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SHARED IMAGE METAPHORS OF THE CORN LIFEWAY IN MESOAMERICA AND THE AMERICAN SOUTHWEST

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The corn lifeway originated in Mesoamerica and spread throughout the Americas. Unresolved is the mechanism by which this lifeway entered the American Southwest. In this article I offer new kinds of evidence to support the argument that corn was brought north with migrating maize farmers (e.g., Carpenter et al. 2002; Matson 2002), in contrast to the prevailing view that corn diffused northward via a down-the-line, group-to-group process (e.g., Merrill et al. 2009). I posit that if corn moved into the Southwest with migrating farmers, one should expect to find many similarities in the way a life dependent on corn is conceptualized and ritualized and, accordingly, in the way this belief system is manifest on media from the two areas. I specifically explore representations that are based on the maize metaphor—the concept that equates human life stages with those of corn growth. I use three forms of evidence to argue for and interpret the shared presence of this metaphorical perspective that heretofore have not been considered: (1) information about corn that explicates its growth stages and how they are manifested, (2) depictions of the natural resources needed to promote these stages of corn growth, and (3) informant testimony and ritual song texts that metaphorically describe the stages of corn growth.

THE ADOPTION OF MAIZE AS THE LITERAL AND CONCEPTUAL MAINSTAY OF EXISTENCE throughout the Americas was one of the major changes in the cultural use of the landscape in the history of human occupation of the New World. Extensive archaeological work has described how permanent settlements arose that were dependent on this foodstuff (Johannessen and Hastorf 1994; Marcus and Flannery 2004; Staller, Tykot, and Benz 2006). Furthermore archaeological research has documented aspects of the belief system associated with the corn lifeway and noted the widespread presence of this evidence throughout Mesoamerica since the early Formative period (Blanton et al. 1999; Marcus 1989). Numerous ethnographic studies have demonstrated that this ancient lifeway, here called the *corn lifeway,* has persisted into the present (e.g., Anschuetz 1992; Freidel, Schele, and Parker 1993; Lipp 1991; Monaghan 1995; Ortiz 1994; Sandstrom 1991). Indeed, researchers have recognized this belief system in prehistoric and ethnographic cultures of the American Southwest (Black 1984; Fewkes 1893; Kelley 1966; Parsons 1933, 1939) and have described some specific similarities

in ritual and material culture related to these beliefs (Bohrer 1994; Hays-Gilpin and Schaafsma 2010; Schaafsma 1999; Taube 2000, 2010; Young 1994).

In this article I suggest that the cosmological concepts related to the corn lifeway shared between Mesoamerica and the Southwest may be imaged in metaphorical rather than literal depictions. Today, as confirmed in ritual song texts, those who live the corn lifeway continue to see, live in, and represent their worlds through metaphorical lenses. The many forms in which these metaphorical constructions resonate within the social group offer an extraordinary window into the key concepts and processes that relate to a culture's being and its chosen ways of survival.

The persistence of the debate about the mechanism by which the corn lifeway arrived in the Southwest has resulted, in part, from the perceived patchy nature of the artifactual evidence. Archaeologists have concluded from low frequencies of non-local objects in sites as well as the great distance between the two regions that the development of the corn lifeway in the Southwest was primarily an indigenous process. In contrast, I argue that metaphorical imagery is a powerful form of evidence that supports the proposal that migrating corn farmers moved northward bringing not only the practical knowledge of how to grow corn but also the rituals and associated concepts to insure the success of this lifeway. I suggest that this "decorative" repertoire on many kinds of objects from both areas is an overlooked but coherent visual record of the cosmological framework of the corn lifeway. The meaning of many images in this visual complex has not heretofore been recognized because they have not been read as metaphorical representations of some of the most important concepts supporting this corn lifeway.

In this article I offer metaphorical readings of this visual record of the corn lifeway based on my studies of the metaphors in Hopi life and ritual song with Hopi consultants (Sekaquaptewa, Hill, and Washburn 2008; Sekaquaptewa and Washburn 2004; Washburn 1995). I also offer new readings of Mesoamerican imagery based on my work with Hopi consultants. I focus on the maize metaphor—an anthropomorphic vision that likens corn growth to human life stages—and illustrate how Hopi ceramic imagery visualizes beliefs concerned with corn growth and the factors that affect this growth. I specifically explore three kinds of evidence that visually represent the maize metaphor: (1) physical features that characterize the stages of corn growth, (2) natural resources that promote corn growth, and (3) concepts of the corn lifeway voiced in ritual song texts. I then show how these beliefs are similar to and thus are derived from those that form the core of Mesoamerican beliefs about their corn lifeway. I assess how this information is presented in realistic representations as well as geometric designs on ceramics, textiles, and other media in both Mesoamerica and the Southwest.

Evidence for this analysis has been drawn from the extensive body of published Mesoamerican ethnographic and archaeological studies that have described the core ideas underpinning the corn lifeway. I have hewn to Vogt's attention to native exegesis, especially to the words native practitioners use to describe their conceptual world (1976) and to how these concepts relate to the daily business of raising food for the next generation. As a proxy for the

cosmological principles of the Puebloan corn lifeway, I cite explanations and metaphorical "readings" shared with the author over several decades by two Hopis, Uto-Aztecan speakers living in northern Arizona who live the corn lifeway. Eric Polingyouma (Bluebird Clan, Second Mesa) explained many life principles and their material manifestations during the preparation of a museum exhibit (Washburn 1995). Emory Sekaquaptewa (Eagle Clan, Third Mesa) explained the meanings of compound song word metaphors during a study of katsina song texts (Sekaquaptewa, Hill, and Washburn 2008; Sekaquaptewa and Washburn 2004).[1]

THE CORN LIFEWAY

The Formative period in Mesoamerica (2000 BC–AD 200) encompasses the development of the corn lifeway that began in small, autonomous hamlets of 5–10 households, each of which grew, processed, stored, and consumed its own corn and other comestibles. As communities became increasingly dependent on this food, they developed a complex of beliefs and rituals to propitiate the supernatural beings thought to control the weather and thus their agricultural success. These activities are visible archaeologically even during the nascent stages of settled village life (e.g., Blanton et al. 1999; Marcus 1989). As hamlets grew into city states, priestly rulers arose who built monuments that sanctified their existence and solidified their control over conquered lands from which they drew sustenance and status.

In the Mesoamerican heartland, a rich symbolic universe was created that conceptualized corn as deity and ruler (Flannery and Marcus 1976; Schele and Miller 1986). Priests and rulers were depicted in terms of the stages of corn growth. In Mayan imagery, for example, corn plants emerge from clefts in the heads of rulers, transforming these individuals into deified personifications of the maize god (Taube 1985, 1996). Yet, despite their hegemonic position, these rulers did not fail to conduct an annual round of carefully orchestrated rituals that acknowledged the importance of maize and the natural elements required to grow it (e.g., Gonlin and Lohse 2007).

At the heart of the corn lifeway is the belief that corn is literally and figuratively the mainstay of life.[2] Archaeological evidence from the Olmec, Zapotec, and Mayan traditions reveals how life was dependent on maize. Today, in the descendent villages of these traditions, even though parts of their diet are composed of other foods, maize is considered to be the primary food (Lipp 1991:11; Sandstrom 1991:128; Tozzer 1907). The Nahua of northern Veracruz believe that maize is "the absolute necessity of life, the source of nourishment that takes precedence over all others" (Sandstrom 1991:128). "No meal is complete without corn . . . regardless of how much rich food a person has eaten, he or she will complain of hunger if the dish lacks a corn component" (1991:132). Indeed, the Nahua believe that maize was given to them by the gods (Galicia Silva 2001:313).

Similarly, the Hopi emergence myth describes how the Hopis chose the short ear of corn as their sustenance when they emerged into this, the Fourth World. In

Hopi belief, planting corn is their destiny. "This is where we start life . . . this is our religion, raising the crops . . . you plant one kernel of corn and it's going to produce more kernels . . . from only one kernel your life is forever" (Polingyouma, personal communication 1994). This concept of the endless process of growing corn to produce future generations was imaged metaphorically as a storeroom full of corn in a kiva mural at the fifteenth-century Hopi site of Awat'ovi (Emory Sekaquaptewa, personal communication 2002) (Figure 1).

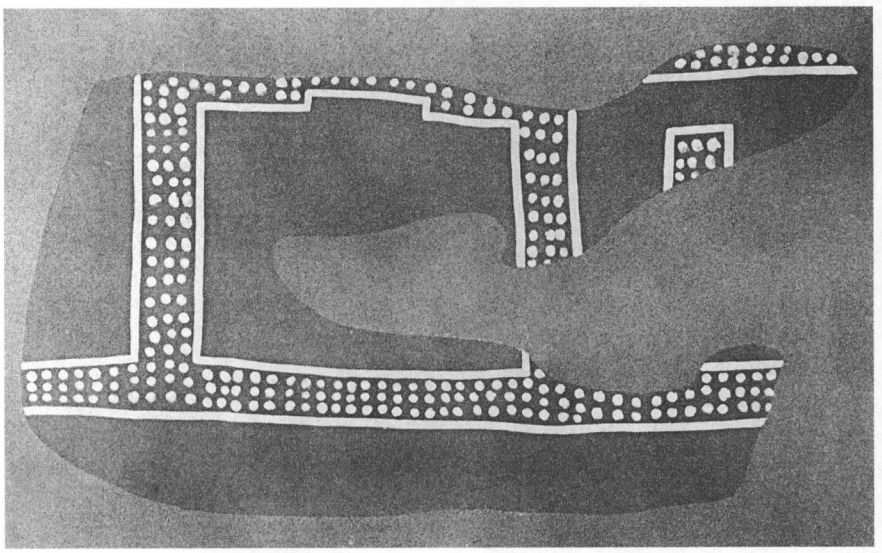

Figure 1. Hopi storeroom full of corn: kiva mural, Awa'tovi, Rm 3, fifteenth century (Smith 1952: Fig 74b; courtesy Peabody Museum of Archaeology and Ethnology, Harvard University, ID #2004.24.20256, Digital file # 153440009).

Importantly, in both Mesoamerica and the Southwest those who live by corn hold the belief that raising of corn is homologous with raising of people. This is known as the maize metaphor. The stages of corn growth are likened to the stages of human life. Nuyootecanos liken sowing corn kernels to sexual intercourse (Monaghan 1995:115). Mixtec children are conceptualized as "tender shoots" that are cared for in "seed bed" nurseries (Monaghan 1995:51). The Tzeltal name thirteen stages of maize growth, linking the plant's development to the growth of little boys (Stross 2006:581). In fact, these thirteen growth stages correspond to the thirteen 20-day intervals in the 260-day Mayan ritual year (Stross 1994: Table 3).

Similarly, Hopis liken their stages of life from birth to old age to the maturation stages of a corn plant (Black 1984). Polingyouma explains: "There are many phases in life. I was conceived and planted, now I germinate and [in] so many days I pop up and pretty soon I'm a little child and began to push as I go on through life. . . . Women form into an ear of corn and they begin to go into this phase about tasseling [reaching puberty], and then the pollen germinates that" (personal communication 1994).

In this sense, for Hopis, corn is a surrogate mother. They refer to a perfect ear of corn, with kernels to the tip—*tsotsmingwu*—as a Corn Mother who cares for people (Song 38).

> The perfect ear of glossy-kerneled corn is my mother.
> They are nurturing us like children here.

A Corn Mother is presented to individuals at their passage into the next life stage at birth, initiation, marriage, and death because, as a mother, she nurtures the rebirth of the person into the next stage. Young corn in the husk, *tímoki*, literally "child bundle," is likened to babies wrapped in blankets (Song 101). Young corn plants with cobs that are just beginning to develop are called *paavönmamant*, literally "corn maidens," a likening of the developing cobs to young girls who are maturing in their capacity to reproduce. Brides appear at Nimantikive (Home Dance) as white cloud maidens wrapped in their white bridal robes with checkerboard-patterned tassels that resemble mature cobs and long cotton strings that resemble falling rain. At this appearance the brides are likened to mature cobs encased in their husks as containers of seeds for future life (Song 126).

> . . . the white cloud maidens from around here,
> after having adorned themselves with their corn and with their rain lines,
> have begun their journey to us from around here.

David Freidel's firsthand description of a Ch'a-Chak rain ritual reveals the close conceptual and ritual similarities among Mesoamerican and Southwestern peoples living the corn lifeway. In brief, the Maya of Yaxuna build a temporary arbor "house" for the deities and tree sap is burned under this arbor as the shaman prays to the Chak, the rain gods. The shaman shakes the branches of the arbor just as "the thunder shakes the roof of a house." Young men, stationed at the four corners of the arbor, make rumbling thunder and clapping lightning sounds and sprinkle water from gourds onto boys who crouch in seated frog position beside the young corn plants. The boys make croaking sounds that imitate "the sound heard when the land and the crops are sated with the rain" (Freidel, Schele, and Parker 1993:30–33).

This ritual and the specific invoking of thunder and lightning and the grateful croaking of the frogs would be completely understandable to Hopis, whose ritual songs similarly document the importance of these natural forces. In Hopi belief, everything in the world is animate. The sun is male and is addressed as "my Father," a provider. The earth is female and is conceptualized reverently as an altar. Tuwapongtumsi, Sand Altar Woman [i.e., Mother Earth], is said to "nurse" all the animals, people, and plants who live on her lands. After the October harvest during the month of Kyaamuya everything is supposed to be kept quiet so that Mother Earth can rest before she wakes up at the winter solstice to begin the growing season all over again.

Hopi katsinas are general counterparts of the Mayan Chak rain gods. Katsinas are people who have passed on to live in the Fifth World as clouds. However, during each growing season they answer the people's prayers for rain, health, and other good things of life by returning to the villages in "masked" dance performances. In Hopi belief they arrive as rain. Between the opening ceremonial of Powaymuya (Bean Dance) in February that anticipates the growing season and the closing ceremonial of Nimantikive (Home Dance) in July when they return to their cloud homes in the four cardinal directions, they sing songs in which they proffer advice in a special ritual language of compound words that metaphorically describe how to live according to principles that sustain their corn lifeway. Thus, just as the young Maya boys were metaphors for the frogs, many Hopi songs recall the cries of happiness by the toads who emerge from the ground after a rain to sing their happiness with the rebirth of life (Song 117).

> Throughout the midst of the planted fields when puddles form,
> the toads will be dancing as they make their cries.
> Waaq, waaq, they will say.

MANIFESTATIONS OF THE MAIZE METAPHOR

What has not been sufficiently recognized is the degree to which this maize metaphor based on plant life stages pervades the imagery produced by peoples who live the corn lifeway. For this reason I begin by reviewing botanical knowledge about the stages of corn plant growth and the associated natural resource requirements for satisfactory plant growth because it is precisely the physical manifestation of these stages and of the necessary natural resources that are imaged in design. I then discuss a number of examples from both Mesoamerican and especially Puebloan depictions that illustrate these forces and features.

The Stages of Corn Growth

A report from the Iowa State University Cooperative Extension Service (Ritchie, Hanway, and Benson 1914) illustrates the basic sequence of kernel germination, root development, leaf emergence, and so on, common to all varieties of corn. Agronomists divide the stages of plant development into vegetative (V) and reproductive (R). The vegetative stages extend from VE, shoot emergence, to VT, tasseling, after which the reproductive stages begin with R1, silking, to R6, maturity. Tasseling actually begins several days before silk emergence, during which time the corn plant attains its full height and pollen drop begins. Pollination occurs when the pollen grains falling from the tassel are caught by the moist new silks emerging from the forming cob. Pollination of one silk leads to the development of one kernel. The kernels at their earliest stages are clear and the embryo—that is, the germ—is not yet visible. As the kernels fill with a milky fluid that is the accumulating starch, the embryo becomes visible.

A number of environmental conditions may compromise these stages of plant growth. Flooding at any time before VE will kill the plant, especially if temperatures

are high. Nitrogen deficiency before VE will impede root development. Moisture and/or nutrient deficiency at the V12 stage, when the stalk has developed with nodes where each ear will form, will reduce ear size and number of kernels on each ear. However, the most critical period occurs during the development of the tassels and silks. Water stress, high temperatures, or nutrient deficiencies during the period from two weeks before through two weeks after silking will reduce seed yield more than at any other period of plant growth. If the stress is severe, silking will be retarded until pollen drop is underway, resulting in poor kernel formation and nubbin ears with barren tips. (A detailed review describing these same conditions for corn plant growth in the prehistoric Southwest can be found in Benson 2011a, 2011b.)

The following discussion will assess how ancient corn farmers in Mesoamerica and the Puebloan Southwest similarly depicted (1) the natural forces necessary for corn plant growth and (2) the sequential stages of corn plant growth. While some images are clear depictions of plants, leaves, and so forth, others represent features in more abstract and geometric ways.

Depictions of the Natural Forces Necessary for Corn Growth

Archaeological research indicates that early Mesoamerican farmers augmented their slash-and-burn techniques with raised fields, terracing, and irrigation in response to periods and conditions of insufficient moisture (Adams, Brown, and Culbert 1981; Harrison and Turner 1978; Moriarty 1968). Research has also found that depletion of soil nutrients was a mitigating factor during the Late Classic, leading to the collapse of these polities (Haug et al. 2003; Hodell, Curtis, and Brenner 1995; Medina-Elizalde and Rohling 2012).

Similarly, in the northern Southwest, homeland of the ancestral Puebloans, sufficient rain was the primary factor determining agricultural success or failure (Benson 2011a, 2011b; Dominguez and Kolm 2005; Hack 1942; Sandor et al. 2007). During prolonged periods of suboptimal moisture, the archaeological record shows a consistent pattern of site relocation from areas with unpredictable precipitation to areas with permanent water sources as well as a shift of field types from those that depended on direct precipitation to those positioned to capture runoff (Ahlstrom, Van West, and Dean 1995; Benson, Petersen, and Stein 2007; Cordell et al. 2007; Dean 1996; Euler et al. 1979; Gumerman 1988). Moisture in various forms was clearly of primary concern to early farmers in both Mesoamerican and the Southwest. Were these natural forces recognized and imaged in design?

Maize farmers in Mesoamerica today revere the power of the natural forces related to corn agriculture. Some of these forces, such as the earth, sun, clouds, lightning, and rain, nurture their crops; others, such as earthquakes, hail, and wind, bring destruction (Marcus 1989). All of these forces are considered animate; they have human capacities and live like humans do. For example, Mixtecans believe that clouds live in "rain houses" on top of mountains and "ripen" and "mature" before they descend as rain (Monaghan 1995:105–6). The Nahua of northern Veracruz conceptualize the soil as the earth's flesh and water as its

blood (Sandstrom 1991:238). The Zapotecs of Mitla conceptualize thunder as "speech" of the clouds (Parsons 1936:2, fn. 5). The Maya of Santiago Atitlan say that lightning bolts charge the earth with life-giving powers that break open the germinating maize seed (Christenson 2001:74).

The earliest Formative period designs on ceramics from Mesoamerican traditions depicted these same natural forces of lightning and thunder. The Olmec and cultures who traded with them decorated their vessels with images of fire-serpent deities as representative of lightning and were-jaguar deities as representatives of earthquakes and thunder (Figure 2). Zapotecs made offerings to the lightning bolt, *cocijo,* and thunder, *xoo cocijo,* the motion of lightning, as well as to the different forms of lightning (clouds, water, hail, wind) with food, drink, human blood, and sacrificed fowl, dogs, children, slaves, or captives (Marcus 1983:346). Zigzags symbolizing lightning continued to be depicted on ceramics throughout the Mesoamerican prehistoric sequence. Postclassic ceramics (Otinapa Red-on-white jars) from the Chalchihuites culture of Zacatecas and Durango are decorated with bands of opposing stepped clouds separated by series of zigzag lightning lines (Figure 3).

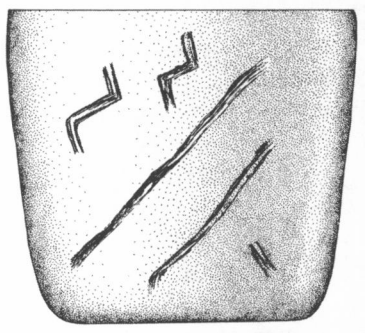

Figure 2. Fire serpents as lightning: Olmec culture (Marcus 1989: Fig. 8.12; courtesy Cambridge University Press).

Figure 3. Lightning and clouds: Otinapa Red-on-white bowl, Chalchihuites culture. Redrawn by the author from Kelley and Kelley 1971: Pl. 43E.

Geometric designs on ceramics in the Puebloan Southwest also focus on these natural forces that promote corn growth. Indeed, the very earliest imagery on Basketmaker gray ware vessels from the northern Southwest associated with early farming sites depicts the regenerative powers of lightning and rain. Designs on small deep bowls are arranged as if the bowl interior represented the people's world. Their village is represented by a circle in the center of the bowl bottom; the extent of their world is the horizon demarcated by the bowl rim. Within this universe zigzag lightning comes to the village from all corners of their world (Figure 4).

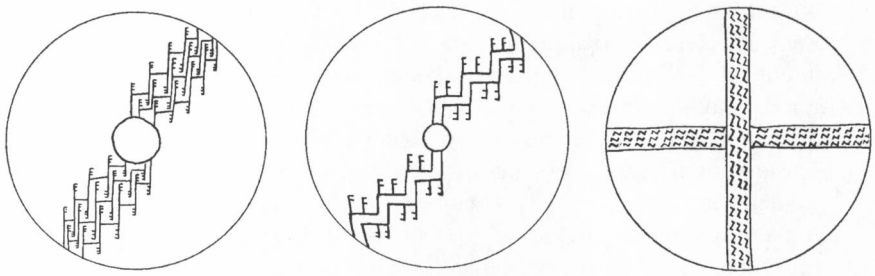

Figure 4. Lightning and rain coming to a village: black-on-white bowls, Basketmaker III period (Roberts 1929: Pl. 15d,f and 16c).

Centuries later this same conception of the way lightning comes to a village appears on a Hopi Yellow Ware bowl (Figure 5). The lightning and cloud designs on ceramic types such as Kana-a, Kiatuthlanna, Red Mesa, and Cortez Black-on-white (Figure 6) made throughout the Four Corners during the ninth through eleventh centuries are very similar to the depictions on Otinapa Red-on-white made by the Chalchihuites culture (Figure 3).

Figure 5. Lightning: Jeddito Polychrome bowl (courtesy Penn Museum, image #233605, object #29-78-623).

Figure 6. Lightning and clouds: Kana-a (Pueblo I) Black-on-white pitcher (from Lister and Lister 1969: Fig. 17; courtesy University of Colorado Museum of Natural History, Earl J. Morris Collection, Cat. #9537).

Hopis today recognize the essential role of rain and the thunder and lightning that accompany it. They think about these forces every day; women paint their hopes for these resources on their pottery, and their ritual paraphernalia is covered with images of these natural forces. For example, katsinas "call" lightning to the villages by thrusting out accordionlike lightning "frames"—*yoytalwipiky*, literally "rain lightning sticks"—to simulate flashes of lightning (Hough 1919: Fig. 45).

Likewise, katsinas mimic the sound of thunder that presages the rainstorms by whirling bull roarers, *tovokinpi* (Hough 1919: Pl. 51 #6). These signs of the natural forces critical for life also appear on Pueblo textiles and ritual paraphernalia. Ceremonial clothing is replete with embroidered images of rain, stepped clouds, running water, and lightning motifs (e.g., Mera 1943).

These same natural forces are also celebrated in the texts of katsina songs. The Four Directional Cloud Chiefs come from the four cardinal directions and "make their lightning flashes stand" (Song 144). The image of vertical lightning strikes is implied in the word "stand." In addition the penetration of the earth by lightning is seen, metaphorically, as a reference to its fertilizing nature.[3] On a fifteenth-century kiva mural from Kawaika'a, an early Hopi site, zigzags are shown vertically piercing—that is, fertilizing—the earth (Figure 7).

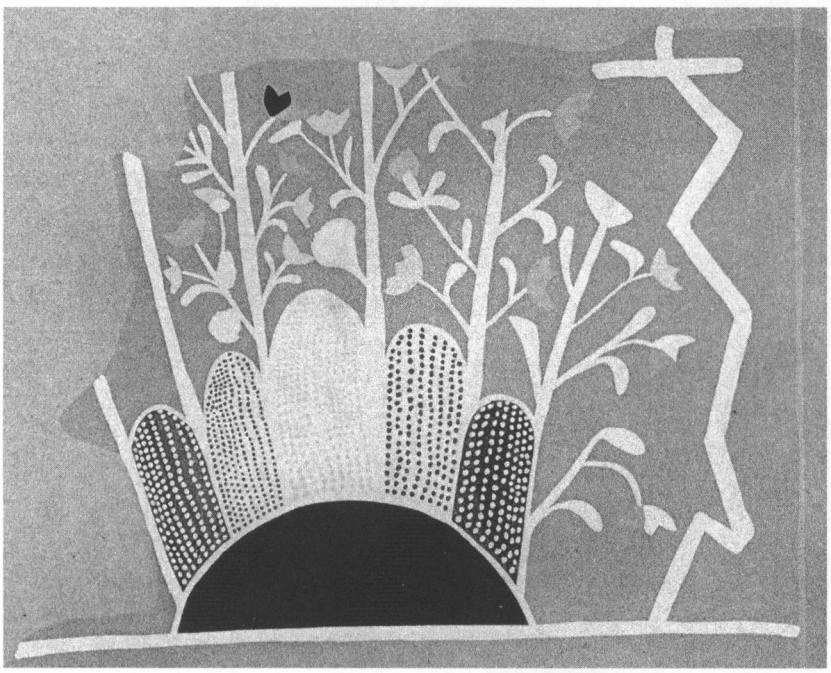

Figure 7. Lightning fertilizing the earth, with all stages of growth depicted: kiva mural, Kawaika'a, fifteenth century (Smith 1952: Fig. 76a; courtesy Peabody Museum of Archaeology and Ethnology, Harvard University, ID #2004.24.20335, digital file #153450054).

The booming of thunder is likened to the sound of the beating of the nighthawks' wings as they swoop over springs to catch insects disturbed by the winds that pass over the desert prior to a rain (Song 32).

> The nighthawks will be pleasing with their thunder all day long.
> We will come moving as rain.
> We will be thundering along the flowery expanses of corn plants.

The Hopi delight in these sounds and sights of the coming rain (Song 49):

> They [katsinas] will be coming along with lightning flashing in the rain;
> they will be moving along;
> they will be coming along thundering;
> they will go along shaking the earth.
> There will be delight in their rain sounds.

However, in the minds of Hopis the most important natural resource is rain. Cumulus clouds full of rain are likened to brides, *omawmamant*, literally "cloud maidens"—young women with the reproductive power to create new life. During Powamuya, the late winter ceremony that portends a successful growing season, the Hahay'iwùuti katsina circulates through the village offering to give people a drink from a gourd. But rather than giving people a sip, she overpours the water down the person's shirt front in a symbolic gesture of hopes for an abundance of rain.

In Hopi belief, the clouds live on mountain tops in their cloud houses (Figure 8) in the four cardinal directions. They "sit in judgment" over whether the people are deserving of their rain. During the summer months Hopis eagerly watch for two features of clouds: the way they first come into view over the horizon in the morning, *kuukuyva*, and the way they build into dark thunderheads in the afternoon. Hopis conceive of these appearances in the animate sense as the way clouds, respectively, "show themselves" (Song 28) and "stack themselves" (Song 24). In image, cloud motifs often hang from the rim edge of bowl interiors as if they are just appearing above the horizon, as represented by the rim edge (Figure 9). Sekaquaptewa described this first appearance in animate terms as "peeking," and in song they are sometimes referred to as cloud boys, *toko'omawtotim* (Song 15).

> The dark billowing cloud boys are rehearsing their rain skills
> by flashing lightning over there where the first light of day is still out of sight.

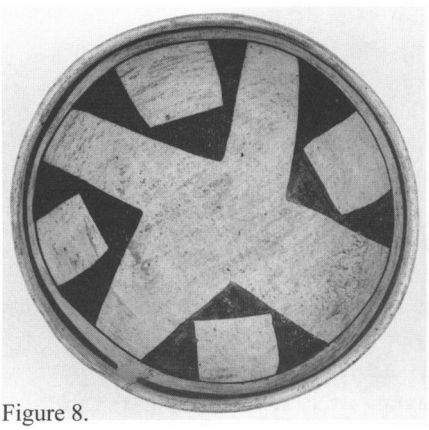

Figure 8.
Clouds coming toward the village from their houses in the four cardinal directions: Hopi Yellow Ware bowl (courtesy Penn Museum, image #233607, object #29-77-667).

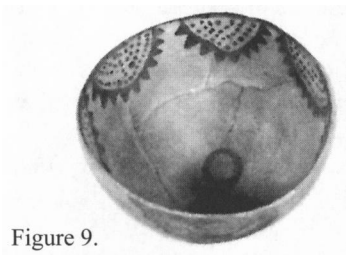

Figure 9.
Clouds filled with rain peeking over the horizon: La Plata Black-on-white bowl (from Lister and Lister 1969: Fig. 8; courtesy University of Colorado Museum of Natural History, Earl J. Morris Collection, Cat. #9571).

The sense of peeking also references the idea that the katsinas, who are the rain, are monitoring the behavior of the Hopis, checking on whether they are deserving of their largesse before coming to their fields and villages.

The Hopi depict clouds as stepped motifs indicating their hopes for clouds that are dark, stacked, and therefore full of rain. They are colored black to indicate their stormy nature or are hatched to show that they are laden with rain. They are often depicted as coming from all four cardinal directions (Song 50) as indicated by their presence in four quarters in bowl designs (Figure 10). Similarly, katsinas wear ankle bands decorated with terraced clouds in all the colors associated with the different directions; these bands "call" the clouds to come from all four corners of the Hopi universe (see Washburn 1980: #166). The Hemis katsinum who often appear at Nimàntikive, the final dance of the katsina season, wear terraced cloud headdresses blackened with corn smut to simulate dark rain clouds.

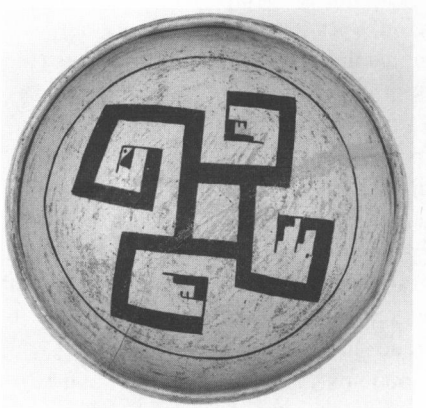

Figure 10. Clouds coming from four cardinal directions: Jeddito Yellow Ware bowl (courtesy Penn Museum, image #150571, object #29-77-636).

Indeed, katsina songs celebrate this process *of the becoming* of rain by endlessly describing how clouds move and stack into thunderheads. Not insignificantly, this also symbolizes the same process *of developing* experienced by plants and people as they grow to maturity. For example, katsinas wear down feathers on their headdresses that bounce up and down as they dance, mimicking the movement of the clouds as they build into thunderheads.

> The down feathers worn on my head will be trembling with water for your benefit (Song 145).

> We [katsinas] have been asked to come and dance from over there.
> To the four directions, the blue/green prayer feather maidens
> are calling for the down feathers worn on my head to come as rain (Song 15).

Typical ceramic designs consist of linear rows of solid triangles, sometimes interlocked, that have been identified as running water (Fewkes 1904) (Figure 11). Angled series of "corbels" have been identified as the water that rushes down the washes after a hard thunderstorm (Figure 12). The dominance of designs on later

prehistoric and historic ceramic types depicting *running* water may reflect the shift from fields that depend on direct rainfall to akchin fields, which are located at the mouths of arroyos so as to receive rainwater gathered from runoff throughout a broad catchment area. Some designs oppose hatched and solid lines of triangles that, respectively, depict the combined activity of falling rain (*yoylecki*) and runoff (*muunangw*).

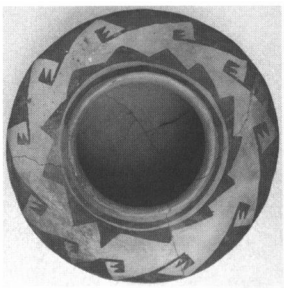

Figure 11.
Interlocked hooked triangles as running water: Awatovi Black-on-yellow jar (courtesy Peabody Museum of Archaeology and Ethnology, Harvard University, ID #39-97-10/21739, digital file #98600120).

Figure 12. Corbels as runoff: Kayenta Black-on-white jar (courtesy Penn Museum, image #150565, object #29-77-649).

These concerns for the resources corn needs to grow were visualized and made manifest in endless ways by Puebloan potters. For example, on the interior of a shallow grayware bowl a potter painted her hopes with economy and beauty. Sekaquaptewa interpreted the image as a zigzag line of lightning imaged as puffy clouds in the process of building into rainclouds, hovering above a series of bird tracks that, metaphorically, are "leading'" the clouds with their rain to the cultivated fields (Figure 13).[4] Another potter imagined the way rain moves across the land by superimposing a series of stepped units on parallel lines that Sekaquaptewa remarked looked like *yoyungwayma*, "rain walking along." It is especially significant that Sekaquaptewa described the action as "walking," a very typical Hopi use of the habitual *-ngwu* grammatical tense that indicates ongoing action. Hopis do not see life as a set of discrete events, but as a neverending process. Only by continually acting in the interest of community survival will the Hopis be deserving of the arrival of the rain that supports their lives.

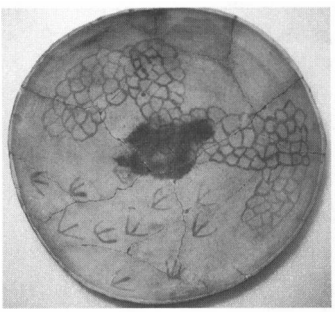

Figure 13. Clouds building and moving toward a village: Piedra Black-on-white bowl (#42905/11 from LA 4195, Navajo Reservoir Project, Collections of the Bureau of Reclamation, U.S. Department of the Interior at the Museum of Indian Arts & Culture/Laboratory of Anthropology).

By the fourteenth century, Hopi artists were depicting the natural forces of lightning, clouds, and rain with endless ingenuity in geometric and realistic ways on their beautiful yellow ware. One bowl depicts realistic clouds with rain lines ending in drops descending within a circumscribed area that may be a field (Figure 14), while another, more geometric pattern depicts clouds, rain, and running water inside a masklike form that may be an effort to connote the idea that it is the katsinas who are the rain (Figure 15).

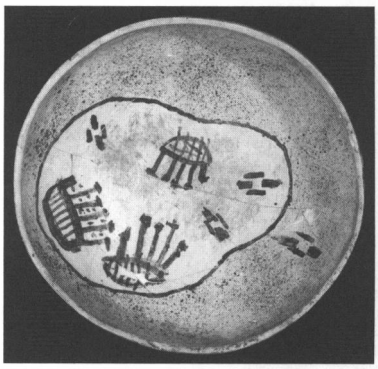

Figure 14. Clouds raining on a field: Jeddito Black-on-yellow bowl (courtesy Peabody Museum of Archaeology and Ethnology, Harvard University, ID # 36-131-10/7434, digital file #98660012).

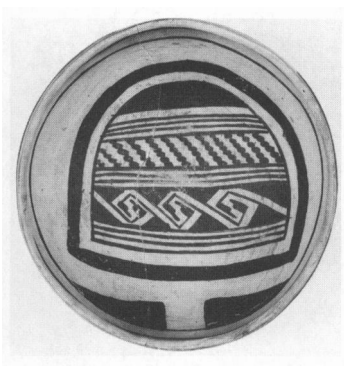

Figure 15. Katsina rain: Jeddito Black-on-yellow bowl (courtesy Penn Museum, image #233609, object # 29-78-974).

Dots and concentric circles were used to represent the different kinds of rain that are specifically described in Hopi katsina songs. For example, during hard summer thunderstorms the raindrops strike puddles with such force that they rebound vertically. Song texts describe this hard rain with the compound song word *paamotoro*, which combines the word for water, *paa*, with the way it looks—like a stalactite, *motoro*—when it strikes the ground vertically.[5] This image of vertical water pillars is then used to metaphorically liken the way the hard thunderstorm rain makes the plants grow—that is, "stand up."

> The journey has begun.
> From over at Shadow spring in the northeast, along the elders' consecrated path,
> we have set out on our journey to you, coming this way.
> We glisten with our water shields.
> The water pillars will repeatedly stand up along there.
> Let it be that we have come to you as rain using those, coming this way.
> Let it be that, using those [water pillars],
> the waters will be descending this way throughout your planted fields along here.
> Let it be, using those, they [plants] will be making themselves mature this way along here throughout your planted fields.

Furthermore, when this hard, vertical rain strikes puddles, concentric circles are formed in the water. These circular patterns in the water are described as "water shields," *paatuwvota,* a compound song word from *tuwqa*, enemy, and coiled plaque, *poota,* that metaphorically connects these concentric circles to the coiled yucca plaques, *tuwvota*, used in the distant past as war shields (Song 99). These raindrops that strike and create the water shields are imaged in a yellowware bowl in which the bowl interior is the Hopi land being covered with a hard rainstorm (Figure 16).

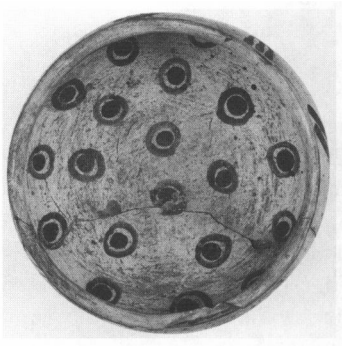

Figure 16.
Water shields:
Hopi Yellow Ware bowl
(courtesy Penn Museum,
image #233066,
object #29-78-685).

Similarly, katsina song texts suggest that dots may also represent pollen. In one early-twentieth-century song the katsinas conflate pollen with rain, telling the people that they have adorned themselves at their cloud dwelling place in the northeast with rain, which they liken to the particulate nature of pollen (Song 50).

> Our fathers, our mothers,
> You are sending us prayers over to the southeast, to the northeast,
> to the dwelling places of the clouds.
> There we adorn ourselves for you with rainwater pollen. . . .
> From the different directions around,
> The clouds will start coming on their journey as rain.

In another song the katsinas attend to the visible appearance of pollen on plant leaves as a way to highlight its importance in the growth cycle (Song 70).

> Throughout, along your fields here,
> the young corn plants are fluttering their pollen-laden wings.
> They will make themselves grow upward here.

Depictions of the Stages of Corn Plant Growth

Several researchers have noted how Mesoamerican imagery depicts the stages of corn growth (e.g., Stross 2006; Taube 1989). Ancient Mesoamericans typically depicted corn kernels, plant leaves, and so on, with both quasi-realistic representations and geometrics (e.g., Taube 1996). While the murals on the walls of the Temple of Agriculture at Teotihuacan quite clearly depict corn

kernels underground and rows of emerging plant tendrils above (Marquina 1964: Pl. 22), Mesoamerican design also uses geometric checkerboards and other nonrepresentational forms to reference stages of corn growth. Both representational and geometric image traditions apparently accompanied the introduction of corn agriculture into the Southwest. A very early realistic example is a Basketmaker period scoop from the Mancos–La Plata drainage in southwestern Colorado that depicts a cornstalk with leaves (Figure 17). However, with the shift to fully settled village life in masonry pueblos, representations of the corn lifeway on ceramics and other media in the Southwest become largely geometric. Below I review the many ways that the stages of corn growth have been imaged in Mesoamerica and the Southwest.

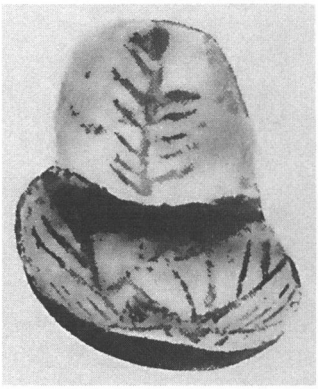

Figure 17. Ceramic scoop with corn plant image, Basketmaker period (from Morris 1919: Pl. 69f).

Germination: The Sprout of Life

Under adequate soil, temperature, and moisture conditions, when a planted kernel germinates, it first sends out a root-like stem called the radical that does not rise above the ground. This is followed by the first leaf, the coleoptile, which contains the embryonic plant. As the coleoptile begins to push to the surface, it makes a 90° turn upward (Figure 18). For ancient corn farmers, this sprouting stage was perhaps the most important stage, for it represented the first sign of potential food.

Figure 18. Corn germination and emergence sequence (left to right). The 90° hook turn is visible on the second from the right (from Ritchie et al. 1914: Fig. 5; courtesy Iowa State University Cooperative Extension Service).

It could be argued that, since germination occurs underground, farmers would not know what this stage looked like and thus would not be able to depict it on their ceramics. But before planting, contemporary Totonac, for example, force-germinate some kernels in water in a wood tray covered with banana leaves. Other kernels are planted directly "so that [they] will endure drought." If the planted kernels are not visible above ground in 8–10 days, the field is replanted with forced germinated seed (Kelly and Palerm 1952:110). Likewise, in late winter, at Powamuya, Hopis force-raise bean and corn sprouts in heated underground kivas as metaphorical symbols of their hopes for a fruitful growing season. On the last day of this ceremonial katsinas move through the villages, distributing bundles of these sprouts to women, who put it in their stews to serve at family meals later that day. Ingestion of corn at this sprouted stage is yet another way to emphasize the importance of germination.

I suggest that the 90° turning of the first leaf sprout, clearly visible at the V6 stage (fifth sprout stage from left, Figure 18), is depicted in both Mesoamerican and Southwestern designs by geometric hook motifs. This hook motif is a visual metaphor for the process of germination.[6] The representation of these germinating sprouts varies greatly. Beyer has compiled an illustrated sample of these depictions as they occur on all types of media, including codices, murals, textiles, ceramics, stone friezes, and other architectural ornaments from Mayan, Zapotec, and Mixtec sites (Beyer 1965). I illustrate several examples here. The first is an array of simple rectangular or curvilinear hooks on a tripod vessel from Copan that may depict a field of sprouting plants (Figure 19). The second array appears on the front of a huipil worn by Lady Chak on Lintel 13 at Yaxchilan (AD 771), perhaps as a metaphor of a woman's reproductive capacities (Figure 20). Lady Chak is wearing this hupil in a bloodletting ceremony of sacrifice to the deities, presumably in the hopes of gaining their benevolence in the form of rain and other life-promoting substances. Looper interprets these "squared scrolls" as "geometricized water scrolls" (Looper 2000:26). However, such series of hooks may also be read as corn sprouts.

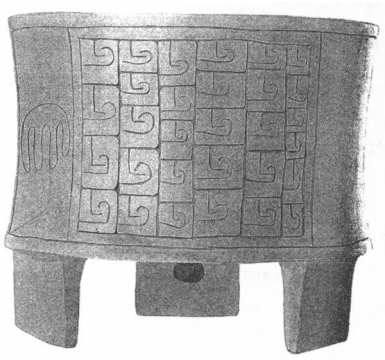

Figure 19. Corn sprouts on whiteware tripod vessel, Copan, Early Classic (from Longyear 1952: Fig. 103c; courtesy Carnegie Institution, Washington DC).

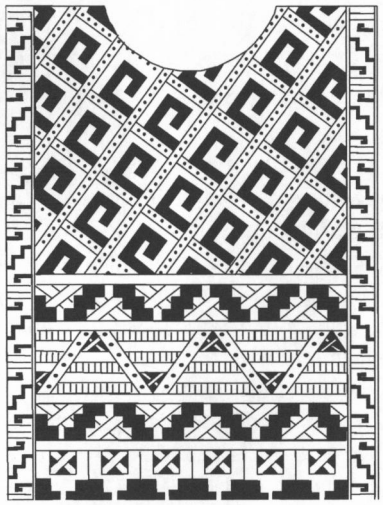

Figure 20. Corn sprouts on *huipil* (textile garment) of Lady Chak, Yaxchilan (from Looper 2000: Pl. 23; redrawn by and courtesy of Lynn Teague).

In precolumbian Mesoamerican traditions, the role of elite male personages as deified representatives of corn was often signaled by means of these germination hooks that are represented in curvilinear form. Taube found that Eduard Seler was the first to identify the presence of these hooks, which he called "brow curls," on the head of Mayan maize god (1989:35). Thompson (1971) later termed them "maize spirals" and Schele (1999) dubbed them "corn curls." Taube identified them as "maize grains" (Taube 1985) and later as tamales (Taube 1989:31).

I suggest that these corn curls are specifically intended to represent the *germinating stage* of maize kernels. What could more clearly represent the task

of the gods and rulers than their responsibility to provide food for their people? And the successful germination of seed is the most important stage that begins the process of raising food. Corn curls on their brows (Figure 21), as well as hooked motifs in the speech scrolls emanating from their mouths (Figure 22) on a tripod cylinder from central Mexico, are succinct statements of this critical stage.

Figure 21. Corn sprout curl on maize god forehead (adapted by Karl Taube 1989: Fig. 1c from Thompson 1971; courtesy of Karl Taube).

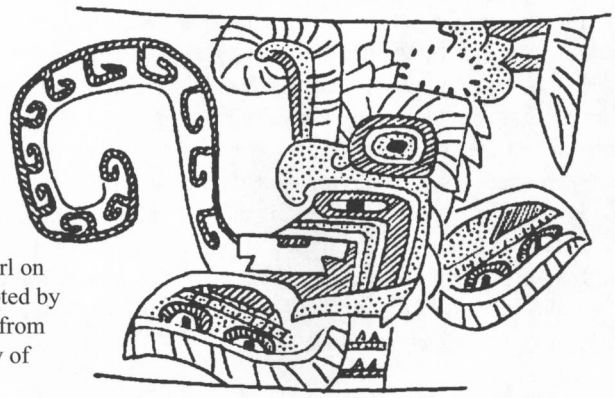

Figure 22. Corn sprouts in speech scroll, Kaminaljuyu, Guatemala (from Kidder, Jennings, and Shook 1946: Fig. 101b; courtesy Carnegie Institution, Washington DC).

When the hooks are attached to stepped fret units, I suggest that these hooks may be read as a representation of clouds "feeding"—that is, nourishing the germinating sprouts with rain. This combined half-stepped motif and hook motif appears on ceramics from Cholula (Figure 23). On the wall of Tomb 105, Monte Alban, women are depicted in a procession of couples wearing capes and skirts decorated with these germination hooks that emanate from half-stepped cloud motifs (Marcus and Flannery 1996: Fig. 250). This combined motif also occurs above the entryways of Oaxaca Valley tombs (Caso 1966: Fig 16—Tomb 1, Zaachila; Sharp 1970: Fig. 4a,b—Tomb 11, Yagul) and on pottery from Oaxaca Valley sites (Elson 2007) as well as on Classic Teotihuacan ceramic imagery (Sejourne 1966: Fig. 108). The diversity of these venues suggests a lengthy and widespread veneration of the close association between rain and germination.

Figure 23. Stepped frets as clouds and corn sprouts, Cholula, Postclassic (from McCafferty 2001: Fig. 4.21g; courtesy Cotsen Institute of Archaeology Press).

Similarly, in the northern Southwest, the hooks on the bands of running water motifs on ceramic design dating from ca. AD 900 may image corn sprouts being fed by thunderstorm runoff (cf. Figure 11). This style of hooked triangle series continues to dominate Pueblo design throughout prehistory into the historic period. In many cases the hooks are arranged in bifold rotation—a metaphorical representation of the procreation efforts of the husband and wife. A Hopi Yellow Ware bowl (Figure 24) depicts these hook pairs in combination with the running water that is required to nourish this newly germinated life.

Figure 24.
Bifold hooks as germinating corn sprouts: Hopi Yellow Ware bowl (courtesy Penn Museum, image #233608, object #29-77-669).

Indeed, the idea that corn sprouts are like a bent hook is embedded in Hopi words related to the process of germination. The word *harumti*, "break through the ground as a sprout," is said to refer to the way bean sprouts appear to be "bent around" when they first emerge from the ground (*Hopi Dictionary* 1998:63). Likewise, the verb *ngaakuyva*, "for a root to emerge," emphasizes that the visible emergence of the sprout is a sign that the potential for new life in the seed has now been realized. From these linguistic clues we may surmise that the countless prehistoric Puebloan designs that depict two rows of running water triangles united by hooks are representations of the integral connection between water and germination.

During the tenth through twelfth centuries many ideas and items of material culture were exchanged between Mesoamerica and the Chacoan great house system that flourished in the Four Corners of the Southwest (e.g., Washburn, Washburn, and Shipkova 2011). Here I note that the same "field" of hooks that decorated Lady Chak's huipil from Yaxchilan is found on a design woven on two twined jog-toe sandals from sites associated with the Chacoan activity (Teague and Washburn 2013). On the Yaxchilan huipil the black hooks are actually in two-color opposition to the hook shapes created in the white background. This two-dimensional bifold (*p2′*) symmetric arrangement is the same arrangement as on the sole of the sandal found in Cave 6, Grand Gulch, southern Utah in which the brown/black hooks are interlocked in two-color bifold symmetry with the natural yucca color of the background (Figure 25, right).[7] In an unusual reversal of surface textures, the upper surface of the Grand Gulch sandal has the same design but in wrapped twining, which creates a raised effect that would have been uncomfortable to walk on. Likewise, the perishable colored and decorated surface on the sole would hardly have been suited for everyday wear. The sandal from the Chacoan outlier of Aztec Ruins, northwestern New Mexico, has a similar interlocking hook pattern, but in this case the rows of hooks moved in opposite directions, creating a different two-color bifold (p'_b2) pattern (Figure 25, left). The decoration and its placement on these sandals suggests that they were created for ritual occasions.

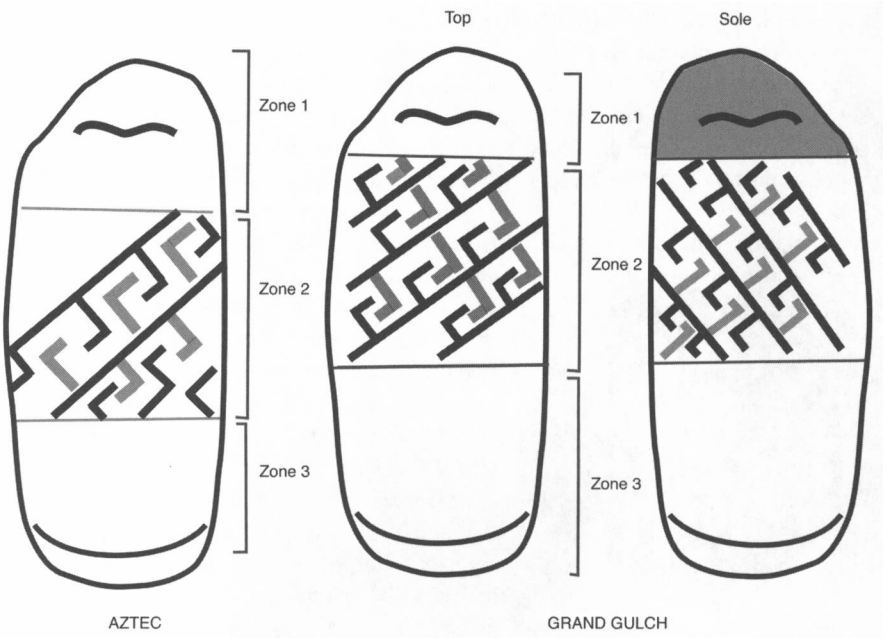

Figure 25. Twined sandals with germinating corn sprout design, prehistoric Puebloan (left: Aztec Ruin sandal #29.0/5289; right: Grand Gulch sandal #H/14131. Collections of the American Museum of Natural History, New York; drawing courtesy of Lynn Teague).

Furthermore, on both the Grand Gulch and Aztec sandals the design in the instep area is angled so it appears to be truncated by the upper and lower banding lines of the design fields as well as by the edges of the sandal. This angled, allover layout is also typical of the black-on-white hatched two-dimensional patterns on Chacoan cylinder jars and associated ceramics found in Pueblo Bonito with rich burials of apparently elite individuals (Washburn 2011). Significantly, both this layout and the two-dimensional patterns are identical to the angled layout and design on Lady Chak's huipil. This layout orientation has antecedents on Mesoamerican pottery design—for example, from Monte Alban period II-IIIA (Caso, Bernal, and Acosta 1967: Fig. 248a). In addition, the heel area of the two Chacoan sandals is "cupped"—that is, upturned and reinforced. These design layout and similar sandal heel construction features are found on sandals worn by royalty as depicted on stelae (Sharer and Traxler 2006: Fig. 12.2) and in the cenote at Chichen Itza (Coggins and Shane 1984; Tozzer 1957: Fig. 553).

Fertilization and Kernel Formation

The developmental stages of tasseling and silking are usually depicted realistically in Mesoamerican art. In Olmec iconography maize silk is imaged as long undulating plumes adorning the heads of the maize god. Nagao suggests that the horns on figures of Two-Horned Gods found in caches at Teotihuacan are embellished with pendant tassels (Nagao 1985: Fig. 10). Taube interprets flowing

quetzal feathers to be the Mayan convention for corn silks (Taube 1996:71; but see Luckert 1976: Fig. 10, who interprets these drooping feathers as corn leaves).

In contrast the stage of pollen drop is represented more metaphorically. Taube has concluded that the Yucatec word *wah* (meaning "to spout") is a reference not only to the spattering that occurs during bloodletting as a metaphor of sacrifice to the gods, but also to the showering of seed as a metaphor for food that results from seed (Taube 1989:38). I suggest that the drops may also reference both the pollen essential for fertilization as well as the raindrops critical for growth. Furthermore, while the act of bloodletting by ancient Mayans was thought to provide sustenance to the gods, and blood itself may have been seen as the metaphorical equivalent of the dynastic seed (Florescano 1999:88; Stross 1992), I suggest that the blood of sacrifice, and especially as it is depicted as sprinkling from its source, may also have been a metaphor for pollen as well as for the rain that must be sprinkled and splashed on growing plants for the development and maturation of the fruit.

For example, a design on a bowl from the Late Classic at Tikal depicting a series of interlocking hooks, each filled with dots, may be an attempt to represent sprouts being fertilized with pollen and fed with the nurturing rain (Figure 26). On the exterior wall of a bowl from Teotihuacan (Sejourne 1966: Fig. 121) raindrops are clearly falling from the sky (from clouds hanging from the rim) onto a colorful butterfly. The head of the butterfly is hooked, perhaps symbolic of the process of fertilization since it is in the form of a germinating sprout. Similarly, among the Hopi, butterflies are prominent fertility symbols. Many katsina songs celebrate their pollinating activities as they flit about the fields of blooming flowers (Song 10; see also Songs 18, 24).

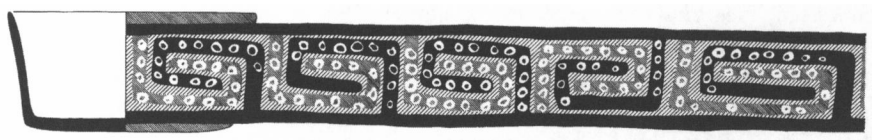

Figure 26. Corn sprouts with pollen and rain: Palmar Orange Polychrome vessel, Tikal (from Culbert 1993: Fig. 78-2a; courtesy Penn Museum).

> The yellow butterflies will be chasing one another about colorfully
> as they go along adorning their faces with the pollen of the corn
> blossom maidens.

Pueblo convention depicts the newly forming kernels without their germ as a crosshatched pattern with unfilled squares. In contrast, fully formed kernels are represented as checkerboards with their germ indicated by dotted centers. This convention of unfilled and filled checkerboards was used on ceramics throughout the Pueblo period in the Southwest. Mature cobs appear as checkerboards on ninth-century Red Mesa Black-on-white vessels and on Chacoan cylinder jars, pitchers, and bowls (Washburn 2011: Fig. 5b; Webster, Hays-Gilpin, and Schaafsma 2006).

Figurative fifteenth-century kiva murals from Awat'ovi (Figure 27) depict two corn ears, positioned to the right and left of Tuwapongtumsi, Sand Altar Woman (Mother Earth), "growing" from the sand altar, *tuwapongyava*—that is, the earth. The cob to her left has empty kernels and is being fertilized by lightning striking its top; the cob to her right has fully formed kernels with their germs represented as small black squares inside each kernel. At the tip of that cob are black vertical marks that represent the dried silks.

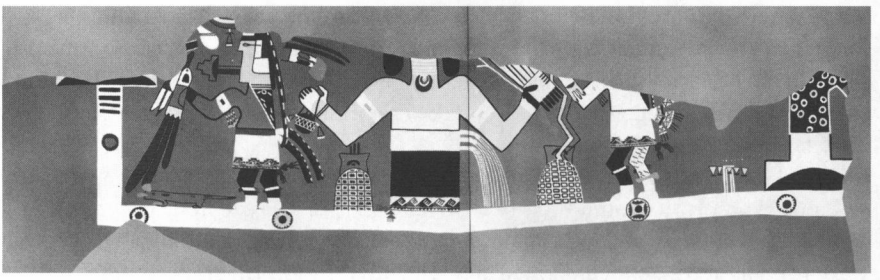

Figure 27. Sand Altar Woman fertilizing developing corn plant with lightning on her left; mature corn plant with tassels shown on her right: kiva mural, Awat'ovi, fifteenth century (from Smith 1952: Fig. 81b; courtesy Peabody Museum of Archaeology and Ethnology, Harvard University. ID#2004.1.352.6. digital file #98800011).

Sekaquaptewa described the dot in the center of checkerboards on prehistoric Puebloan, Hohokam, as well as early Hopi pottery from Awat'ovi as the germ, *soona'at,* the "vital substance" of the kernel. This idea is expressed on a mural from Awat'ovi depicting *qöö'aya*, the keeper of the fire of the village. In this role she stands as its mother and wears a dress with checkerboards that include the germ (Smith 1952: Fig. 50c). In Mesoamerica, examples of both unfertilized and fertilized cobs are found on Mayan cylinder jars, such as on one from Tikal (Culbert 1993: Fig. 79c1).

Depictions That Combine Stages of Growth

Many Mesoamerican and Southwestern images conflate the different stages and processes of corn growth in a single image. Having all the stages represented in one image more forcefully connotes the power of the maize gods and their earthly counterparts. These beings were only effective if they were able to transform seed into food. Among the Maya, the imagery of the ruler-priests indicates that they were consumed with making this succession of stages happen so their hegemony would be maintained. For example, the image of God K on a relief panel from the West Court at Copan (Figure 28) appears to depict all the critical stages of fertilization that lead to kernel formation: his brushy head piece represents the silks which have grown to capture the pollen grains (round balls) falling from the tassels that surround him. His "corn curl" eye is a germinated corn sprout, a depiction of the end product of fertilization. Likewise, the empty crosshatch

pattern at the end of his sash depicts the newly formed translucent kernels that will mature to become food. Stross (2006) arrived at a similar interpretation of the iconography of the Hauberg Stela 4 as representing the five growth stages of the maize deity.

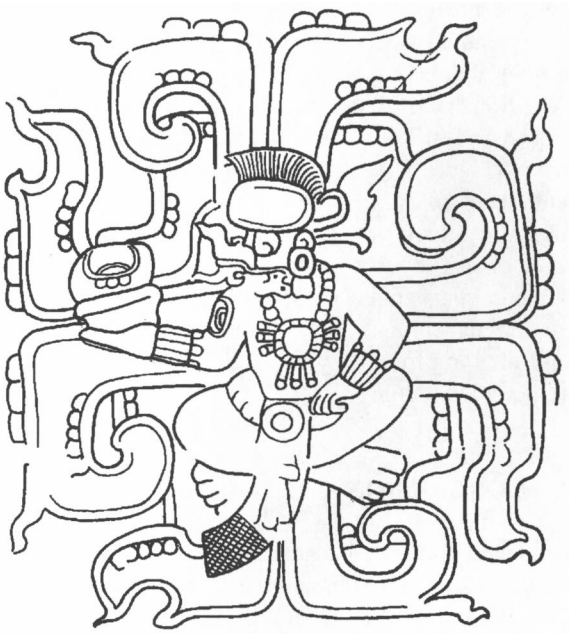

Figure 28.
God K seated on corn plant exhibiting leaves, pollen, tassels, and developing corncob (adapted by Karl Taube 1989: Fig. 10c from A. Maudslay 1889–1902 [Vol. I]: Pl. 9a; courtesy Karl Taube).

In Southwestern imagery, corn stages and belief concepts are also conflated in metaphorical representations in order to depict the metaphors of the corn lifeway stages. For example, a Chaco period hatched pattern on a bowl (Figure 29) from the Allentown great house depicts the reciprocal relationship between the prayers of the people and corn growth. The right half of the design anthropomorphizes a cornstalk that has alternating leaves topped by a round end suggestive of a human head, making this segment a succinct depiction of the maize metaphor. The left half of the design has a cornstalk ending in an arrow point. The Hopi word for prayer stick is *paaho*, literally "water arrow" (*paa,* water, and *ho* from *hohu,* arrow). In Hopi belief, prayers are "shot." This quasi-representational ceramic design thus references the idea that if people send (shoot) their prayers for rain, corn and people will mature.

Figure 29.
Human as corn plant (right) shooting prayers for rain: Chaco Black-on-white bowl, Allentown Ruin, Arizona (Collections of the National Museum of Natural History, Smithsonian Institution. #36749; drawing by the author).

Similarly, the design on a Pueblo IV yellowware bowl combines the Hopi concepts of emergence, prayer, and sustenance. On either side of a segmented tube that references the Hopi myth of emergence into the fourth world through a reed are eagle feathers and corn leaves. Paired together they symbolize the basic reciprocity of Pueblo life: heartfelt prayers for rain, as sent by prayer feathers, will bring corn and thus survival (Figure 30). The same combination of sentiments appears on a kiva mural from Kawaika'a, a fifteenth-century Hopi site. All stages of plant growth and fruition, from foliage of blooming plants to mature corncobs in all the directional colors, are juxtaposed and depicted as emerging from the earth, represented as a mounded dome (Figure 7).

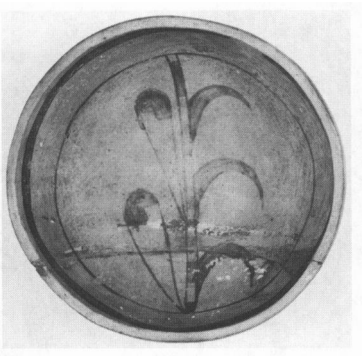

Figure 30. Reed from Hopi emergence story shown with corn leaves (right) and with eagle feathers (left) as prayers for corn: Jeddito Black-on-yellow bowl (courtesy Penn Museum, image #233604, object #29-78-599).

CONCLUSION

In this article I have discussed and illustrated visual evidence of the shared nature of cosmological beliefs and rituals underpinning the corn lifeway between Mesoamerica and the Puebloan Southwest. Based on the premise that the corn lifeway practiced by maize farmers is sustained by a complex of cosmological concepts, I have proposed that these concepts and associated ritual activities accompanied farming families as they moved north. To explore this assertion I have focused on imagery that depicts these concepts as they are embedded in the maize metaphor that equates the stages of corn growth with those of human growth. I have specifically focused on the shared nature of depictions of the natural forces essential for corn growth and of the stages of corn growth.

The image "readings" given are not derived from a literal reading of what the images appear to depict. Rather they derive from conceptual metaphors that structure the corn lifeway. Reading these metaphors was aided by reference to verbal descriptions of the metaphors in Hopi ritual song tests and by exegesis shared with me by two Hopi consultants. A comparable analysis of Mesoamerican song texts may recover similar links between belief and design and similarly confirm the rich ethnographic testimony of Mesoamerican corn farmers reported here. I assert that the shared nature of the metaphors projected on imagery in both Mesoamerican and Southwest corn farming communities is yet another way to substantiate the proposition that the corn lifeway was brought into the Southwest with migrating farmers.

NOTES

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1. Reference to the songs is by song number as listed in Sekaquaptewa, Hill, and Washburn 2008, where 150 katsina songs have been transcribed, translated, and analyzed. Here I present the English translation; the original Hopi transcription is available in the 2008 manuscript.

2. Some may ask why corn, and not beans, became the conceptual basis of life. Both are hardy plants that thrive in a variety of environments, and their "fruit" can be stored for long periods. But it is only corn that is both male and female and thus can stand on its own. Probably because of this special power to regenerate itself, corn has become the potent symbol for life.

3. See Benson 2011a:36 for scientific assessments of the nitrogen-fixing powers of lightning.

4. A more literal interpretation has been offered by the archaeologist Stewart Peckham, who described this image as depicting birds being hunted with a net (1990: Fig. 54).

5. Stalactites are known to Hopis; they occur in the salt caverns in the Grand Canyon, where Hopis obtain their salt.

6. The hook shape may also depict the opening of the seed coat of a bean and the upward turning of the cotyledon prior to the appearance of the first leaves.

7. An explanation of the symmetries used to describe the motif arrangements can be found in Washburn and Crowe 1988.

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