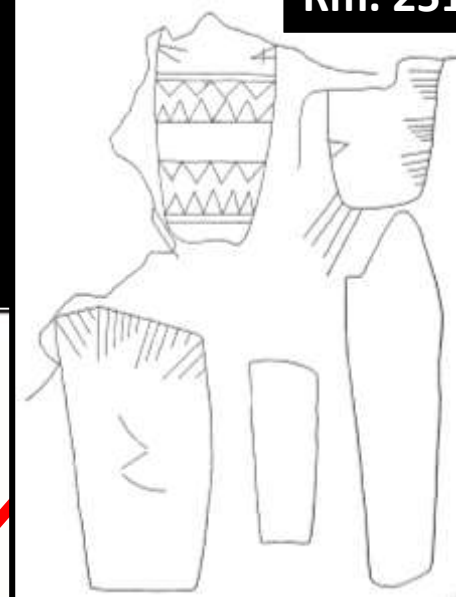


Sandals and Sandal Imagery at Bonito

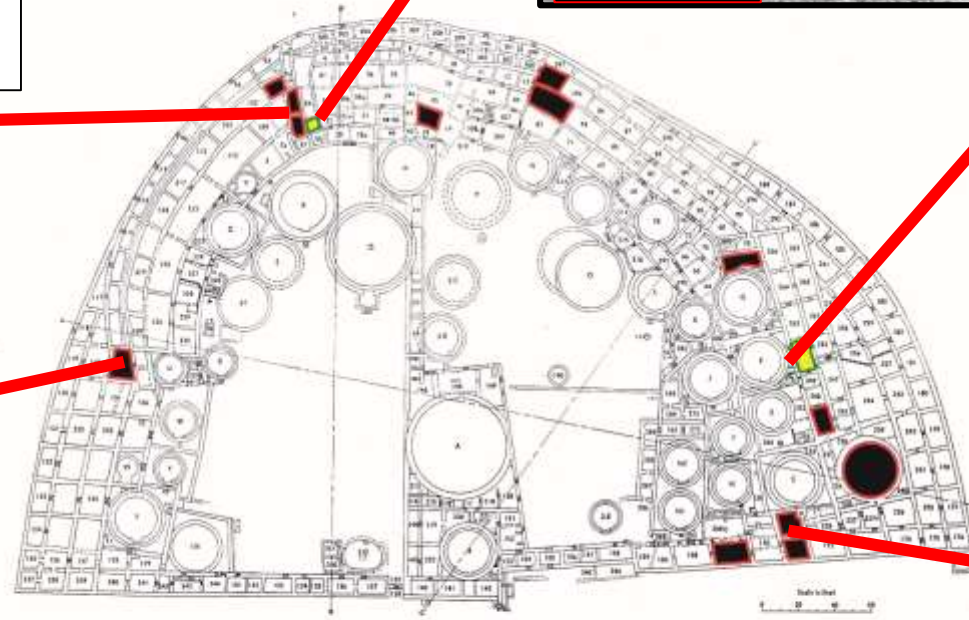
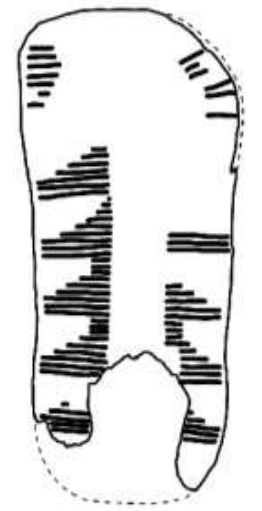
Rm. 33



Rm. 251

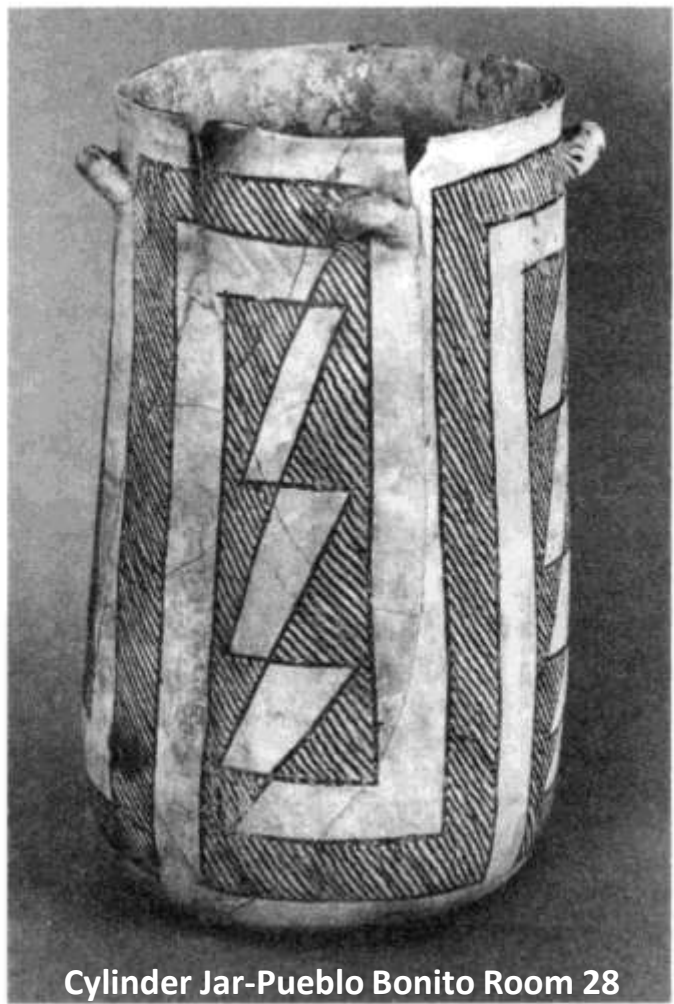


Rm. 24

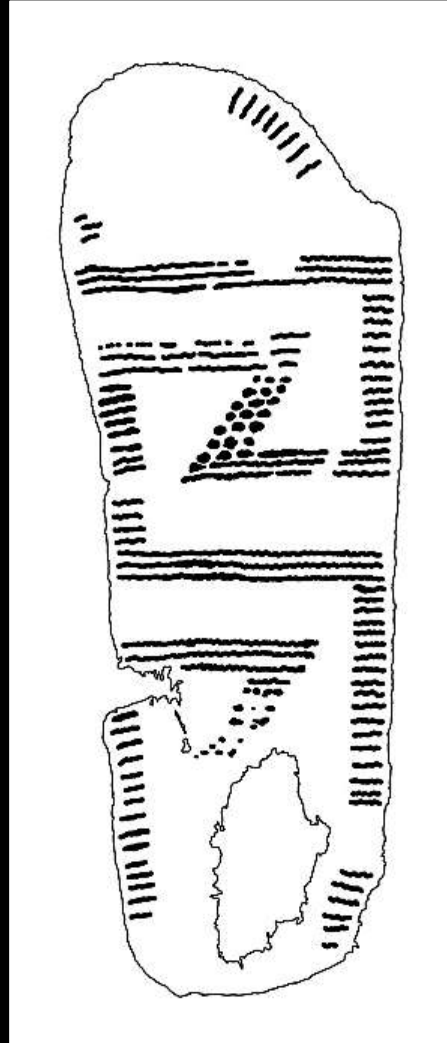


Base Map from Stein et al, 2003: Figure 4.6

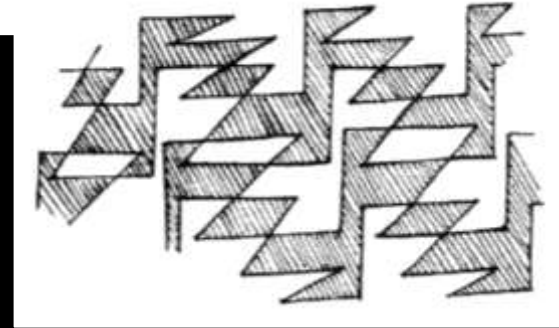
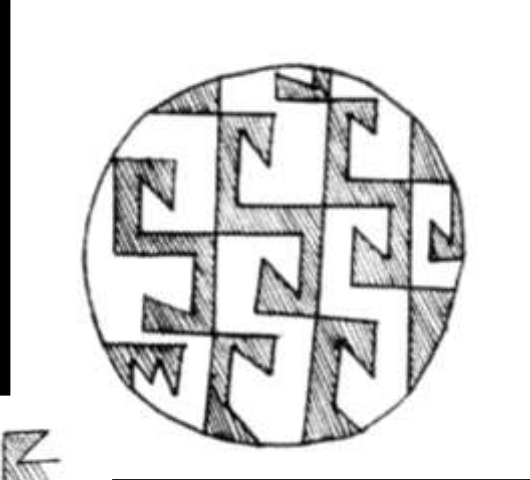
Rectilinear Scrolls Motifs and Chaco Cylinder Vessels



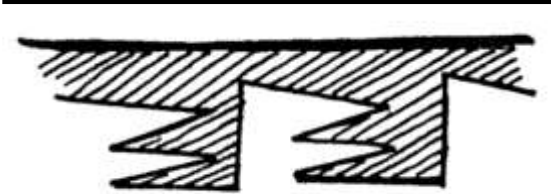
Cylinder Jar-Pueblo Bonito Room 28



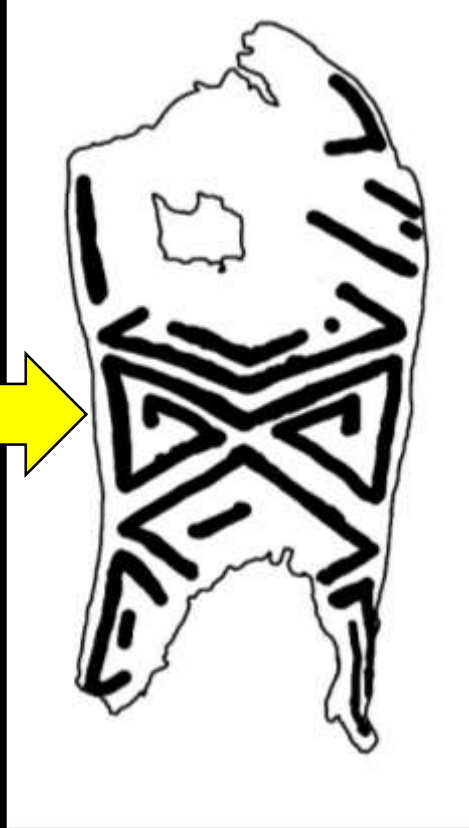
Chaco Style Design Repertoire



Local San Juan "Simplified" Version of Chaco Style

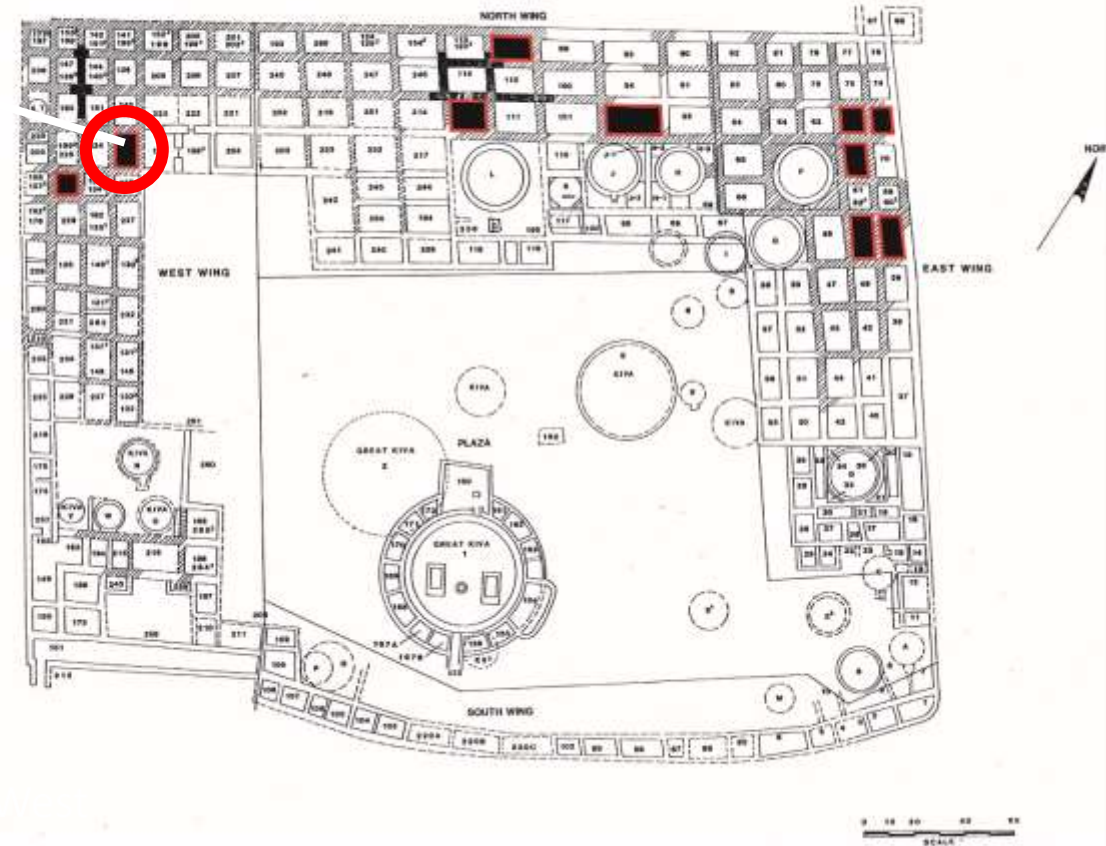


Sandals Pueblo III Components at Aztec West



AMNH-29.0/2455, Bottom surface

Room 139

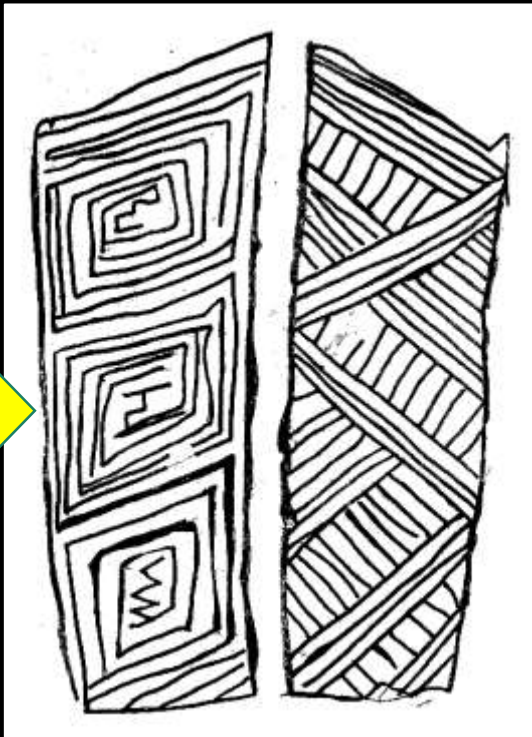


- 1st story room built during Stage III const. (1118-1125/1130) (Brown et al. 2008: Figure 12.4)
- Recovered from “Mesa Verde Refuse” (i.e. Pueblo III component)
- Diagonally oriented triangular scrolls, massive wrapping of wefts (i.e. Pueblo III)

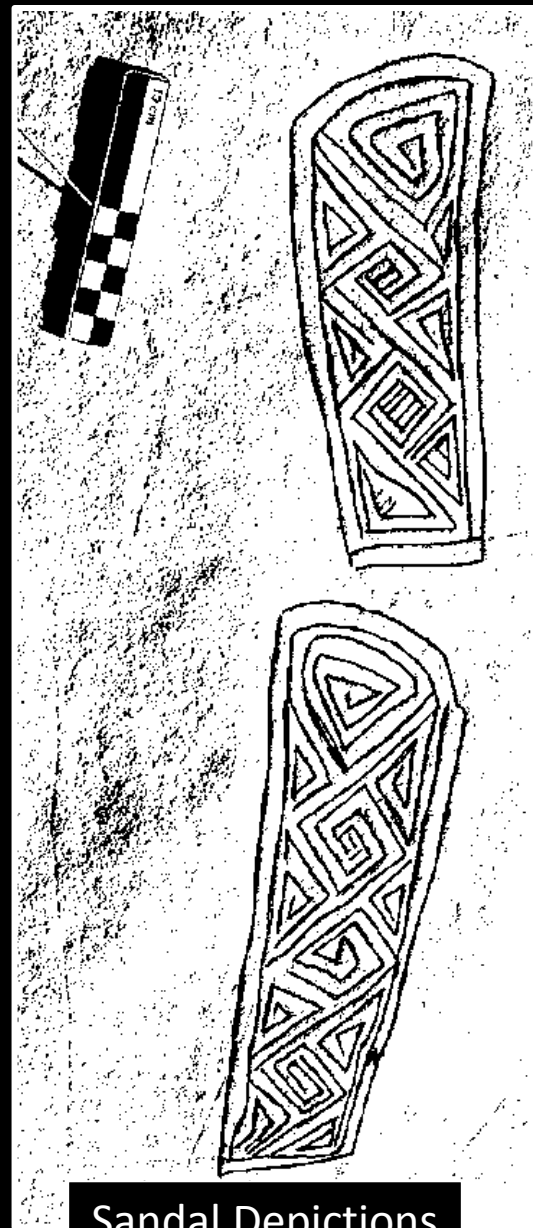
SE Utah Sandals and Post-Chaco Sandal Imagery



Incised Sandals, Kiva Mural (Str-14), 42SA6965, Natural
Bridges Nat. Mon., Utah

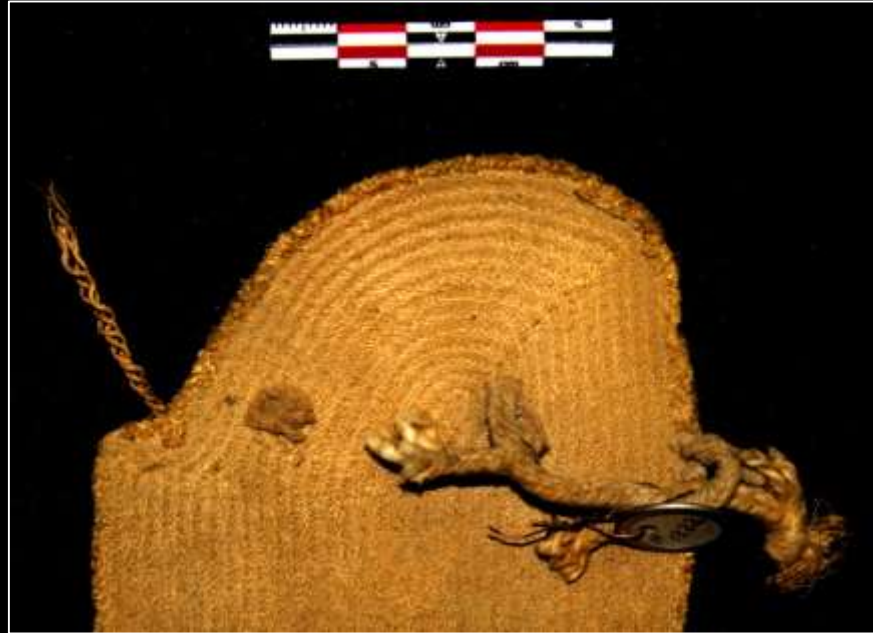


Grand Gulch or Glen Canyon,
Utah, AMNH H/3945



Sandal Depictions
in Rock Art

Discussion

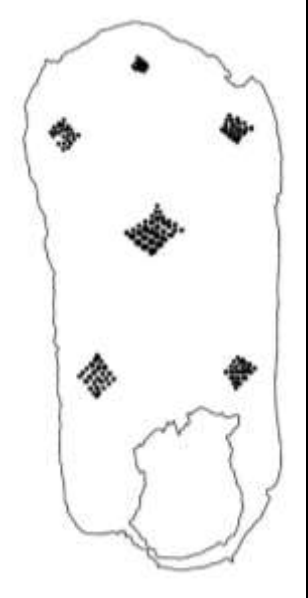


Four-Ply Square-Braid Cotton Cord Double
Toe Loop Straps

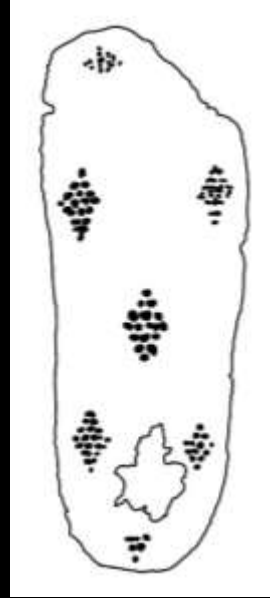
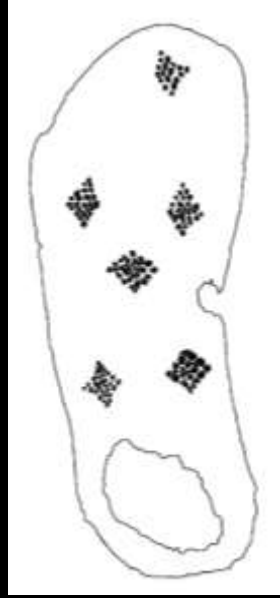
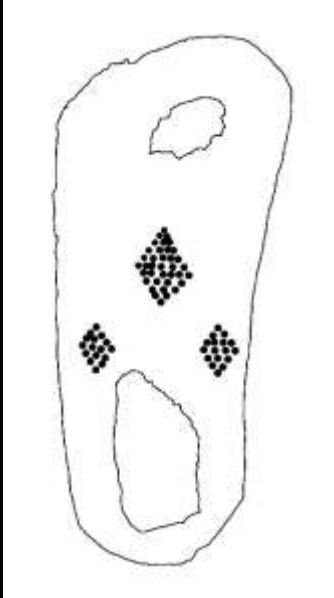


Sandal With Died
Cotton Wefts

Conclusion

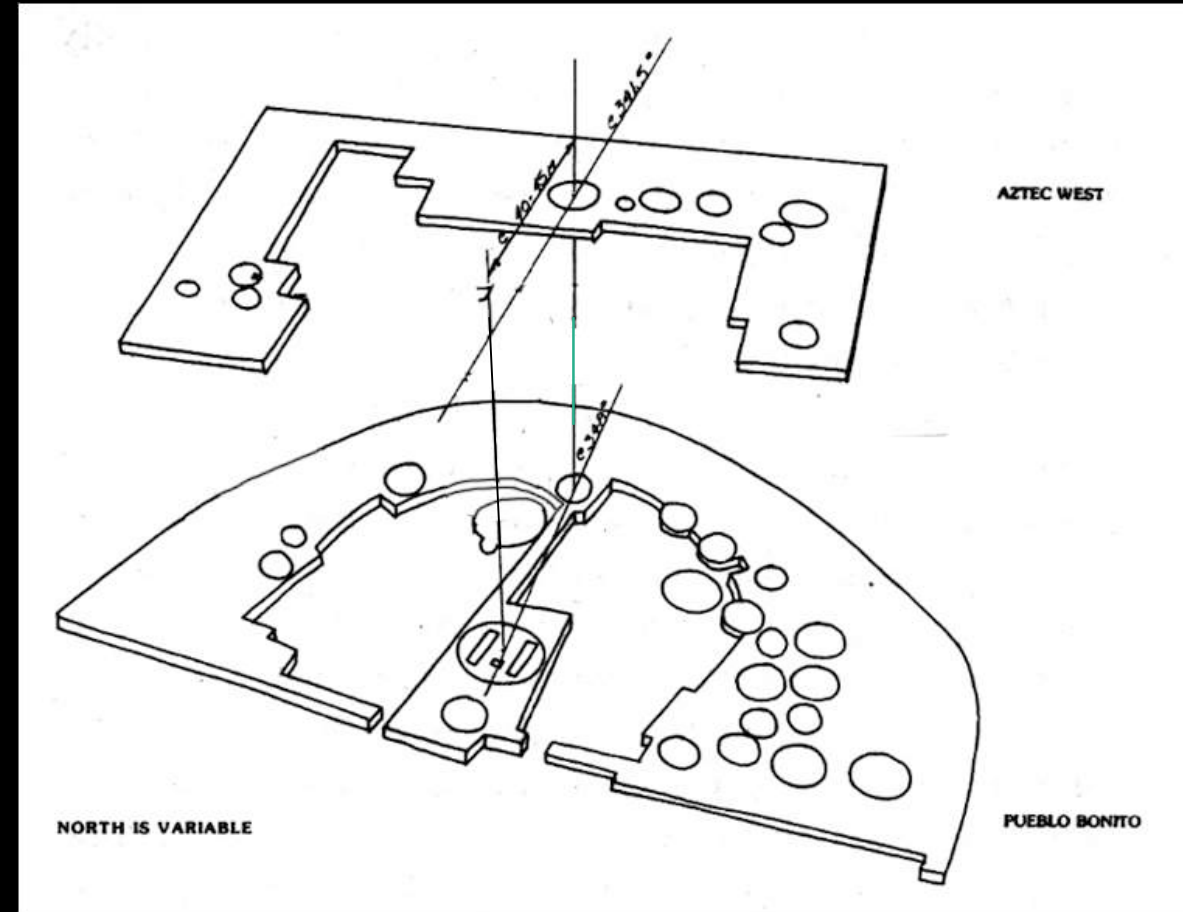


Pueblo Bonito



Aztec West

“Chacoan leaders and members of particular religious societies” came to Aztec West in the early A.D. 1100s “with their ceremonies and paraphernalia in tow” (Webster 2011:165).



Thank You

I would like to thank:

- Erin Baxter, Kyle, and Steve
- Laurie Webster
- Lynn Teague and Dorothy Washburn
- Jonathan Till and the staff of the Edge of the Cedars State Park
- Anibal Rodriguez and the staff of the American Museum of Natural History
- Barbara Mills, Ron Towner, E. Charles Adams, and TJ Ferguson
- Monticello Field Office of the BLM
- Canyonlands Natural History Association
- Grants and scholarships from the University of Arizona School of Anthropology and Laboratory of Tree-Ring Research
- Travel grants to the SAAs from the Arizona Archaeological and Historical Society
- Many friends and volunteers who have helped me over the years!

