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Western Basketmakers: Social Networking among Uto-Aztecan Foragers and Migrant Farmers on the Colorado Plateau

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This paper explores a question that has long perplexed Southwest archaeologists regarding the roles played by indigenous foragers and migrant farmers in the extension of maize agriculture to the Colorado Plateau during the Early Agricultural Period, beginning ~2000 BC. Drawing on linguistic, archaeological, and rock art evidence, we constructed an argument suggesting that southern Uto-Aztecan speaking people who practiced corn agriculture migrated from the Tucson Basin-Border area to the territory of the historic Hopi Indians in Northeastern Arizona, somewhat backed by Hopi ethnohistorical accounts that identify certain clans as coming from the south of the Hopi country. Evidence suggests that during the Basketmaker II period (~800 BC–AD 400), these immigrant farmers came into contact with the ancestral Hopi collectors. The interaction between these immigrant farmers and the indigenous foragers became the basis of the Hopi culture, the expansion of corn agriculture and the archaeological complex known as the Western Basketmaker II culture.

Este papel explora una pregunta que mucho tiempo ha dejado perpleja a arqueólogos Sudoeste en cuanto a los papeles jugados por foragers indígena y agricultores migratorios en la extensión de agricultura de maíz a la Colorado Plateau durante el Temprano Período Agrícola, comenzando ~2000 BC. Dibujando sobre lingüístico, arqueológico, y pruebas de arte de roca, construimos un argumento sugiriendo que las personas de habla Uto-Azteca sureñas que practicaban la agricultura de maíz migraron desde el área de Cuenca-Frontera de Tucson al territorio de los históricos indios Hopi en el noreste de Arizona,

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algo respaldado por relatos etnohistóricos Hopi que identifican ciertos clanes como viniendo del sur del país Hopi. La evidencia sugiere que durante el período Basketmaker II (~ 800 a. C. a AD 400), estos agricultores inmigrantes entraron en contacto con los ancestrales recolectores hopis. La interacción entre estos agricultores inmigrantes y los forrajeadores indígenas se convirtió en la base de la cultura Hopi, la expansión de la agricultura de maíz y el complejo arqueológico conocido como cultura Western Basketmaker II.

KEYWORDS Western basketmaker, Basketmaker, Uto-Aztecan, Hopi, Maize agriculture, Loanwords, Rock art, Iconography

A question that has long puzzled archaeologists of the U.S. Southwest speaks to the roles of indigenous foragers and migrant farmers in the spread of maize agriculture to the northern Southwest during the Archaic-Formative Transition (Geib 2011). Did it arrive by a process of indigenous development (Irwin-Williams 1973, 1979; Minnis 1985; Smiley 2002a, 2002b; Wills 1995) or by the replacement of indigenes by migrant farmers from the Borderlands to the south (Berry and Berry 1986; Chisholm and Matson 1994; Hill 2001; Huckell 1996; Matson 1991)?

According to Matson (1991, 2007), one of the pathways that maize arrived in the northern Southwest involved Western Basketmaker II (WBM II) farmers who were Uto-Aztecan (UA) speaking migrant farmers from the Sonora-Arizona borderlands. He found WBM II culture to be intrusive, linked to San Pedro-Cochise material culture from the borderlands, a view that has, for the most part, put to rest the idea that maize agriculture exclusively reflects in situ development. This raises the questions central to this study: did maize-bearing migrant farmers from the south enter an empty landscape on the southern Colorado Plateau, or did they encounter local foragers already living in the area? If they did encounter foragers already living there, did these migrant farmers merely expel them, or did they form a mutually beneficial or a hostile relationship with them?

To address these questions, we draw on linguistic, archaeological, and rock art evidence to build an argument that Southern Uto-Aztecan (SUA) speaking people who engaged in corn agriculture migrated north from the Tucson Basin-Borderland area over several generations arriving in northeastern Arizona and southeastern Utah during the San Pedro period (~1200–800 BC). During the WBM II period (~800 BC–AD 400), these southern farmers appear to have formed a close affiliation with Northern Uto-Aztecan (NUA) ancestral Hopi-speaking foragers. We emphasize that the second group represented Hopi language speakers as distinguished from diverse groups who culturally and linguistically identified as Hopi, AD post-1200. While beyond the scope of this paper, we do not rule out that other groups, such as Zuni and Keresan speakers, may also have participated in WBM II culture (see Damp 2007 on Zuni farming ca. 1200 BC). Hopi ethnohistory holds that certain clans, who later identified as Hopi, came from south of the Hopi country. This social interaction involving local (i.e., southern Colorado Plateau),

NUA Hopi-speaking foragers and SUA speaking farmers from the south who would subsequently over time adopt the Hopi language, became the basis of WBM II and later Hopi culture.

Hill (2001, 2002a, 2002b) put forth the idea that the large geographic extent of the Uto-Aztecan (UA) family reflected a prehistoric population expansion due to population increase related to corn agriculture. We, along with others (Merrill et al. 2009; see summary in Shaul 2014:218–254), reject this idea for multiple reasons that are reviewed below. Kemp and others tested Hill's hypothesis with genetic data and rejected it, concluding that the spread of corn cultivation "strongly correlated with geography and not with language family" (2010:6763).

This suggests that there were most likely multiple paths for the inception of corn agriculture in the American Southwest. Indeed, there was corn cultivation with irrigation in the Zuni Valley by 1000 BC (Damp 2007). The Tanoan peoples (including Kiowa) had agriculture in the San Juan Basin by Basketmaker II times (Ortman 2012:164–165; Ortman and McNeil 2017). The basic words for cultigens in the existing Puebloan languages (Hopi, Zuni, Keresan, and Tanoan) do not match, and so show no evidence of linguistic borrowing from a UA or other local Puebloan source (Shaul 2014:245–250). Instead, we find the stimulus for Hopi corn agriculture came from SUA speech communities (e.g., Tepiman, Corachol), rather than Tanoan, Zuni, or Keresan, as suggested by Hopi ethnohistory and SUA loanwords (discussed below). We believe that the context of such contact was WBM II culture.

Foragers and Farmers Co-presence on Colorado Plateau

To build this argument, we first present plausible evidence that foragers occupied the area of northeastern Arizona when maize agriculturalists arrived from the south. Until recently, archaeologists have debated whether there were foragers inhabiting the Colorado Plateau during the Late Archaic period. Some focus on evidence of depopulation of the region during the Middle Archaic period, while Geib (2011:264–265, 377–379) attributes a spike in ^{14}C dates on perishables from 2500 to 1800 BC to evidence that foragers repopulated the region. He interprets a spike in dates in the region to suggest the co-presence of local "pure foragers" and colonizing agriculturalists from the south, explaining a temporal gap found in the archaeological record from 800 to 400 BC in the northern Kayenta area (Geib 2011:265) as the result of a small sample size, not necessarily to forager abandonment of the region. During the temporal gap that Geib reports for the Kayenta area, data collected from rock shelters in the Butler Wash area of southeastern Utah, our study area, shows evidence of cultigens (corn, squash) ^{14}C dated to around 600 cal. BC (Smiley and Robins 1997:36, fig. 2.16).

His view is further supported by corroborative evidence of forager presence throughout the larger southern Colorado Plateau during the Late Archaic-Formative Transition: in northeast and central Arizona at Black Mesa (Smiley 2002a), the middle Little Colorado River area (recently Adams 2016), in northwestern New Mexico and southwestern Colorado, and the lands north of the Colorado River

including Glen Canyon (Berry 1982; Berry and Berry 1986; Geib 2011; Huckell 1996; Irwin-Williams 1973; Lipe 1970; McBrinn 2005; Simms 2008; Smiley 2002a). Taken together, we believe this provides compelling evidence that foragers were present in the northern Southwest or southern Colorado Plateau during the Late Archaic when maize arrived.

Maize-Bearing Farmer-Colonists on Colorado Plateau

The evidence to date suggests that maize arrived in the northern Southwest in the least two waves, initially through trade and subsequently and fairly suddenly through immigration by committed farmers (Geib 2011; Smiley 2002b:40). The earliest reliable radiocarbon dates for putatively traded corn (sans farmers) in the American Southwest came from the Old Corn site (western New Mexico, 2260 cal. BC; Huber 2005), McEuen Cave and Clearwater (central Arizona, 2080 cal. BC; B. Huckell et al. 1999), Three Fir Shelter (northern Black Mesa, 1950 cal. BC; Smiley and Parry 1992), and Lukachukai (northeast Arizona, 1900 cal. BC; Gilpin 1994). A third possible scenario involves corn associated with migrant farmers who moved on or failed. This would account for the changes in maize DNA during the Late Archaic which made it more suited to dryland farming on the southern Colorado Plateau (Swarts et al. 2017 on Turkey Pen Ruin on Cedar Mesa; also Romero Navarro et al. 2017).

What we now know is that maize agriculture appeared suddenly in northeast Arizona and southeastern Utah with migrant farmers bearing San Pedro material culture similar to that which is found the Tucson Basin and southern Arizona-Sonora borderlands (Carpenter et al. 2005, 2015; Matson 1991, 2007). The southern Arizona homeland of these migrant farmers was the northern edge of the area where SUA languages formed and are still spoken today along the Sierra Madre Occidental corridor in West Mexico. WBM II culture in the northern Southwest is associated with the arrival of purported SUA speaking maize farmers in the northern Southwest.

Where had people farming in the borderlands and Tucson Basin acquired corn? A recent international study has shown that maize (*Zea mays* spp. *mays*) arrived in the U.S. Southwest by way of diffusion (with or without people) from Mesoamerica along the Sierra Madre Occidental in West Mexico (Fonseca et al. 2015; Merrill et al. 2009:21019; also Shaul 2014, Ch.8). In the southern Arizona-Sonora (Mexico) borderlands, abundant archaeological evidence of maize agriculture appears during the Late Archaic, possibly the missing Basketmaker I period in the Pecos classification scheme (Colton 1939; Lipe 1970; Matson 2006). Recently, archaeologists have excavated large farming communities at La Playa (Sonora), 2100 BC–AD 150, at Cerro Juanaqueña (Chihuahua), 1300–1100 cal. BC, and at multiple farming village sites in the Tucson area dating from about 2000 to 1500 BC, such as Las Capas at about 2050 cal. BC (Haury 1950; see Carpenter et al. 2005, 2015:229, 249; Cordell and McBrinn 2012:131; Mabry 2005, 2008; Mabry et al. 2008; Merrill et al. 2009). These data suggest that growing farming communities resulted in some committed farmers moving north in search of suitable land for farming.

Following a path known as the "San Pedro Meridian" (Berry and Berry 1986), we can trace an imaginary line extending north-northeast from Tucson, Arizona to Bluff, Utah that intersects excavated Basketmaker II sites with increasingly younger ^{14}C dates as you move north. This suggests that farmers from the Tucson Basin-Borderland area migrated north, leap-frogging from one suitable farming site to the next over several centuries. Excavations in rock shelters in the Mogollon Highlands' Upper Gila River caves, yielded the earliest reliable dates for maize in this area, ca. 1200–800 cal. BC (Cosgrove 1947; Martin et al. 1952). In central and northeastern Arizona, radiocarbon dates ~815–500 BC were reported on Basketmaker II pithouse, associated bell-shaped cist, and maize from God's Pocket at Chevelon Canyon area on the middle Little Colorado River; also recovered were San Pedro projectile points (Adams 2016: 11, Tables 3 and 18). Dates were found on corn at Black Mesa, 1000 cal. BC (Coltrain et al. 2007: Table 1) and at White Dog and Kinboko Caves in the Kayenta-Marsh Pass area ~800 cal. BC (Geib 2011). In southeastern Utah (Butler Wash area). Radiocarbon dates ~600 BC were reported at Six-Toe Shelter on corn and at the Boomerang Shelter on cucurbita (bottle gourd) (Smiley and Robins 1997:36, fig. 2.16).

While beyond the scope of this paper, it is worth mentioning another line of evidence that might support our idea of social interaction between NUA and SUA speakers. Early Agricultural Period (EAP) radiocarbon dated perishables from the Mogollon cultural area appear suddenly and are discontinuous with Late Archaic perishable traditions in the area. According to Webster (2007:293; Teague and Washburn 2013:22), both Early Mogollon and WBM II perishable traditions reflect "a (similar) composite of technologies" suggesting the hybridization of populations from the Western Great Basin with an "emphasis on Z-slant twining" and people from the south (see McBrinn 2005:39 on isochrestic stylistic patterns in marriage groups). Regarding the latter, Webster identifies White Dog phase Basketmaker II "looped bags, four-warp wickerwork sandals, and yucca plain-weave cloth with twined selvages" that show strong affinities to the south, that is, San Pedro culture. Matson (1991, 2007:110, fig. 7.3) finds San Pedro-Cochise and WBM II two-rod-and-bundle foundation uninterlocked stitch coiled basketry traditions to be identical.

The chronometric data summarized here and the spatial distribution of WBM II sites spreading north from the Tucson Basin and/or Borderlands suggest that descendants of maize-bearing farmers from this region migrated to northeast Arizona and southeast Utah, perhaps over a few centuries (ca. 1000–600 BC). This calls into question the idea of in situ development to explain the arrival of maize on the Colorado Plateau. Instead, we expand upon Matson (1991, 2007) and others by proposing that small groups of San Pedro culture bearing, committed maize farmers, who spoke a SUA language, left the rapidly expanding Tucson Basin farming communities and over several centuries their descendants migrated north, leap-frogging across suitable farming sites. In central or northeast Arizona during the Late Archaic/Early Agricultural Transition (EAP), these colonizers would have entered a landscape inhabited by ~2500 BC by local foragers who had migrated to this region from their ancestral homeland in southern California (discussed below).

Farmer and Forager Identities and Interaction

To build a case regarding the origin and identity of the foragers and farmers in question, we follow the idea that WBM people spoke an UA language (Matson 1991, 2007), as opposed to Eastern Basketmakers who probably spoke Kiowa-Tanoan (Ortman 2012; Ortman and McNeil 2017). Next, we review recent historical linguistic reconstructions of the oldest or proto-Uto-Aztecan (PUA) speech community homeland, and then review the evidence for the temporal and geographic dispersal of UA speakers and its split into northern and southern speech communities. We believe that the paths of small groups from these dispersed speech communities crossed in the northern Southwest, perhaps repeatedly, during the EAP.

The contested Bellwood-Hill Hypothesis argues that the PUA homeland was located in Mesoamerica (Bellwood 2001, Hill 2001) and that the daughter languages spread north with farmers. This idea is consistent with the Farming-Language Dispersal Model, or FLDM (Bellwood and Renfrew, 2002; Renfrew 1996:70), which argued that agriculture was the primary agent in language dispersal.

We reject the Bellwood-Hill hypothesis and instead follow the northern homeland hypothesis, which is based upon a comparison of late Holocene plant and animal taxa with the PUA plant and animal lexicon. This analysis revealed that the PUA speech community was probably located in western North America, that is, either in central Nevada (Merrill et al. 2009), in central Arizona (Fowler 1972, 1983; Merrill et al 2009 and refs.; Shaul 1986, 2014), or in the northern Mojave or Sierra Nevada foothills in western Nevada (Shaul 2014; Figure 1).

This reconstruction challenges the FLDM (see Campbell 2013:44, Table 16.1 for more examples). In the PUA case, apparently dispersal from the western Great Basin occurred before the acquisition of farming and resulted in the split into southern and northern UA branches. The SUA chain of dialects stretched along the Sierra Madre Occidental in West Mexico, where it still exists today. In the past, this corridor probably acted as a conduit for the diffusion (with or without people) of maize to the U.S. Southwest (Merrill et al. 2009).

We believe that some forager groups in the northern Southwest (northeast Arizona) spoke ancestral Hopi, an NUA linguistic isolate. The Hopi language is an NUA language which can only mean that the language was brought to the Hopi Mesas in northeast Arizona from another place to the north of the Hopi historic area. Hopi ethnohistory states that the Hopi ethnic group evolved as other groups of people who would become clans arrived after the initial northerners' settlement. For the most part, these non-Hopi-speaking clans eventually adopted the Hopi language and identity. We maintain that it is important to distinguish between the Hopi language and the formation of the Hopi ethnic group. Indeed, some clans arriving from the south were probably not speaking Hopi when they arrived, but shifted to Hopi as a part of the growing Hopi ethnic group.

Using historical linguistic methods, Shaul (2014) reconstructs the NUA ancestral Hopi speech community homeland to the southern Sierra Nevada foothills or western Nevada. He determines that they began migrating east through the Grand Canyon and into north central Arizona (Black Mesa, Kayenta, Marsh Pass)

FIGURE 1. Map showing the Proto-Uto-Aztecan homeland and subsequent Proto Southern Uto-Aztecan and PNUA dispersals. Drawing by Rachel Pfeffer.

beginning about 3000 BC This scenario is consistent with the Hopi origin and migration oral traditions recounting how Hopi groups emerged from the Grand Canyon (Nequatewa 1967 and others). In contrast to Sutton (2000) who places the Hopi dispersal around 1000 BC, Shaul's (2014) reconstruction concludes that it occurred much earlier (~3000 BC), before the introduction of maize farming to the region. The Virgin Anasazi presence in southwest Utah area may reflect a northeastern migration of small groups of ancestral Hopi speakers out of the Mojave Desert ca. 1000 BC.

This interpretation is based upon the Arid Lands/Foraging Model of linguistic prehistory which suggests that foraging peoples, having egalitarian social relations and using language as an adaptive strategy, tend to share words, sound systems, and grammar over large geographic areas, thus obscuring a language's time depth

(Hill 1978; Shaul 2014, chap. 4). Notably, Shaul's time frame maps with Geib's previously cited evidence that between 2500 and 1800 BC, late Middle to Late Archaic foragers (re)occupied the central to northeastern Arizona region that had been largely abandoned during the Middle Archaic (Geib 2016:33 on Middle Archaic 4300–400 ca. BC).

If NUA foragers were in the northern Southwest during the Middle to Late Archaic, then approximately when and how did they acquire maize agriculture and agricultural words? We reason that if NUA ancestral Hopi-speaking foragers were located in northern Arizona during this time frame, then they would have encountered SUA-speaking farmers migrating north from the Sonora-Tucson borderlands. Given the evidence of agriculture loanwords from SUA (possibly Tepiman) into Hopi (Merrill 2013b; Shaul 2014), it is highly likely in our view that this was the result of direct contact or social networking between NUA-Hopi foragers and SUA farmers. We maintain that this would have happened when Hopi-speaking foragers adopted maize agriculture hypothetically around 1200–800 BC, based on ^{14}C dates for Mogollon and WBM II hybridized perishables (see Table 1).

According to historical linguist Campbell (2013:442), social networking that results in loanwords "provide(s) strong evidence of agricultural acculturation rather than language displacement." He cites the case of Xinkan, a small family of four languages in southeastern Guatemala where "nearly all terms for cultivated plants are borrowed from neighboring Mayan languages. This suggests that the Xinkan speakers were not agriculturalists until contact with Mayan groups gave them agriculture," probably during the pre-Classic or early Classic period.

Using Xinkan as an ethnographic analogy, we believe that direct contact between SUA and NUA ancestral Hopi speakers occurred approximately when descendants of migrant farmers from the Tucson Basin area encountered foragers on the southern Colorado Plateau (~1200 BC). According to this scenario, SUA immigrants eventually adopted the Hopi language, which begs the question why SUA farmers would adopt the language of NUA foragers. Here is one possible explanation. If NUA forager society was matrilineal, as we know Hopi society has been (pre)historically, then it is reasonable to assume that SUA farmers adopted the Hopi language of their wives over a period of time.

Hopi Lexical Artifacts Referring to Agriculture

Merrill (2013b:230) has identified Hopi borrowing of SUA (mainly Tepiman and Corachol) words for cultigens. Of Hill's (2001) 13 words claimed to be PUA that appear in Hopi, seven are shared by Hopi and only SUA languages (Shaul 2014, 221–223; also see Teague 1993). The others with referents like "corncob" (*qaa'ö*, coming from a root meaning "pine cone"; see Shaul 2014, 238), "parch," "digging stick," and the like, are easily derived from a forager word base, that is, the words correspond to the needs of a foraging culture and hence have a possible pan-UA distribution. In this section, we review Hopi agriculture words of SUA origin. We first review those proposed by Merrill (2013b), and then add some additional data.

TABLE 1

HOPI AGRICULTURAL LEXICON DERIVED FROM SOUTHERN UTO-AZTECAN LOANWORDS

Gloss	Reconstructed form	Hopi	UA distribution	Comments
"corn ear"	**pikuri*, "mature, fresh maize ear"	*pìik^{y}a-*, "immature corn ear"	Taracahitic Corachol Nahuan	
"clear land for field"	**mawe*, "to prepare land for cultivation"	*maala-* "to clear an area for a new field"	Taracahitic Corachol Nahuan	
"to rain"	**yuki*	*yooyoki*, "to be raining"	Tepiman Taracahitic Corachol Nahuan	Northern UA languages have words for "to rain" but none of them matches this root.
"corn ear/ kernel"	**pa'tsi*	*pa'tsi*, "hominy"	Taracahitic Corachol Nahuan	
"tamale/ griddle"	**tëma*	*tëma*, "stone griddle"	Tepiman Taracahitic Corachol Nahuan	Also occurs in Serrano (Takic, Northern UA) as "roast/bake"
"to plant"	*ëtsa	ë:ya	Tepiman Taracahitic Corachol	The /ts/ to /y/ change in Hopi is a regular sound correspondence. The form /ë'a/, "to plant" occurs in Southern Paiute and Timbisha Shoshone, who acquired agriculture from the neighboring Hopis.
"field"	*wasa	pa:sa	Tepiman Taracahitic Corachol	The initial consonant are not regular sound correspondences, showing that the form is a loan word in Hopi.
"squash/ pumkin"	*aya	a:ya, "gourd rattle"	Tepiman Taracahitic Nahuan	
"beans"	*mVr/ni	mori, "dried beans"	Tepiman Taracahitic Nahuan	The first vowel of the root is variable, as is the middle consonant. The lack of regular sound correspondences for this root shows loan word status.
"digging stick"	**wika*	*wiikya*	Tepiman Taracahitic Corachol Nahuan	This root also occurs in Tübatulabal (Northern UA).
"corn"	*yuuri*, "maize, mature maize ear"	*yoowi-*, "corn silk"	Corachol Nahuan	May also be seen in Proto-Cupan (Takic, Northern UA) *yu:-, "hair/head."

Merrill (2013a) proposed a subfamily of southern SUA, which refers to the language spoken by foragers who migrated south before adopting agriculture. He then proposed that this SUA speech community practiced incipient corn agriculture. In Table 1, we list words referring to agriculture drawn from Merrill (2013a, 2013b) and Hill (2001) that have Hopi and SUA forms, along with the distributions by UA subfamily of the SUA material (following Shaul 2014:252–253). The distributions are summarized from Stubbs (2011); the Taracahitic grouping may be a subfamily (not yet demonstrated, it may be just a geographical grouping). There are other roots of pan-UA distribution (Shaul 2014: Table 8.4, 230–247) with agricultural referents in Hopi and SUA languages which could have developed the agricultural meanings from a forager technological base. For example, digging sticks, planting

wild plants, and processing wild seeds with a mano/metate were all used by foragers and, therefore, preceded farming technology.

Lack of regular sound correspondences in Hopi forms ("beans," "field") show that the Hopi forms are loan words. Three additional roots given below also show that Hopi borrowed words for naming cultigens, extended a local root's meaning, or created a new word (neologism). The Hopi word for "beans (in pod)" in Hopi is *pa:pë*, is related to **bavi*, which is found only in the Tepiman subfamily of UA (Stubbs 2011:70). If the form came from PUA, it would show *kwa:pë*, which it does not (Shaul 2014:225). This suggests that Hopi borrowed the word after the distinctive Tepiman sound changes (Shaul 2014:161), perhaps around the time that beans appeared in the archaeological record of the northern Southwest ca. AD 200–400.

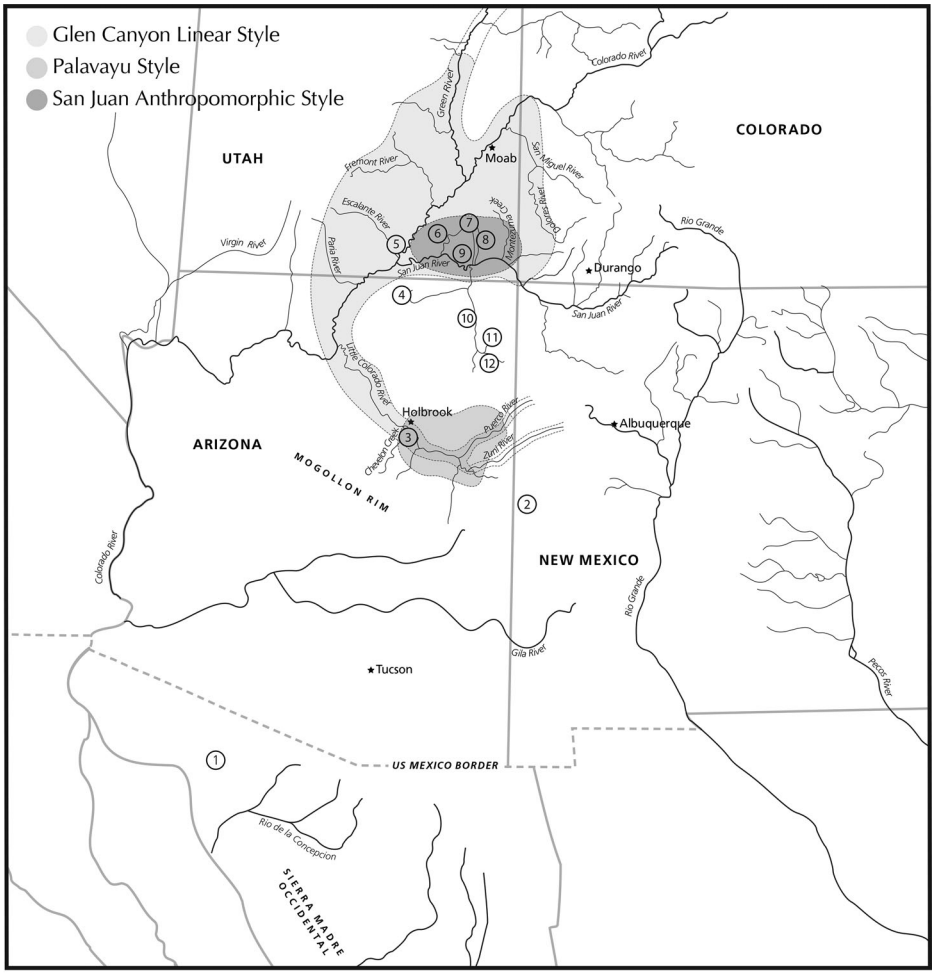
The Hopi word for "dried corn still on the cob" (*qaa:'ö*) has only one cognate within all of Uto-Aztecan: Southern Paiute *qa'o:-S-*, "pine cone." It is not hard to see the resemblance between a pinecone and a corncob. The difference in vowel length suggests a loan word, either way. The Hopi word for "squash," *patŋa*, is a coinage made up of *pa-*, "water" and *-tŋa*, the combining form of *taŋa*, "contain." This shows that this cultigen was at one time unknown to Hopi speakers, and was named with a compound word (and not a single root). The NUA Hopi words for corn (*qa:'ö*) and for the common bean (*mori*) show the relative time that complex agriculture came into Hopi cultural practice. The Hopi word for corn (*qa'ö*) shows a sound change from the PUA vowel */o/ to the Hopi /ö/ which must have occurred soon *after* maize was introduced into the American Southwest about 2000 BC (Shaul 2014:304).

We know that another important cultigen, the common bean, was grown in southern Arizona 2,500 BP (ca. 500 BC) and 500 years later (ca. AD 1) at Bat Cave, New Mexico (Cordell and McBrinn 2012:132). This dates Hopi cultivation of common beans to between 1 and AD 400 (see Geib 2011:285–286), with the cultivation of corn earlier, that is, about 1000 BC. These relative dates for incipient Hopi agriculture fit well with the dating range for WBM II (800 BC–AD 500), hence supporting the idea that SUA speakers from the south, who over time adopted the Hopi language, participated in the WBM II farming culture.

Glen Canyon Linear Style Rock Art (~3000–400 BC)

When SUA migrant farmers arrived in northeast Arizona, not only was the landscape already occupied by local foragers, it was also inscribed with a highly visible Middle to Late Archaic rock art style, Glen Canyon Linear (GCL) or Turner's (1963) Glen Canyon Style 5. This rock art style is concentrated along the major river corridors in the region, including the Colorado River in the Grand Canyon along the possible path of ancestral Hopi migration and emergence (Figure 2; Tables 2 and 3).

GCL style rock art distribution includes, but is not limited to, the Colorado River, middle Little Colorado River, and Lower San Juan River (see Cole 2009:10, fig. 4). On the middle Little Colorado River, the GCL style appears to have been both antecedent and ancestral to the local Palavayu (PV) (McCreery and Malotki 1994:17,



Colorado Plateau Anthropomorphic Rock Art Styles and Distribution

FIGURE 2. Colorado Plateau anthropomorphic rock art styles and distributions. Map showing geographic distribution and key sites mentioned in the paper: (1) La Playa, Sonora, (2) Old Corn and Bat Caves, (3) Chevelon Creek, "The Steps" site, (4) Kayenta-Marsh Pass, (5) Moqui and Bernheimer Canyons, (6) Grand Gulch-Cedar Mesa, (7) Comb Ridge, (8) Upper Butler Wash, (9) Chinle Wash, (10) Lower Butler Wash (Kachina Panel, "Joe's Place"), (11) Prayer Rock District, (12) Canyon de Chelly. Drawing by Rachel Pfeffer.

Fig. 2.3) and subsequent Basketmaker II styles, the latter ~1000 BC (Adams 2016:4–8, Table 1 on Late Archaic/Basketmaker II petroglyphs and artifact scatter; Cole 1996). See Supplementary Table 1. Below we explore the possibility that PV style may be ancestral to the earliest episode of San Juan Anthropomorphic (SJA) style rock in southeastern Utah based upon stylistic similarities.

Cole ([1990] 2009) maintains that GCL style images depicting large artiodactyls, especially big horn sheep, were iconographic analogs for Grand Canyon split-twig figurines used in ritual to increase hunting success. GCL is formally similar and

TABLE 2

CHARACTERISTICS OF THE SAMPLES STUDIED ACROSS THE STUDY AREA

Sector	Site	Total units	Total panels analyzed	Total anthropomorphs (headdressed) analyzed	Total anthropomorphs (w/o headdress)	Total figures analyzed
Butler Wash	Lower Butler Wash 42SA28484	1	8	181	29	210
	Upper Butler Wash42SA8646	1	2	51	37	88
	Window Rock 42SA17382	1	1	5	3	8
	Joe's Place	1	1	4	0	4
Sand Island	Lower Sand Island 42SA52638	1	1	34	6	40
	Upper Sand Island 42SA3589	1	17	62	3	65
Grand Gulch	42SA3659, 42SA5112, 42SA5117, 42SA5119, 42SA5120, 42SA5121, 42SA5122, 42SA5123, 42SA5264, 42SA7746, 42SA23685,42SA23410, 42SA23693,42SA23710, 42SA23712,42SA23715, 42SA23716,42SA23725, 42SA23729,42SA23716, 42SA24480,42SA24490, 42SA23725,42SA25073, 42SA25081,42SA25085	25	35	39	11	50
Chinle Wash		2	2	6	5	11
Totals		33	67	382	94	476

overlaps temporally and spatially with the Grand Canyon split-twig figurine tradition, radiocarbon dated to ~2900–900 BC (Coulan and Schroedl 2004:50, Table 2). Its spatial distribution clusters at the confluence of the Colorado and Little Colorado River in northwestern Arizona (46, fig. 2), notably the sacred place (*sipapu*) of Hopi emergence. Also important to our claim, the distribution of known Grand Canyon split-twig figurines extends from the Mojave Desert in southern California, the reconstructed NUA pre-Hopi speech community homeland, to the Little Colorado River drainages in central Arizona.

The highly conventional nature of the GCL style suggests that it was produced within learning traditions of biologically or socially related groups. GCL style anthropomorphic figures are a straight body with small appendages and round heads, and typically wear a mask and headdresses observed in other Late Archaic regional rock art traditions like the Barrier Canyon Anthropomorphic Style found in east-central Utah and southwestern Colorado. GCL anthropomorphic figures appear to depict religious practitioners involved in animal increase magic, expressive of hunter-gatherer cosmology.

Late Archaic GCL Headdress Designs: Shapes and Symmetries

GCL headdress designs encompass a repertoire of forms composed of pairs of curved or straight vertical or oblique lines, paired oblique feather or plant-like forms, or downturned arcs stacked in pairs (Table 2). The production of these

distinct forms relies upon mirror symmetry or translation, that is, the duplication of a single form (Shepard 1948; Washburn 1999). They appear to be naturalistic representations of large quadruped (bighorn sheep, bison) horns, wings of birds of prey (eagle, hawk, thunderbird), or natural phenomenon (rainbow) important to a hunter-gatherer cosmology (Cole 2004:42–44, 2009:45–46). The fact that western North American Late Archaic rock art draws upon the same repertoire of headdress designs is consistent with what is known about hunter-gatherer egalitarian borrowing. On the middle Little Colorado River drainages in central Arizona, Late Archaic headdress designs (see Table 3) were used continuously as seen in GCL, PV, and a local "Majestic" Basketmaker II petroglyphic styles (McCreery and Malotki 1994:15, Fig. 2.2a and 17, Fig. 2.3). The depiction of Late Archaic headdress

TABLE 3

FREQUENCY OF GLEN CANYON LINEAR HEADDRESS DESIGNS

Motif		LBW	UBW	LSI	USI	GG	CH	Total
	A	10	2	2	28			42
	B	1		3				4
	C	2	2	3	12			19
	D			1				1
	E	1						1
	F							
	G							
	H							
	I							
	J							
	K							
	L							
	None or Q			4	26			30

Note: Drawings by Rachel Pfeffer.
Site names: Lower Butler Wash (LBW), Upper Butler Wash (UBW), Lower Sand Island (LSI), Upper Sand Island (USI), Grand Gulch (GG), and Chinle Wash (CH)

designs extends into Fremont style rock art north of the Colorado River after AD 500.

To summarize this pre-agricultural scenario, around 3000 BC NUA Hopi speakers began their migrations out of the Mojave-Sierra Nevada foothills and soon thereafter the southern Colorado Plateau was repopulated from about 2500 to 1800 BC (Geib 2011). Given this time frame, it is plausible that NUA-Hopi mobile foragers were involved in the production of Grand Canyon and perhaps also later Green River split-twig figurines (2900 to 1250 cal. BC), which were formally similar to and in the same general area as GCL rock art (~3000 to 400 BC, Cole 2009:45), and Gypsum projectile points (2000–1200 BC). This encapsulates the evidence of forager presence when migrant farmers arrived (or began arriving) in northeastern Arizona ca. 800 BC.

San Juan Anthropomorphic Style Rock Art (~800 BC–AD 400)

Since the first Pecos conference in 1927, the challenge for archaeologists studying Basketmaker period rock art has hinged upon the lack of reliable chronometric data that could define the end of GCL and the beginning of WBM II SJA styles. Previously, Robins (1997) used stratigraphic analysis to identify two SJA stylistic layers from the WBM II, White Dog phase (also see Charles and Cole 2006; Geib 2016, Ch.11; Robins and Hays-Gilpin 2000) at sites along the Lower San Juan River. He wondered if SJA rock art style was the product of in situ transformation of the earlier GCL style or if it might represent a new, intrusive style. In this section, we built an argument in support of a social interaction that resulted in both in situ transformation of the local GCL style and the intrusion of new SJA attributes from the south occurred together in time.

To address the dating challenge, we follow Geib's "arbitrary cut points" for the White Dog phase as they map with three stratigraphic episodes of SJA rock art production. Focusing on the Kachina Panel at Lower Butler Wash (Figure 3), we identify the earliest episode of SJA style rock art production, early SJA (layer 1), ~800–400 cal. BC (see Figures 4 and 5), based upon radiocarbon dated cultigens recovered at White Dog and Kinboko caves ~800 BC on corn, as well as at Three-Toe and Boomerang shelters in the Butler Wash area ~600 BC on corn and cucurbit, respectively

FIGURE 3. Main section of "Kachina" panel Lower Butler Wash (42SA28484). Used with permission, drawing by Ann Phillips.

FIGURE 4. A close-up photo from the "Kachina" panel with different styles labeled: a = Glen Canyon Linear; b = Early San Juan Anthropomorphic; and c = Classic San Juan Anthropomorphic. Photo by permission, Ann Phillips.

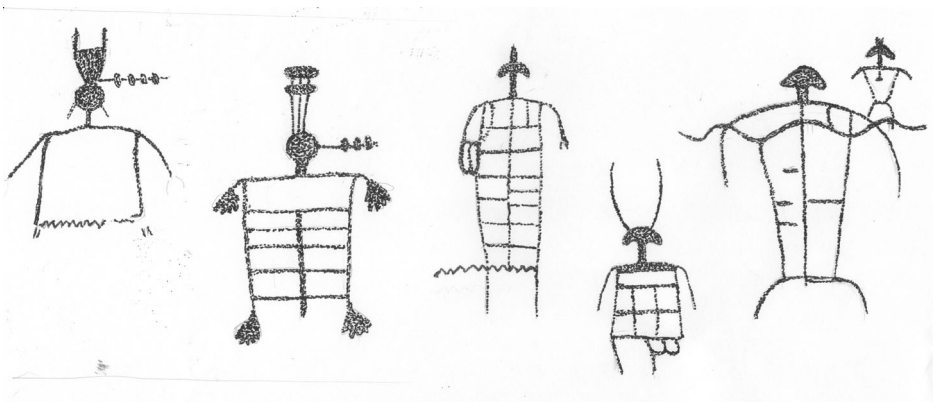


FIGURE 5. Drawings of selected petroglyphs in Early San Juan Anthropomorphic style from Lower Butler Wash, the Kachina panel, and from Upper Sand Island. Drawing by L.D. McNeil (not to scale).

(Geib 2016:37, modified from Geib 2011; Smiley and Robins (1997) on Butler Wash, which he used as a proxy for Grand Gulch). The second stratigraphic layer of SJA style rock art (layer 2) marks the middle or Classic stage of production ~400–0 BC which is correlated with reliably dated WBM II material from burials and storage cists in stratified rockshelters (Tables 4 and 5). The third and final stage or stratigraphic layer of SJA style rock art marks the Lolomai episode of production AD ~0 to 500 cal. (Figure 6). We believe that it is

TABLE 4

FREQUENCY OF SAN JUAN ANTHROPOMORPHIC HEADDRESS DESIGNS

Motif		LBW	UBW	LSI	USI	GG	CH	Total
	M					3		3
	N	7	11	2	1	17		38
	O	8			2	1	1	12
	P	16	5	1		1	1	24
	Q	5	1			1		7
	R	3			1		1	5
	S		1					1
	T	3	4		2	4		13
	U	11	3	1			2	17
	V	1	1				1	3
	W	14	9	8	1	7		39
	X			2		4		6
	Y	7	16	4				27
	None or Q	29\12	37\10	06\2	3\8	11\8		86\40

Note: Drawings by Rachel Pfeffer.
Site names: Lower Butler Wash (LBW), Upper Butler Wash (UBW), Lower Sand Island (LSI), Upper Sand Island (USI), Grand Gulch (GG), and Chinle Wash (CH).

correlated with the shift to a mesa-top adaptation in open-air pithouse sites on Cedar Mesa. This later style may also be ancestral to Fremont style rock art in central and northeastern Utah.

TABLE 5

FREQUENCY OF SAN JUAN ANTHROPOMORPHIC COMPOUND HEADDRESS DESIGNS

Motif		LBW*	UBW	LSI	USI	GG	CH	Total
	AA	10	1					11
	BB					1		1
	CC	2	4					6
	DD	1						1
	EE		1			1		2
	FF	3						3

Note: Drawings by Rachel Pfeffer.
Site names: Lower Butler Wash (LBW), Upper Butler Wash (UBW), Lower Sand Island (LSI), Upper Sand Island (USI), Grand Gulch (GG), and Chinle Wash (CH).

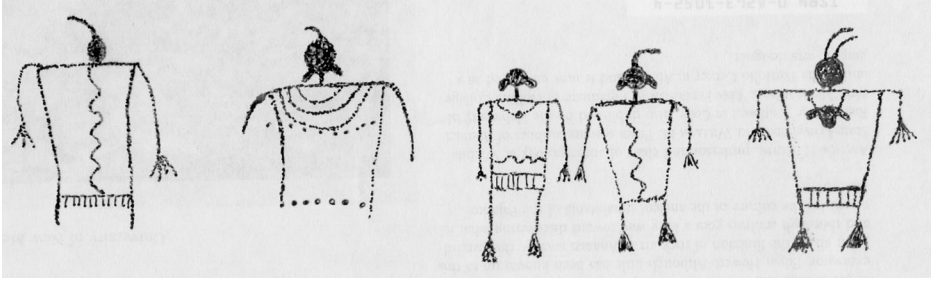


FIGURE 6. Late San Juan Anthropomorphic style figures at Lower Butler Wash, east (42Sa28484). Drawing by L.D. McNeil (not to scale).

With the arrival of migrant farmers during WBM II, White Dog phase in southeastern Utah, we identify the earliest expression of SJA style rock art, stratigraphic layer one. SJA style rock art along the Lower San Juan River corridor is characterized mainly by pecked or petroglyphic figures—both on the meter and centimeter scales—depicted wearing decorative clothing, jewelry, and headdresses (Figure 3). At rock art sites in Grand Gulch, Montezuma Creek, and Canyon de Chelly, SJA style rock also appears in the pictographic form. Early SJA style closely resembles

Palavayu (PV) style on the Middle Little Colorado River to the south where it appears to be the key bridging style linking GCL and Basketmaker II styles in that area (see Supplementary Table 1).

While general similarities exist between GCL and SJA rock art styles based upon their depictions of anthropomorphic, front-facing figures, do these similarities provide sufficient evidence for a wholly in situ origin of SJA style? To address this compelling question, we analyze three scenarios for SJA style rock art origins, one with only foragers, one with only farmers, and one with foragers and farmers interacting. First, let us consider a hypothesis involving *only foragers* producing SJA style rock art. If true, then the earliest episode of SJA style production at the Butler Wash and Sand Island sites would be understood in terms of the in situ transformation of the local GCL style into the local Early SJA style. If in situ transformation from GCL style into Early SJA style occurred, then it would reflect a similar process and product (i.e., rock art figures) as that which resulted in the similar PV style to the south, not the most plausible proposition. Another weakness of this idea stems from the fact that from its earliest episode of production (layer 1), SJA style rock art introduces an entirely new, intrusive repertoire of headdress motifs in both single and compound forms. Only one SJA headdress, Q, uses vertical lines similar to GCL headdress A or C "horns" or "antennae" (discussed below).

The second scenario with *only farmers* suggests that the earliest episode of SJA style at the Butler Wash and Sand Island sites was produced by colonizing farmers from the Tucson Basin-Borderland area who expelled local foragers (Ferguson and Colwell-Chanthaphonh 2006:106 on Hopi migration paths). It is plausible that these farmers may have emulated select attributes of the local antecedent GCL style (see Clark 2007 on stylistic emulation), thereby creating their own early SJA variant. However, so strong are the similarities between Early SJA style (layer 1) and PV style to the south, one cannot rule out the possibility that immigrant farmers drew upon their memory of the latter for Early SJA style. This "only farmers" idea also explains the intrusion of a new repertoire of headdress motifs with early and classic SJA style rock art. It is one weakness in our view pertains to its inability to explain the placement of SJA figures and the emulation of antecedent GCL stylistic attributes.

A third scenario involves *forager and farmer social interaction* in the production of SJA style rock art, which we find the most plausible in view of supporting stylistic, linguistic, and archaeological evidence. It hypothesizes that NUA foragers, the most likely producers of the local GCL style rock art (based upon evidence already discussed), occupied the area when SUA farmers arrived ca. 800–600 BC. Local forager and migrant farmer interaction is likely to have resulted in marriage groups and shared knowledge regarding where to find local resources (e.g., pine nuts) and how to grow corn (McBrinn 2005:93; Smiley 2002b:40–41 on Basketmaker II storage cists containing pine nuts and corn). These migrant farmers, either alone or with the participation of local foragers, produced several episodes of SJA style, the earliest of which: (1) was placed in close proximity, but not on top of GCL images so as to preserve, not to obliterate them, (2) emulated certain elements of antecedent local GCL style such as

elongated body shapes, interior lines, diminutive arms and legs, or reproduced PV style perhaps remembered from the middle Little Colorado River area, and (3) introduced a new symbol system in headdress designs with agricultural themes, which were also depicted as free-floating images and chest emblems, possibly Hopi southern clan symbols (discussed below).

Early SJA Style Rock Art (~800 to 400 BC)

Late Archaic PV style figures seen along the middle Little Colorado river drainages closely resemble early SJA style (layer 1) at Lower Butler Wash and Upper Sand Island type sites on the Lower San Juan River in southeast Utah (Figures 3–5; also see Supplementary Table 1). Following the proposed "San Pedro Meridian," this is an area through which SUA migrant farmers, whose ancestors originated in Tucson farming villages may have passed before settling along the Lower San Juan River in southeastern Utah.

PV style rock art and early SJA style are display several similar attributes. Both depict anthropomorphic figures with small round heads and a variety of body forms (trapezoidal, rectangular, and ovoid) with interior vertical, horizontal, or cross-hatched lines. Like the transformation of GCL into PV style in the south, some early SJA figures display headdress motifs or pecking techniques that show continuity with or emulate certain attributes of the antecedent GCL style (Clark 2017 on stylistic emulation). For example, headdress type Q (Robin's "tabular" form), depicted on SJA (layer 1) figures, appears to expand upon Archaic headdress motif A ("two straight horns" or "antennae") by adding horizontal lines across the top and bottom. Also, SJA headdress motif P ("stacked plumes") is depicted on a GCL-like head with large round face carved in bas-relief, a non-local pecking technique more common in the Gila River area and western New Mexico.

SJA Headdress Designs: Shapes, Motifs, and Ideograms

Despite proposed stylistic continuity between PV styles on the middle Little Colorado River and early SJA styles body forms with interior line designs on the Lower San Juan River, Early and Classic SJA rock art depicts an entirely new repertoire of headdress motifs unlike any pre-agricultural Late Archaic types (Table 3). Instead, SJA headdress designs (Table 4) focus on: (1) new sets of minimal units (shapes), (2) new rules for combining these shapes into motifs (M to Y), and (3) new conventions for combining motifs to form ideograms or iconographic ideas (Table 5), some of which depicted as headdress motifs, free-floating forms, or chest emblems (Table 6). Our analysis suggests that SJA headdresses functioned as a visual information system unprecedented in US Southwest rock art and, in some cases, with possible conceptual roots in pre-Classic Mesoamerica (discussed below).

The new minimal units or shapes incorporated in SJA headdress designs include the downturned crescent (differs from Archaic Barrier Canyon style headdress J), rectangle or bar, plume, trapezoidal form, and inverted-u form. The crescent, bar, and plume shapes are, in turn, elaborated (or translated in symmetry analysis) to form several motifs with distinct agricultural meanings. Often, single or multiple

TABLE 6

FREQUENCY OF SAN JUAN ANTHROPOMORPHIC FREESTANDING IMAGES AND CHEST EMBLEMS

Motifs	LBW	UBW	LSI	USI	GG	CH	Total
K	5			1	12		18
M[1]	1		7				8
N	4	7		4		3	18
O	8				1		9
P[2]	7	2					9
Q		2					2
R[3]	1						1
S	1						1
U[4]	5			1			6
W[5]			1			1	2
CC	1						1
bear paw	4			2			6
big horn	2	1	3	1		6	13
crane				2			2
duck[6]	1	3			10		14
spider[7]		1					1
sun[8]		2	2	1			5
Total	40	18	13	12	23	10	116

Note: For comparison, Hopi Southern clan symbols are numbered as follows: 1 = Máasaw, 2 = Greasewood, 3 = Eagle, 4 = Cloud, 5 = Rain clouds, 6 = Duck, 7 = Spider, 8 = Sun.
Site names: Lower Butler Wash (LBW), Upper Butler Wash (UBW), Lower Sand Island (LSI), Upper Sand Island (USI), Grand Gulch (GG), and Chinle Wash (CH).

(three to four) vertical lines or other elements are added to these basic shapes. The inference that these communicate agricultural meanings is illustrated by motif T, a single downturned crescent topped by an ovoid element resembles the Olmec unripe corn image (Taube 2000:298, fig. 1).

Several motifs are formed using the downturned crescent shape, either single or several (~4) stacked crescents, using rules of symmetry or translation (Shepard 1948; Washburn 1999). Several downturned crescent shapes are typically stacked ("floating") or stacked and bisected by a vertical line or "stalk," which we interpret to depict a maize plant in its stages of growth from unripe to mature plant, the latter depicted with a chevron element or "maize tassel" (motif X). If correct, this motif may represent the earliest anthropomorphic expression of "Corn Maiden" in the American Southwest (Figure 7).

Other headdress motifs formed from free-floating downturned stacked crescents may represent cumulous clouds (U), some of which appear to emit rain shown by parallel vertical lines (V).

Interestingly, stacked rain clouds (U) are referenced in historic Hopi Katsina songs as "clouds moving along" or a "cloud maiden" (Sekaquaptewa and Washburn

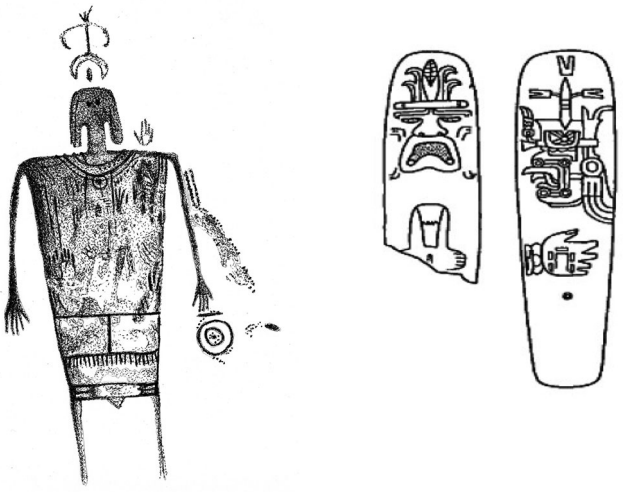


FIGURE 7. (a) San Juan Anthropomorphic Corn Maiden figure (42SA23716) Grand Gulch. Similar San Juan Anthropomorphic figures are depicted at Bernheimer's Alcove (42SA772). (b, left) maize deity figure, style B maize stalk headdress on an incised jade celt or votive axe from Rio Pesquero, Veracruz, ca. 1400 to 1200 B.C. (from Joraleman 1996: 57, fig. 8) and (b, right) maize deity on votive celt of unknown provenience, Early Formative (from Stross 1992:91, fig. 112).

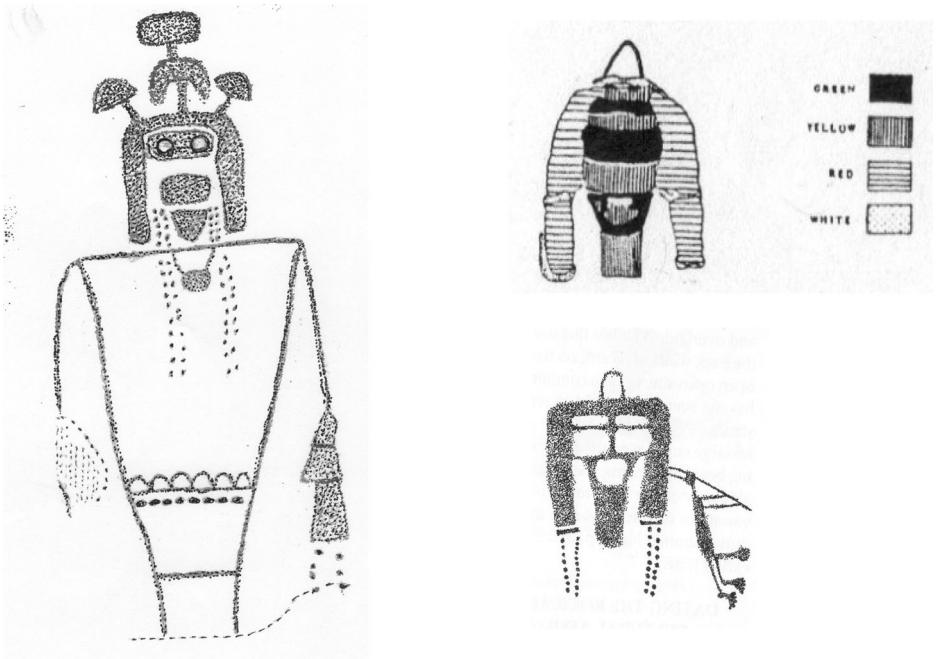


FIGURE 8. Window Rock (42SA17382) figure, headdress motif BB variant, drawing by principle author. Green Mask full-faced scalp, drawing from S. Cole (1993) and Lower Sand Island rock art images of trophy head with a flute player, drawing by permission, Ann Phillips.

2004:464 on Hopi Katsina songs). When downturned stacked crescent motifs are transected by three to four parallel lines (V), they suggest rain falling from clouds, referred to in ancient Keresan loanwords to Hopi **henati* to *hanati* or in Hopi *yoyleki* which translates as "rain lines."

The SJA motif described as an inverted-u (M) is consistently depicted with eye and mouth holes which resemble a full-head scalp or skull (Figure 8). In West Mexico and Mesoamerica, decapitated heads or skulls are regarded as a blood offerings to the ancestors believed to reside in the watery underworld and, consequently, to control rain (Schaafsma and Taube 2006; Stross 1992). This idea is correlated with material evidence of a WBM II painted full-faced scalp, 385–200 cal. BC (Geib 2016:284), recovered from a White Dog phase burial at Kinboko Cave (Cole 1989:73, fig. 8; Kidder and Guernsey 1919:55, Pl. 19). Similar trophy heads are depicted in SJA style rock art as free-floating images at Lower Sand Island and in SJA figures in Grand Gulch and Butler Wash (Cole 1990:118, fig. 42, 119, fig. 44; Phillips 2003).

Finally, a practice typically absent in the Southwest that is used to create SJA headdress designs involves combining motifs into compound forms that appear to function as ideograms which are early forms of writing. Formally similar ideograms appear throughout Mesoamerica on Formative Period Olmec votive celts (Stross 1990; Taube 1996, 2000). These ideograms, like SJA compound motif headdress designs, are arranged in a vertical column that includes images, as well as bars and dots. While bars and dots are thought to signify dates and place names in Olmec iconography, what they meant to WBM II people to date remains unclear. All compound headdress designs are composed of composite motifs showing identical repatination suggesting they were produced concurrently, not through addition over time. For one example, headdress motif M is combined with motif X ("maize plant with tassel") forms compound motif or ideogram BB (see Table 5). It resembles a "skull" out of which a mature maize plant grows, which is formally and conceptually similar to the Olmec "Maize God" headdress composed of a decapitated head (referencing blood offerings) and a mature maize plant (see Stross 1992). This is not to imply that SJA motif BB represents a Maize Deity, only that it reflects Mesoamerica beliefs connecting blood offerings and maize agriculture. The SJA sub-set of headdress motifs M, T, U, V, W, and X appear to reference a conceptual domain related to this belief system that includes: mature maize with tassels, water, rain, and blood offerings. It is possible that these conceptual metaphors underlie the near homophone linking Hopi *yo:-we* (corn silk) to Hopi *yo:vepta* (scalp).

Another pervasive example of an SJA headdress design is the ideogram EE, that is, the trapezoidal form which may be an extinct Hopi Water Clan symbol, on top of which a duck silhouette appears to be perched. Our interpretation of this ideogram draws upon similar mythological beliefs in Mesoamerica and those shared in the US Southwest (Hopi, Zuni, Keres) that the duck represents a liminal being who enjoys special access to the three planes of existence: sky, earth, and the watery underworld. As such, it acts as a mediator between humans and deceased ancestors below who control the weather, especially rain.

Cluster Analysis and Density of SJA Ideograms

Observing the distribution of SJA headdress motifs across the study area reveals a pattern of clustering similar motifs at a given site or panel. For example, at the "Kachina Panel" at Lower Butler Wash (Figure 3), we observed a high frequency ($n = 9$) of stacked plume images, for example, motif R, as shown in compound motif FF): five freestanding, three headdress motifs, and one chest emblem. There is also a strong correlation between the proximity of the plumed motif and the trapezoidal (or tabular) motif: five freestanding and three headdress motifs under which parallel "rain lines" were added. Also on the Kachina Panel, compound headdress AA appears four times (i.e., stacked horizontal "floating" bars above the head and stacked vertical bars impaled on a horizontal axis attached to the side of the head). It may be relevant that the four directions and the *axis mundi* are central to both Puebloan and Mesoamerican cosmologies (Taube 2000:324, citing Parsons 1920:96). In the case of compound headdress motifs BB (trophy head + mature maize plant) and EE (water container + duck), most examples appear in Grand Gulch either at the Green Mask site 42Sa23725 or at Polly's Island site 42Sa25085, suggesting that these ideograms encode shared beliefs important to these agriculturalists.

With regard to the relative density of SJA figures in the study area, the "Kachina Panel" (Figure 3) displayed, far and away, the highest frequency of images and greatest time-depth, second only to nearby Upper Butler Wash and the Lower Sand Island panels. It dominates site 42SA28484, extending about 100 meters, and depicts GCL figures in close proximity to SJA figures who are, in turn, represented in two or three temporal phases or stratigraphic episodes of production (Figure 4). Clusters of freestanding SJA headdress motifs, similar to chest emblems and headdress motifs on anthropomorphic figures (Table 6), are wedged between the Early and Classic SJA figures, adding to the impression of repeated visitation and rock art production at the site over many centuries.

Discussion

Previous research has framed the question of WBM II origin and identity in binary terms as either (1) diffusion in situ, developing in place by indigenous foragers on the southern Colorado Plateau after the introduction of maize farming (Irwin-Williams 1973 and others) or (2) replacement or expulsion of foragers by Uto-Aztecan speaking maize-bearing farmers who expanded northward into the Southwest from West Mexico or Mesoamerica (Berry 1982; Berry and Berry 1986; Matson 1991, 2002, 2007). While gradual migration seems to have played an important part in the spread of maize agriculture in the northern Southwest, we provide evidence suggesting that SUA speaking migrant farmers and NUA Hopi-speaking local foragers became closely affiliated, perhaps intermarried, and over time formed corporate kinship groups.

The first implication of our research pertains to the geographic correlation of the NUA-Hopi speech community in southern California and its dispersal to the east through the Grand Canyon and the location of split-twig figurine and GCL rock

art traditions that flourished along the Colorado, Lower San Juan, and Little Colorado rivers. These data also temporally correlate with the radiocarbon dated Grand Canyon split-twig figurine tradition, relatively dated GCL rock art, and Geib's proposed repopulation of the northeast Arizona ca. 2500 BC.

The second implication of our research involves the iconographic similarities between PV and early Basketmaker II rock art along the middle Little Colorado River drainages and the earliest expression of SJA rock art along the Lower San Juan River. We argue that the Little Colorado River rock art style is partly antecedent and ancestral to SJA style as a consequence of the history of farmer migrations through the area ca. 800 BC.

Perhaps the most important implication of our research pertains to the iconographic similarity between SJA headdresses motifs and clan symbols of Hopi clans who came from the south (see Table 6, notes). We find formal and possible conceptual similarities between SJA headdress, freestanding, and emblematic motifs and southern clan symbols identified in Bernardini's study by Hopi elders. For example, SJA headdresses and similar freestanding motifs resemble images inscribed at the extensive Tutuveni rock art site to the west of the Hopi Mesas and along the pilgrimage route to the Grand Canyon followed by male initiates into Hopi society (Bernardini 2005, 2007).

Bernardini (2007:46) estimates that these clan symbols may date to as early as AD 500, but adds they perhaps more likely date to ca. AD 1000. However, if the former estimate is plausible, then this opens the possibility of temporal as well as iconographic links to early and classic SJA style headdress motifs, similar SJA style free-floating symbols, and historic Hopi southern clan symbols such as those depicted at Tutuveni near Hopi Third Mesa. Our understanding of Hopi southern clans follows Whiteley's definition of a "clan" as affiliated, but not necessarily biologically related groups that later (P III-IV) self-identified as Hopi southern clans (Whiteley 2003; cited in Bernardini 2007:11). This supports our hypothesis that SUA and NUA pre-Hopi groups likely formed a social network and employed rock art headdress and freestanding motifs to identify early corporate kinship groups and/or sodalities. Hopi ethnography recounts how ceremonies were brought and are owned by clans, but in each Hopi village, non-clan persons are initiated into each clan's cult, thus providing for integration.

Regarding a southern connection, some SJA motifs that are formally similar to Hopi southern clan symbols may have conceptual connections to a regional Mesoamerican belief system associated with agriculture (discussed below). SJA headdress and freestanding motifs that represent a skull are similar to a Hopi southern clan symbol for *Máasaw* (Bernardini 2007:34, fig. 3.9 r). According to Wright's catalogue of Hopi ritual artifacts and symbols (1979), *Máasaw* represents both the "deity of death, fire, darkness, and passage to the Underworld" and paradoxically a Germinative deity and "original owner of Hopi lands and by extension of everything that is ancient" (Wright 1979:100). In the historic period, *Máasaw* has a clan symbol, a katsina mask related to the clan totem of the Masaw Clan, and a flat doll given to children [see Wright 1979:99, specimen 1148 CI/254, *Máasaw* katsina mask, and 114, specimen 1200 CI/559, a katsina flat doll *Masau-u Puch'tihu*)].

SJA compound headdress motif (BB) combines the *Máasaw c*lan symbol of motif M ("skull") and motif X ("mature maize plant with tassel") (see Table 5). In this compound motif, we see the conceptual linking of death represented by a skull or blood offerings and maize growth success, an idea prevalent in Pre- classic (Olmec) to Post-classic (Mixtec) cultures (Pool 2007). For example, an Olmec maize deity widely represented on votive greenstone celts or axes is depicted as a decapitated head out of which a mature maize plant sprouts (Bernardini 2007:34, fig. 3.9 i; Stross 1990, 1992; Taube 2000; Washburn 2012). This raises the question whether this concept diffused north to the U.S. Southwest with maize farming.

Another SJA motif, P, resembles and may be an antecedent to the Hopi Greasewood Clan (*Tevnngyam, Tepngyam*) symbol (Bernardini 2007:34, fig. 3.9 n). As White Dog phase WBM II perishables in museum collections attest, the greasewood shrub was an important wood used to make planting stick, staffs, and prayer sticks (*paahos)* to which feathers, corncobs, and/or stones were attached as an offering to ancestors who control rain. Notably, this headdress motif is often positioned horizontally, as if sending prayers at ear level. In the prehistoric period ~AD 1500, the Awatovi kiva mural depicts a stylized corncob shot with "an arrow or dart," perhaps suggesting that it "shoots prayers" with the help of feathers/flight to the rain beings, katsinas (Sekaquaptewa and Washburn 2004:475; see Geib et al. 2017).

Motifs R and S (plumes, not crescents) may depict a stylized Eagle feather headdress, which in historic times represents the Eagle Clan or *Kwanngyam* (see Bernardini 2007:34, fig. 3.9k; Stephen 1936:239; Voth 1967:12; Wright 1979:37 specimen 1026 CI/381;). According to Voth (1985), it is "one of the most common headdresses used is the knot of eagle feathers or *kwasakwa* attached to the back of most kachina masks … making a large spray of feathers at the back of the head" (Voth 1967:12; 1985). Ideogram FF combines motifs S ("eagle wing" with rain lines) and X ("mature maize plant"), perhaps another example of a conceptual metaphor which in this case connects eagle wings, rain, and maize.

An especially enigmatic motif, Q, referred to in the literature as a "tabular" form, may represent an extinct Water [or Watery Underworld] clan symbol (see Bernardini 2007:35, fig. 3.11 d or hh), given the fact that motif Q is often depicted with "rain lines" as it is in compound motif CC and sometimes abraded inside the form as if it containing something, for example, water (?). Ideogram EE expands on motif Q + rain lines (also seen in CC) by adding motif Y, duck or aquatic bird in silhouette. This compound motif may draw a connection between the role of the duck as an intermediary between the human world and the watery underworld in both Puebloan and Mesoamerica belief systems (Monaghan 1990, 1995). The Hopi duck/aquatic bird clan (*Paawikwngyam*) is believed to have come from the south (Bernardini 2007:12, Table 2.1) and from historic times Hopi have had a Duck Katsina(*Pawik'china*) (Wright 1979:112, specimen 1205 CI/592).

Late SJA style figures (layer 3) display Archaic or pre-agricultural horned headdress motifs, perhaps reconceptualized in an agricultural context. Notably, motif K (one "back-turned horn") and motif L (two "back-turned horns"), appear to reference two related Hopi deities from the south (Figure 6). Motif K resembles the Agave Clan (*Kwanngyam*) symbol and the agave headdress (*kwaakwant)* worn by the One Horn priest from the south (Fewkes 1899; Stephen 1936) and

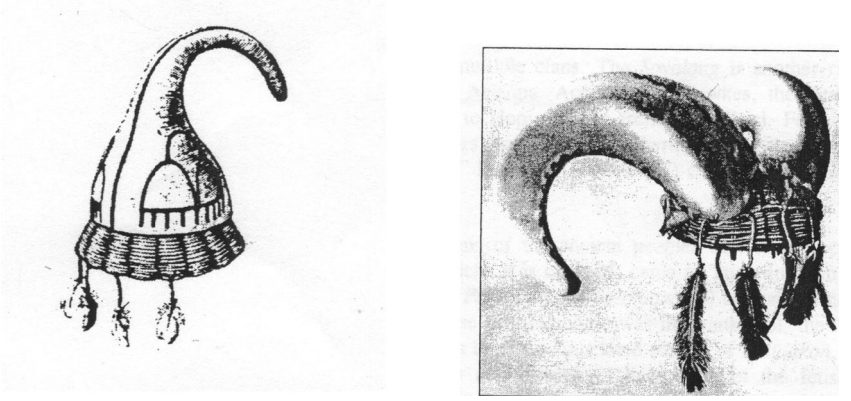


FIGURE 9. *Kwaakwant* (Agave) or One Horn priest's headdress, after drawings in Stephen (1936) and (c) *Alósaka* or Two Horn priest's headdress, after drawings in Fewkes (1899).

motif L resembles the two horn headdress (*a'la nakchi*) made from split gourds (Hopi Second and Third Mesas), a skin-covered wicker framework (First Mesa), or sometimes big horn sheep horns (Stephen 1936:934; Wright 1979:38, specimen1021 CI/637). It may be antecedent to the headdress worn by the *Alósaka* or Two Horn priest of the *A'ahltu* Society, believed to have come from the south and worn for *Wuwuchim*, the early winter male tribal initiation ceremony (Figure 9).

Conclusion

In this paper, we explored several lines of evidence suggesting that during WBM II NUA speaking high-desert foragers and SUA-speaking migrant desert farmers on the southern Colorado Plateau interacted and formed a mutually beneficial affiliation (see Conkey 1990; Geib 1996:71; LeBlanc et al. 2008; Wiessner 1983; Wobst 1977 on genetic admixture). While these groups apparently cooperated, the archaeological record also shows that deadly conflict occurred mainly between competing farmers (Geib 2016), which would have been a natural consequence of social boundary setting, for example between WBM (Uto-Aztecan) and EBM (Kiowa-Tanoan) groups.

Evidence we enlist to support this claim includes: 1) NUA-Hopi adoption of maize agriculture concurrent with borrowing of SUA lexical artifacts associated with agriculture and 2) Colorado Plateau rock art evidence suggesting that PV and Basketmaker II styles in the middle Little Colorado River area were, at least in part, antecedent and ancestral to the SJA style in the Lower San Juan River area. At the same time, SJA style (Schaafsma 1980) introduced a new repertoire of headdress motifs, possibly used as a visual information system with roots in Mesoamerica, as well as showing iconographic continuity with Hopi southern clan symbols.

We interpret these data to expand upon Hopi ethnohistory by recounting how small groups of southern UA speaking maize farmers from the Tucson Basin or

vicinity expanded north from southern to northeastern Arizona over several generations in search of new farming land to the north. On the southern Colorado Plateau, their descendants found a landscape already occupied by a northern branch of UA (Hopi) speaking foragers who migrated earlier into the area from southern California or western Nevada. If this hypothesis holds up, then at some point in their life histories both groups were either indigenes or migrants in the greater U.S. Southwest who coalesced to form what we know archaeologically as WBM II culture.

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Supplemental Material

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