

COLORED WASHES AND CULTURAL MEANING AT THE MONTEZUMA CASTLE CLIFF DWELLING AND CASA GRANDE GREAT HOUSE

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ABSTRACT

Colored earthen washes are the primary form of wall decoration at the Montezuma Castle cliff dwelling (AZ O:5:14 [ASM]) and the Casa Grande great house (AZ AA:02:14 [ASM]). This paper explores the possible meaning of colored washes at both sites using an interdisciplinary approach incorporating architectural analysis, archaeology, and Native American oral histories. Yellow washes at Montezuma Castle, and red micaceous earth and gypsum washes at Casa Grande are compared with other objects in the archaeological record, particularly ceramics, to investigate visual symbolism. Additionally, the intended audiences for these washes are considered by investigating concepts of physical and visual access. Taken together, this approach provides an interesting perspective on the aesthetic preferences of past people and the possible cultural meaning associated with colored washes at both sites.

In this paper, we briefly discuss the recent identification and characterization of earthen plasters and colored washes at two sites in Arizona -- the Montezuma Castle cliff dwelling (AZ O:5:14 [ASM]) and the Casa Grande great house (AZ AA:02:14 [ASM]) (Figure 1). The use of various colored earthen washes constitutes one of the principal forms of plaster embellishment at each site, and provides information about the past. As Cameron (1999:12) noted, "cultural ideals and values are encoded in vernacular buildings."¹ To that end, this paper attempts to decode visual symbolism associated with yellow earthen washes at Montezuma Castle and washes of red micaceous earth and gypsum at Casa Grande using an interdisciplinary approach that includes architectural analysis, archaeology, and Native American traditional knowledge.

We hypothesize that these yellow and red micaceous earth and gypsum washes are indicators of ideological concepts relating to water and fertility symbolism. First, we investigate the aesthetics of each wash (Munson 2011). Each wash is conceptually related to other

objects in the archaeological record and is assumed to represent an aesthetic preference with deep-rooted cultural meanings. We rely heavily on past archaeological studies investigating the visual symbolism of ceramics and other objects to compare possible meanings associated with the color yellow, as well as visual effects created by micaceous and burnished materials. We draw on information from Native American oral histories to strengthen these interpretations. Second, we discuss the intended audiences and access to each wash (Munson 2011). That is, who had visual or physical access to the rooms with earthen washes? To do this, we briefly discuss the physical location of each earthen wash and the ways in which visual or physical access may have been restricted or controlled. Taken together, this information provides an interesting and unique perspective on the possible symbolism and function of earthen washes at each site.

WALL PLASTER DATA AND ANALYTICAL TECHNIQUES

Previous archaeological studies of wall plasters have focused on the iconography of painted and incised murals, but relatively little attention has been given to the cultural significance of plaster washes. For example, studies of Pueblo III period (AD 1150–1325) wall paintings in the Four Corners area and Rio Grande Valley focus on the placement of monochrome and bichrome color fields and geometric patterns as well as the related experience of the viewer (Brody 1991; Chapman 1938; Cole 2006; Meyers 2012; Munson 2011; Newsome and Hays-Gilpin 2012; Schaafsma 2007; Smith 1952). Intricately painted murals dating to the Pueblo IV period (AD 1325–1680) have been studied in greater detail (Brody 1991; Crotty 2007; Hays-Gilpin 2010; Hays-Gilpin and LeBlanc 2007; Meyers 2012; Newsome 2010; Schaafs-

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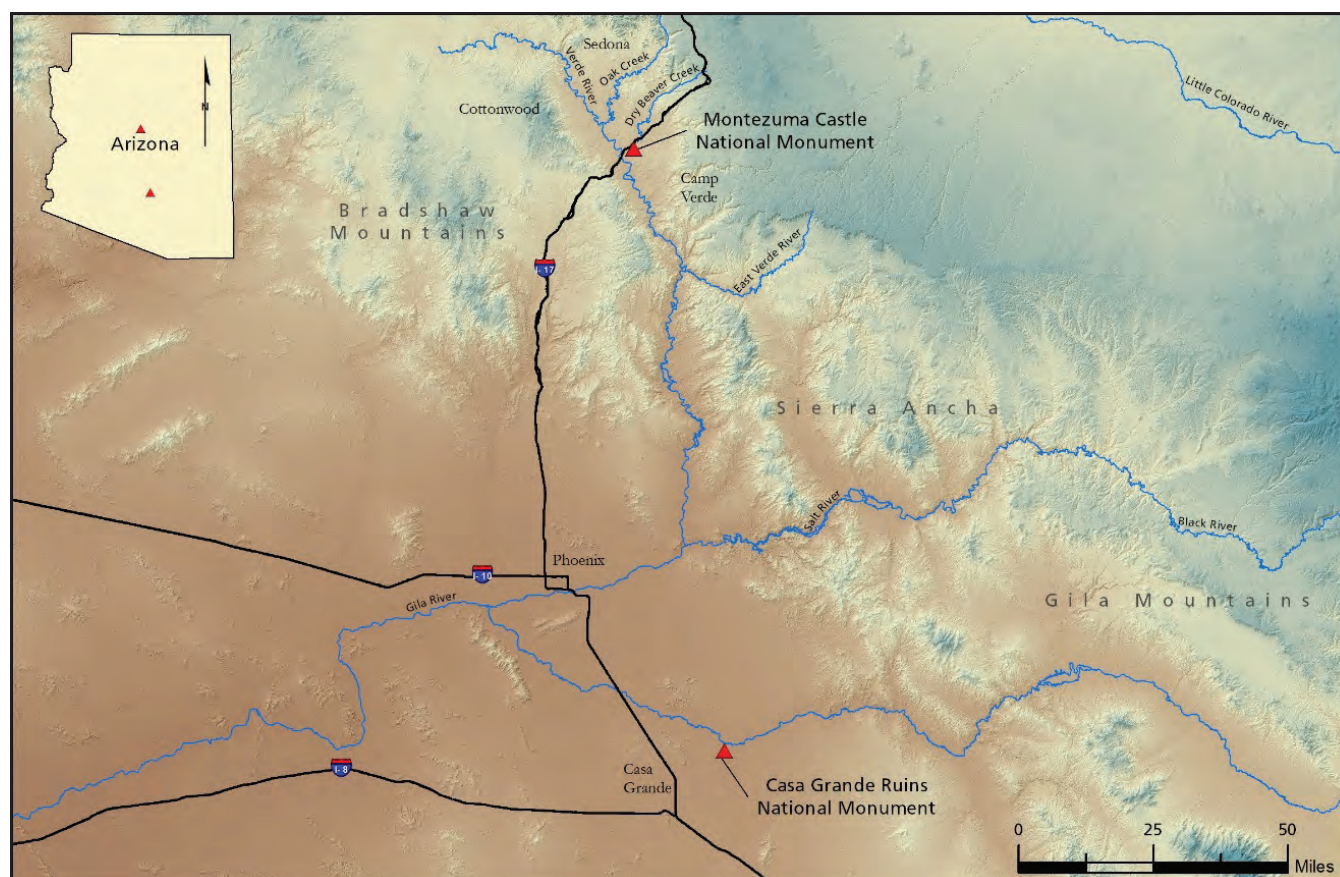


Figure 1. Map showing the location of Casa Grande Ruins National Monument and Montezuma Castle National Monument

ma 2007, 2010:22; Webster 2007). These murals depict complex scenes including human, allegorical and mythological figures, spiritual beings, ceremonial and ritual activities and paraphernalia, animals, plants, landscape imagery, and geometric or abstract designs. Archaeological interpretations of these murals have identified iconographic schemas relying heavily on ethnographic comparisons. Researchers studying these murals have also employed a cross-media approach that compares design elements and color symbolism on a variety of artifacts and rock art (Hays 1992; Hays-Gilpin 2006, 2010; Hays-Gilpin and Hill 1999; Hays-Gilpin and LeBlanc 2007; Smith 1952; Taube 2010).

Techniques for characterizing earthen materials generally require large samples.² At Montezuma Castle and Casa Grande, sample sizes were small to preserve architectural material in situ. The mineralogical content of samples was determined through X-ray diffraction (XRD) analysis conducted by the Institute of Meteoritics in the Department of Earth and Planetary Science at the University of New Mexico. XRD data were collected from air-dried, glycolated, and heat-treated samples using standard procedures (Poppe et al. 2001). Semi-quantitative phase analysis was done using the Reference Intensity Ratio (RIR) method included with the PANalytical HighScore Plus software (Version 4.7). To aid in the identification of clay, portions of selected samples

were mounted and analyzed on a JEOL JSM5800LV scanning electron microscope (SEM). The chemistry of individual clay particles was determined using an Oxford Instruments Energy Dispersive X-ray spectrometer (EDS). Semi-quantitative EDS analysis was accomplished using the Oxford software with elemental peak profiles measured on in-house mineral standards and built-in correction routines for data reduction. Backscattered electron imaging and EDS analyses were conducted exclusively on polished petrographic thin sections, coated with approximately 20 nm of gold-palladium alloy for conductivity.

By combining optical microscopy, XRD, SEM and EDS to identify clays and aggregates, secondary minerals, and soluble salts, investigators were able to produce detailed characterizations using very small samples (Bass et al. 2017). These analytical techniques resulted in a complex dataset that was then interpreted within an archaeologically meaningful framework. This included investigation of plaster embellishments, soil processing and application techniques, repair episodes, occupational sequences, and physical characteristics affecting plaster performance and deterioration (Bass et al. 2014, 2015; Bass et al. 2017; Nordby 2014, 2015).

Montezuma Castle and Casa Grande do not have painted murals with elaborate or stylized compositions. Yet, colored washes may represent the shared beliefs

and aesthetic preferences of past people. For this reason, we consider the possible meaning of colored washes within their respective geographic and chronological contexts. It is important to note that there are no published archaeological studies on decorative wall plasters in the Verde Valley and Gila River Valley. The following discussion describes and interprets earthen plasters and colored washes at each site.

MONTEZUMA CASTLE CLIFF DWELLING

The Montezuma Castle cliff dwelling consists of five architectural stories and 20 rooms in an alcove high above Beaver Creek in the Verde Valley of central Arizona (Figure 2). The iconic site is located within the Southern Sinagua archaeological culture area, defined by pueblo-style architecture, inhumation burials, and distinctive plain ware ceramics (Colton 1946). Based on the radiocarbon age of wooden beams at the site, as well as the cross-dating of decorated ceramics, the Montezuma Castle cliff dwelling was likely built during the Honanki phase (AD 1150–1300) (Breternitz 1960; Colton 1946; Hodgins et al. 2018; Wells and Anderson 1988). Architectural repairs and artifacts found at the

site indicate that the cliff dwelling grew over time and that occupation continued until the late-fourteenth century (Guebard 2015, 2016; Nordby 2015).

The Castle's Yellow Washes

Sixteen rooms with ancient wall plaster were analyzed at Montezuma Castle (Bass et al. 2017). Most interior walls in the Castle have three layers of plaster, although some have as many as six. Additionally, walls also contain repair patches and infills, many located on the lower portion of the wall surface. Cross sections of plastered surfaces prepared for microscopic analysis indicate that wall stratigraphy contains thick dust and soot layers between plaster applications, suggesting that substantial time passed between each plastering episode (Figure 3).

Of the 16 rooms included in the study, 7 have traces of red, yellow, or white earthen washes (Bass et al. 2014). These washes consist of clays selected for color, manipulated to remove larger particles and increase the binder proportion, and mixed with enough water so that they spread like paint. These washes were used to highlight architectural features such as dados³, doorways, and other openings. While the use of all colored washes likely held important meaning, we focus here on yellow washes.



Figure 2. Montezuma Castle cliff dwelling, 2017



Figure 3. Thin section of finish plaster in Room 3-4, south wall, showing up to six plaster and wash layers separated by dust and soot

Yellow earthen washes were identified in three rooms, on a total of seven wall elevations. The yellow washes contain approximately 12.5 percent albite, a mineral that appears light yellow or light green in color (Mineral Atlas 2017). Interestingly, albite did not appear in any of the other plasters or washes analyzed for this study, suggesting that it may contribute to the yellow color of the plaster wash. At Montezuma Castle, the yellow washes comprise the outermost layer of interior walls. While these layers were not chronometrically dated, they are late within the occupational sequence of the dwelling. Recent research suggests the site was abandoned sometime after AD 1375 (Guebard 2015, 2016). It is therefore reasonable to assume that yellow plaster washes at Montezuma Castle were applied to walls during the mid- to late-fourteenth century.

As Figure 4 illustrates, the condition of yellow washes is poor and heavily impacted by animal activity and the presence of soluble salts. As a result, yellow

plaster washes now appear as small, discrete patches surrounded by larger areas of surface erosion and plaster delamination. Although much of the yellow wash is now obscured or destroyed, we located all surviving yellow fabric at the dado level. Based on this finding, dado plasters in three rooms at the Montezuma Castle cliff dwelling likely featured bright yellow washes. In the next section, we discuss the possible meanings associated with yellow ceramics and washes.

The Color Yellow: Aesthetics and Associations

In the Pueblo world, the color yellow denotes a direction (northwest) and is also associated with birds, fire, rainbows, butterflies, pollen, flowers and the summer growing season (Hays-Gilpin et al. 2010; Hays-Gilpin and Hill 1999; Hill 1992; Lewis 2002). Using this set of shared visual concepts, Hill and Hays-Gilpin identified and described a shared system of verbal imagery called the Flower World (Hays-Gilpin and Hill 1999; Hill 1992). Associated with the Uto-Aztec language, Flower World imagery is prevalent in songs and represented in material culture. The Flower World concept is thought to originate in Mesoamerica and includes a variety of complex ideas with similar imagery and themes including moisture and fertility (Hays-Gilpin et al. 2010).

Jeddito Yellow Ware ceramics are one example of Flower World imagery expressed in visual media. Jeddito Yellow Ware consists of distinctive yellow, coal-fired ceramics manufactured only on the Hopi Mesas. According to Hays-Gilpin, “Regardless of painted design, each Jeddito Yellow Ware vessel can evoke Flower World in color.... Selecting certain clays, the use of coal as fuel, and firing pottery in the open to oxidize it at high temperatures ensure that the quintessential flowery color—yellow—pervades each vessel” (2010:123).

Early varieties of Jeddito Yellow Ware were first made around AD 1300, and quickly circulated throughout the American Southwest. In the northern Southwest, these ceramics and the ideas they represent may have facilitated the spread of the Katsina religion (Adams 1991; Adams and LaMotta 2006; Newsome 2010). Katsinas are part of the Flower World and share similar concepts associated with water and fertility.

At the Homol’ovi villages, approximately 100 miles from Montezuma Castle, Adams and LaMotta (2006) concluded that large quantities of Jeddito Yellow Ware ceramics, as well as artifacts depicting Katsina images, signaled the adoption of Katsina ceremonies in the mid-fourteenth century. While the spread of these ideas

might be accepted or incorporated differently at each village, this is a reasonable way to understand how Katsina ideology was adopted. Although there have been no Katsina images found at Montezuma Castle, yellow ware ceramics are pervasive. These ceramics denote a strong economic and social connection with the Hopi Mesas and also may signal the adoption of the Flower World ideology.

Awatovi Black-on-yellow and Jeddito Black-on-yellow, two distinct types of Jeddito Yellow Ware, account for approximately 69 percent of all decorated Tuzigoot phase (AD 1300–1400) ceramics collected at the nearby Castle A site (Guebard 2015:94). Similarities in yellow ware ceramics and the colored washes at Montezuma Castle are striking. The color of the yellow earthen washes is 2.5 Y 7/4 “pale brown” (Munsell 2015). This color is very similar to paste and surface colors noted on early Jeddito Yellow Ware vessels found near the site. So, while yellow washes and ceramics probably do not indicate the adoption of specific Katsina ceremonies at Montezuma Castle, together they may indicate the acceptance of Flower World concepts. Regardless, yellow ceramics indicate aesthetic preferences associated with social and economic changes occurring on the Hopi Mesas. Hopi oral histories provide additional information about this connection.

Oral histories indicate a strong connection between the cliff dwelling and the Hopi village of Songoopavi, located on Second Mesa. Members of the Bearstrap Clan at Songoopavi trace their ancestral lineage to the people that built and lived in the Montezuma Castle (Guebard 2016; Kralj KenCairn and Randall 2007). Ac-

cording to oral histories, clan members abandoned Montezuma Castle following a violent attack. Ancestral Hopi people continued north on a migration path that eventually ended in the village of Songoopavi. Neutron Activation Analysis conducted on yellow ware ceramics from the Verde Valley indicate that these vessels were made primarily on Second Mesa (Adams 2013:119). This suggests, perhaps, that Second Mesa villages were responsible for the manufacture and distribution of yellow ware ceramics in and around Montezuma Castle.

Trade routes associated with the exchange of ceramics are corridors for the transmission of ideas and concepts. The Flower World ideology, represented by yellow artifacts, was prevalent in the northern Southwest during the fourteenth century. The social and economic connections between the Hopi Mesas and Montezuma Castle may have facilitated the spread of this ideology and contributed to the use of yellow earthen washes. In this way, there is a connection between ceramics and architecture that signals a shared iconographic, social and economic connection between Montezuma Castle and Second Mesa.

Access to Yellow Washes

For the purposes of this paper, we use the concepts of physical and visual access, both of which have been used to analyze artwork (Munson 2011). Although many archaeologists may dispute the classification of colored washes as “art,” per se, the concepts discussed below are relevant for understanding how ancestral Native Americans may have accessed, experienced and viewed colored washes. Physical access is defined as the way in

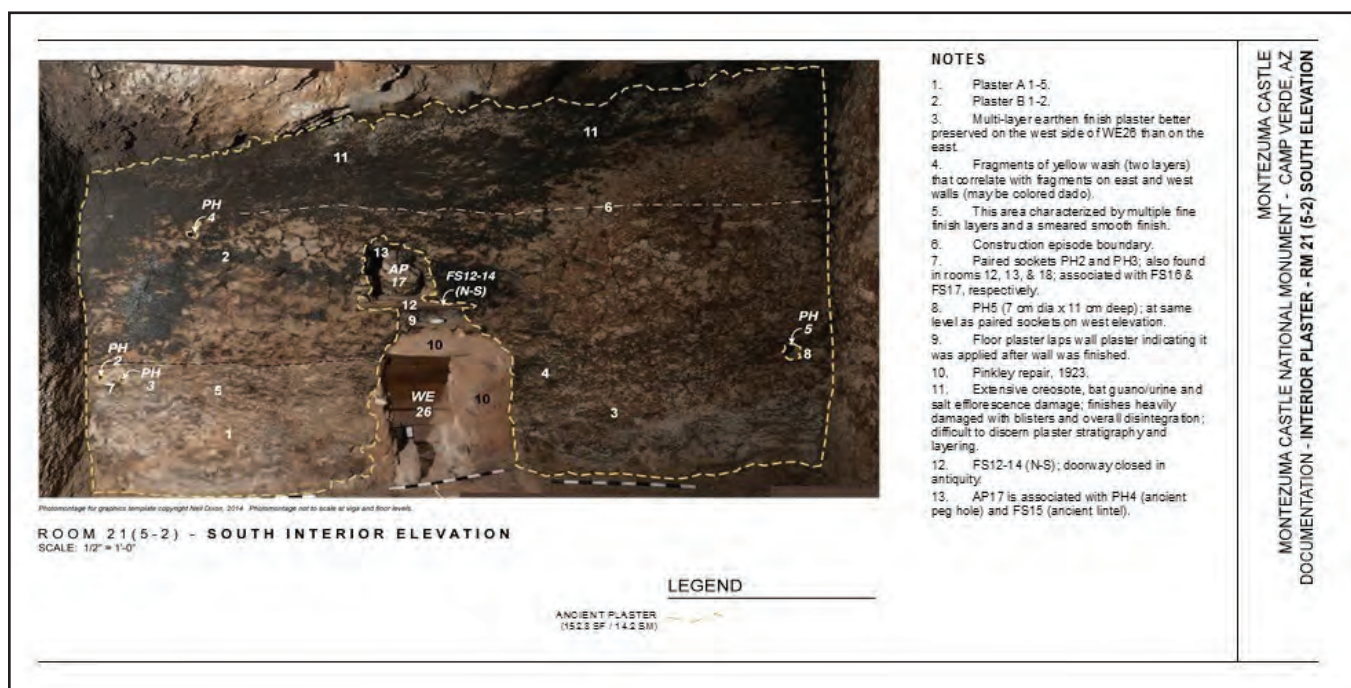


Figure 4. Plaster survey and condition assessment graphics for Room 5-2, south wall. There are remnants of a yellow dado throughout the south, east and west elevations (From Bass et al. 2015)

which a room's size and shape facilitates certain intended visual experiences (Munson 2011). As an example, Room 5-2 is located on the top story of the Montezuma Castle cliff dwelling. The room is connected to an open area with an expansive view of the southern horizon and surrounding valley. The room contains yellow earthen washes, small geometric plaster glyphs and several enigmatic features that may have served as peg holes, viewing ports, ventilator holes, niches and a cistern.

Room 5-2 is the largest within the cliff dwelling, but is not substantially larger than rooms in nearby dwellings (Wells and Anderson 1988:227). While most rooms inside Montezuma Castle are narrow and rectangular, Room 5-2 is broad and open, making it an ideal gathering space. At approximately 21 m² in size, this room could have contained approximately 20 people (Wells and Anderson 1988:226). The size and shape, as well as the presence of earthen washes and other specialized features may indicate that the room was used for group activities such as ceremonies. Furthermore, yellow earthen washes may have created an atmosphere necessary for certain activities and performances associated with Flower World ideology.

It is also important to consider where washes could be seen within the dwelling. This idea has been called "visual access" and refers to "the qualities and characteristics of a work of art that are visible at different distances or from different locations" (Munson 2011:79). The place where a wash is visible may indicate the intended audience. Yellow washes in Room 5-2 were not visible from other rooms in the cliff dwelling, nor were they visible from anywhere outside the dwelling. This means that to experience the washes, participants would need to physically enter the room. Access to yellow washes and associated activities could therefore be controlled by restricting access to the room.

Summary

Yellow washes at the Montezuma Castle cliff dwelling are unique and represent a dynamic period during the mid- to late-fourteenth century. These washes are part of a shared aesthetic representing strong associations with water and fertility. Most notably, these washes facilitated a shared, but restricted experience that connected the Montezuma Castle cliff dwelling with the Hopi Mesas, particularly Second Mesa and the village of Songoopavi. In this way, the development of certain ideologies on the Hopi Mesas, particularly the Flower World concept and related ceremonies, affected people at Montezuma Castle.

CASA GRANDE GREAT HOUSE

The Casa Grande great house is a large puddled earth structure with the remains of four architectural stories and 11 rooms (Figure 5). The site is located near the Gila River and prehistorically, was part of an exten-

sive irrigation canal system. The great house sits within a large compound and is surrounded by evidence of other walled compounds, an elliptical ballcourt, a platform mound and other earthen structures. The great house was built during the Civano phase (AD 1300–1450) and is associated with the Classic Period of the Hohokam archaeological culture area, defined by the presence of walled compounds, public architecture, population aggregation, increasing use of inhumation burials, and the appearance of polished red and polychrome ceramics (Abbott et al. 2003:8). Ceramics found at Casa Grande suggest the site was occupied until the mid-fifteenth century (Steen 1965; Wilcox and Shenk 1977). Later architectural repairs are evident throughout the building and may represent a short period of abandonment followed by reuse. The earthen washes discussed here are associated with the early occupation of the building, approximately AD 1350.

The Great House's Micaceous and Gypsum Washes

All rooms at Casa Grande have interior plasters that include one or more leveling coats and a dense finish coat. The finish coat has a grayish cast that previous archaeologists identified as sooting (Fewkes 1907:296; Nordby 2015:84; Wilcox and Shenk 1977:157). The wall surfaces also include a single, thin (100–130µm), red earthen wash. Our analysis indicates a lack of soot and dust between plaster and wash layers in all rooms, suggesting that the finishing sequence was completed without significant time intervals between coats, and fire was used inside the building infrequently or not at all (Figure 6). Regardless of the room, all walls contain the same, single layer of red wash suggesting that all interior walls within the building were coated in a single and coordinated effort. Red washes are composed of illite and palygorskite clays and contain a distinctive calcium phosphate component that appears to be the result of the admixture of ash or bone to the wash. Finishing plasters and red washes contain micaceous clays in larger proportion than is typical of other earthen materials used at the great house, suggesting that the materials were deliberately sourced or amended.

In Hohokam culture, the color red was seemingly important and used in decorated and plain ware ceramics. Similarly, red mineral pigments and argillite jewelry were common adornments and burial offerings (Bostwick et al. 2010:91). While the color red most certainly held important meaning for the inhabitants of Casa Grande, this paper only discusses the micaceous clay and gypsum washes found inside the great house. Future researchers will find it useful to address the symbolism associated with the color red. A thin (15–32µm) gypsum wash was applied over the red, micaceous wash in every room. The use of micaceous clays and gypsum seems intended to impart a reflective quality to the wall surfaces (Figure 7). We are not the first to



Figure 5. The Casa Grande great house, 2016

note this stunning visual effect. Seventeenth century Spanish travelers and nineteenth century American explorers and scientists all commented on the appearance of these washes (Mindeleff 1896:310; Van Valkenburgh 1962:7).⁴

Micaceous Materials: Aesthetics and Associations

Micaceous clays and gypsum washes are found in every room at the Casa Grande great house. The visual effect is similar to mica-tempered ceramics and other reflective archaeological materials found in the Hohokam culture area. This suggests an aesthetic preference for reflective objects, but also indicates deep cultural meanings and associations. It is therefore useful to briefly consider the possible visual symbolism associated with these objects.

The use of micaceous schist temper in Hohokam ceramics has been extensively studied (Heidke 1989, 2012; Miksa 1998, 2001; Ownby et al. 2004; Walsh-Anduze 1993). Micaceous schist is available in the Middle Gila River Valley and is more heavily used as temper during the Hohokam pre-Classic Periods (Abbott et al. 2007). The possible ideological meaning associated with pre-Classic schist-tempered ceramics, along with other reflective objects, is hypothesized to represent an ideological movement in the Hohokam area (Wallace 2014; Whittlesey 1997). Although researchers disagree about the specific details of this movement,

one component is the symbolic representation of water (Heidke 2012:314; Wallace 2014:478). Micaceous tempers impart a reflective quality and may have symbolized water shimmering in sunlight. Researchers have also suggested an ideological connection between water and mountains (Whittlesey 2009). The creation of pottery with micaceous schist temper extracted from mountains in the Gila River Valley may therefore represent an attempt to physically incorporate this ideology into ceramic vessels (Whittlesey 2009). The following discussion presents one possible explanation for the appearance of reflective plaster washes and the visual symbolism they promoted.

The Hohokam Classic Period is recognized by archaeologists as a time of social and cultural transition. Public architecture as well as concurrent changes in material culture and mortuary practices are often considered markers of increasing social stratification, the appearance of religious elites, the adoption of new religious or ideological concepts, or a combination of these changes (e.g., Abbott 2000; Abbott et al. 2003; Bostwick and Downum 1994; Bostwick et al. 2010; Doyel 1981; Elson 1998; Gladwin et al. 1937; Haury 1945, 1976; Howard 1992; Wasley 2009; Wilcox and Shenk 1977). The volume of archaeological literature discussing this transition is overwhelming. Not surprisingly, archaeological interpretations of this transition are varied and sometimes contentious. With this in mind,

one possible explanation for the appearance of the Casa Grande great house is the rise of individuals with specialized religious or ceremonial responsibilities (Abbott 2000; Mitchell and Brunson-Hadley 2001). Bostwick argues that platform mounds were symbolic mountains and specialized structures for elites with ceremonial responsibilities associated with rain (Bostwick 1992; Bostwick et al. 2010). The Casa Grande great house appears to have served a similar function.

O'Odham oral histories recount the Casa Grande great house as the home of a lineage of priests associated with the Morning-Blue Sivanyi (Loendorf and Lewis 2017). According to these oral histories, priests were responsible for ceremonies associated with the control of rain and wind (Teague 1993:441). The great house is identified as the home of these priests, indicating that important ceremonies were conducted within the building. Oral

histories along with the presence of reflective plaster washes and a lack of sooting on walls may indicate that the great house was used for ceremonial purposes related to the control of weather. In the next section, we briefly discuss access to reflective washes at Casa Grande.

Access to Reflective Washes

The great house consists of adjoining rectangular rooms of uniform sizes. These rooms are not appreciably larger than other rooms within the surrounding compound, although their configuration may be significant (Wilcox and Shenk 1977:168-169). Some researchers have suggested that the floor plan of the great house represents the religious cosmology of its builders (Cushing 1892; David Jacobs, personal communication 2017). In this way, movement through the building may have constituted a ritual action. While this may be true, there has been very little research on this topic. Perhaps future work will help to connect reflective plasters with other ideological concepts encoded in the site's architecture.

Reflective earthen washes cover all interior walls in the building, suggesting that the same visual experience was intended for each room. Unlike Montezuma Castle, builders and designers appear to have been particularly concerned with the uniform appearance of interior walls. Each wall was meticulously finished to be smooth and plumb and covered in the same reflective wash. This finding matches with previous architectural studies concluding that the entire building was intended for a single, integrated function and was managed by a centralized authority (Nordby 2015; Wilcox and Shenk 1977). Perhaps the Sivanyi identified in O'Odham histories were responsible for managing the site. Regardless,

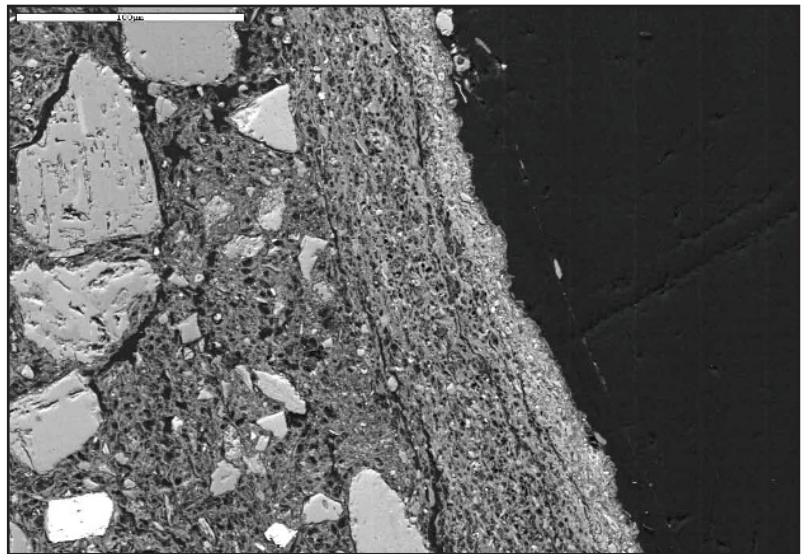


Figure 6. SEM photomicrograph (330x) of a Casa Grande sample showing a thin gypsum layer (far right), single clay wash (middle) and plaster substrate (far left)

the initial intended function of the building appears to be ceremonial.

Visual access to interior rooms at the great house was restricted. Reflective plasters are not visible from anywhere outside the building. Additionally, a compound wall approximately 2 m tall limited physical and visual access to the great house (Fewkes 1907:96). It is important to note that compound architecture was common during the Classic Period, meaning that the use of compound walls was a regional trend. Nevertheless, the walls at Casa Grande were intended to restrict access to buildings within the compound. As was the case at Montezuma Castle, this suggests that only those with access to the compound and the great house could see and experience the washes.

Summary

Interior walls at the Casa Grande great house were adorned with plaster washes similar in appearance to mica-tempered ceramics and other archaeological objects representing water symbolism. O'Odham oral histories suggest that Casa Grande was managed by priests with important ceremonial responsibilities associated with the control of weather. Visual and physical access to rooms containing earthen washes was likely restricted. The lack of sooting on walls indicates that fires were prohibited and suggests that the building functioned as a ceremonial structure. Matching plaster stratigraphy throughout the great house also indicates corporate control over the appearance and maintenance of the building. This interpretation matches well with oral histories recounting control of the building by a small group of religious elites.



Figure 7. Photograph of plaster and wash finishes from the northwest corner of Stack A, Casa Grande great house. Note the red wash and underlying gray plaster

FINAL DISCUSSION

This paper illustrates how the in-depth study of subtle architectural features can provide evidence capable of addressing archaeological questions about prehistoric room use and aesthetics. By characterizing earthen washes and incorporating concepts of access we have attempted to decode aesthetic preferences and identify possible meanings associated with the use of yellow and reflective red washes. Native American traditional knowledge also provided important information that guided our conclusion. While the interpretations in this paper are tentative, they present an interesting and unique perspective on architectural features at both sites.

We can only speculate about the meaning of earthen washes, but there are strong connections to symbolic representations of water and fertility at both sites. Additionally, rooms and sites containing washes had specialized features and floorplans suggesting they were used to enhance group activities such as ceremonial performances. Finally, visual and physical access to rooms with colored washes appear to have been restricted, suggesting that only those permitted inside each room had access to the activities and experiences occurring therein.

Admittedly, the focus of this paper is quite narrow. Montezuma Castle and Casa Grande are idiosyncratic buildings representing periods of use and adaptive reuse. As such, additional study of the architecture at both sites is necessary to refine the interpretations presented here. We hope, however, that this study will provide a positive example of interdisciplinary research that includes architectural analysis, plaster characterization, archaeology, and Native American traditional knowledge.

Notes.

1 The Merriam-Webster Dictionary (2017) defines vernacular as “of, relating to, or being the common building style of a period or place.” The Montezuma Castle cliff dwelling and Casa Grande great house are not typical design styles, however, the materials and methods used to construct both buildings were common throughout each region. Coupled with architectural and archaeological data as well as Native American traditional knowledge, each

building has the ability to convey important information about the designers, builders and occupants.

2 See ASTM C 1324-05 (Standard Test Method for Examination and Analysis of Hardened Masonry Mortar), ASTM D7928 – 16 (Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation [Hydrometer] Analysis), ASTM D6913 – 04 (Standard Test Methods for Particle-Size Distribution [Gradation] of Soils Using Sieve Analysis).

3. The dado level refers to the lower portion of a wall surface. At Montezuma Castle, the dado level is demarcated by colored washes.

4. Captain Juan Mateo Manje, a member of the 1697 Kino expedition to Casa Grande, made a similar connection between plaster washes and ceramics not-

ing that the walls at Casa Grande “shone like Puebla earthenware” (Van Valkenburgh 1962:7).

Acknowledgements. This work was funded through several Colorado Plateau Cooperative Ecosystem Study Unit (CPCESU) projects between the National Park Service and the University of New Mexico. Thank you to the National Park Service, especially the Southern Arizona Office, Casa Grande Ruins National Monument and Montezuma Castle National Monument for project funding. We are grateful to Superintendents Sherry Plowman (retired), Karl Pierce and Dorothy FireCloud as well as Casa Grande Chief of Resources Alycia Hayes and CPCESU Research Coordinator Dr. Todd Chaudhry for supporting project objectives. Larry Benallie, Jr., Dr. J. Simon Bruder, Dennis Gilpin, Sharlot Hart, Lucas Hoedl, Dr. David Jacobs, Stewart Koyiyumptewa, Leigh Kuwan-wisiwma, Dr. Jill Neitzel, Larry Nordby, Dr. Glen Rice, Iraida Rodriguez, and Henry Wallace reviewed the manuscript and provided helpful comments. Thank you also to Mary Ownby for sharing research material as well as Neil Dixon, Nicholas Ferriola, Dominic Henry, Leon Natker, Liisa Reimann, Katherine Shaum, Mike Spilde, and Keri Stevenson for assisting with fieldwork and sample analysis.

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