

**TAKING A CLOSER LOOK AT YARN PRODUCTION
SPECIALIZATION IN THE FLAGSTAFF AREA**

by
Linda Stephen Neff
Northern Arizona University
Flagstaff, AZ

Paper presented at the Ninth Annual Southwest Paleoethnobotany Workshop, Flagstaff, Arizona,
October 6 and 7, 2001

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I want to start by thanking Karen for inviting me to present today. This afternoon I'd like to talk about an extension of my thesis research on spindle whorls. For those of you who don't know what a spindle whorl is -- It is actually one of two items used to spin yarn and thread **(Slide 1)**. The spindle is a long wooden shaft that passes through a whorl which acts as a weight working to keep the spindle rotating by storing potential energy. It is also used to collect the spun yarn.

Today, I will talk about the evolution of my thoughts regarding my thesis research and more recent work on social process and culture tradition, and then I will reconstruct the prehistoric economy of the Sinagua and try to understand their relationship to social organization.

Beginning with my thesis research, I examined the ancient economy of Pueblo spinning in the northern Southwest. I investigated spinning at the culture area unit of analysis therefore examining craft specialization at a very gross scale. I focused on the well-represented period including the Pueblo II (A.D. 1000 to 1150) to Pueblo III (A.D. 1150 to 1250). This transition period marked a significant socio-political reorganization. I examined these periods for two primary reasons: (1) the sample was larger; and, (2) the perishable cotton textile remains first appeared in direct association with the production implements. But it was my endless fascination with the craft of spinning and weaving that led me to this research topic as well as the somewhat mysterious nature of cotton products on the Plateau. The final motivation was due to the encouragement I received from Wolf (8 years ago) who suggested that I extend my interest in cotton, textiles and the rise of the Andean state to the Northern Southwest. So here I am.

Unfortunately, in the American Southwest cotton materials rarely make it into the archaeological record. Only under pristine preservation conditions does textile preservation occur. **(Slide 2)** More often the weavers' tools such as spindle whorls, loom parts, loom holes, battens and needles, have a higher chance of survival than the perishable raw materials and final products

Building on previous work in the Northern Southwest, I examined yarn spinning technique within and between the ever familiar cultural boundaries archaeologists have defined based on artifactual and spatial similarities and differences. Theoretically, relatively discrete cultural units occur in the northern Southwest -- the Winslow, Kayenta, and Eastern Anasazi, as well as the Cohonina and Sinagua and Mogollon. Each archaeologically defined culture often shares similar architectural building styles, site structure, mortuary and cranial deformation practices, as well as ceramic, lithic and exotic good assemblages. Realistically, however, the cultural boundaries are a bit blurry and often hard to nail down given one set of criteria.

Using yet another line of evidence, yarn spinning technique, I demonstrated that the archaeologically defined cultures of northeastern Arizona represent a set of fluid social relations between several groups of individuals. Spinning techniques reveal both merging and discrete traditional boundaries.

Based on a statistical analysis of spindle whorl outer and inner diameters, thickness and weight, I examined spindle whorl spatial, temporal and functional variation using the Museum of Northern Arizona's collections. In concurrence with Kent (1957) and Teague's (1996) work, it was apparent that the non-perishable cotton textiles and tools, plant remains and spindle whorl frequencies suggested a dramatic increase in cotton production after A.D. 1000. Poor archaeological preservation, finger twined

products and settlement patterns may account for spindle whorl deficiency on earlier Basketmaker and Pueblo I period sites. However, the appearance and increase in efficient spindle whorls and other textile-related tools suggested a degree of yarn production specialization **(Slide 3)**.

With this in mind, I examined the data under two units of analysis: the region and culture. In the end, I identified two specialized production groups which Costin (1991) defines as a "number of producers sharing a technology, raw materials, or workshop" (Costin 1991:33). She states that a production group has no size limitations and represents culturally determined choices made by the ancient spinners **(Slide 4)**. Ethnographic descriptions, archaeological spindle whorl and shaft specimens, and spindle whorl dimensions, suggested that post A.D. 1000, the Winslow, Kayenta, and Eastern Anasazi, Cohonina, and Wupatki inhabitants (Group 1) all used the horizontal thigh, supported spinning technique whereas the Sinagua (Group 2) were the sole practitioners of a vertical base, supported technique.

In another paper, I sought to understand the social processes that contributed to the existence of the two specialized, spinning production groups (Neff 1996, 1999). For each production group, the social processes leading up to the cultural distinctions follow two separate trajectories. The northern cultures (Group 1) chose not to adopt the modeled whorl technique opting for their horizontal thigh, supported technique **(Slide 5)** that dated back to the Basketmaker III period. The Sinagua (Group 2) shared the vertical base, supported spinning tradition **(Slide 6)** with Native Americans living in southern Arizona. In reference to today's topic, I was very curious as to why the ancient inhabitants of the Sinagua region choose the technologically distinct vertical base, supported technique after A.D. 1000? The modeled whorls **(Slide 7)** are commonly found on post-A.D. 1000 west Mexican coast, and southern Arizona sites, and areas directly influenced by the Hohokam (the Verde Valley, Prescott and the Flagstaff area) (Kent 1957). Kent (1957) suggested the presence of the modeled whorls in the Sinagua region was a product of diffusion from the south -- a Hohokam trait in the Sinagua region.

Kent (1957) and many others (Colton 1932, 1936, 1937; McGregor 1936, 1937, 1941, 1965; Schroeder 1961, 1975, 1977; and Stanislawski 1963) have traditionally used the migration model to interpret the southern traits in the Sinagua culture. The early culture historians' primary goal was to create lists of the southern traits in the Flagstaff and Verde Valley regions (McGregor 1941).

Fish et al. (1980) noted the need to expand the cultural historian aim by understanding "the social contexts of traits and their changes through time" (1980:151). **(Overhead 2)** In attempt to reach this goal, the authors created a large table documenting the time period in association with southern traits such as Hohokam style structures, ballcourts, mounds, irrigation features, Hohokam ceramic types and forms, spindle whorls, and numerous other Hohokam exotics (e. g., human figurines, beads, pendants, frogs, animals, mosaics, argillite, copper bells, nose plugs, palettes, shell, and basalt cylinders). A majority of the Flagstaff sites examined were larger multiroom pueblos.

The authors (Fish et al. 1980) concluded that the early exotic items came to the area via expeditionary trade. Expeditionary trade entails "travel for the purpose of trading with the resource procurers or may entail extraction of a localized raw material by the expedition members themselves" (Fish et al. 1980:169). **(Overhead 3)** Eventually,

the sites with ball courts and a Hohokam style structure were interpreted as large trade centers. They suggested the Hohokam structures were the homes of resident full-time trading specialists (Fish et al. 1980:171). The authors recognized the Sinagua as a chiefdom with a four tier settlement hierarchy. The trade centers were at the top of the hierarchy and the numerous field houses were at the bottom.

Kamp and Whittaker (1990) chose to examine the smaller sites of the settlement hierarchy. Surprisingly, they found the same percentages of exotic trade goods at the smaller sites. The small percentages of exotic items in combination with the lack of any significant storage facilities at the larger sites led Kamp and Whittaker (1990) to reject the chiefdom model. They recognized the existence of multi-village communities and integrative ballcourt structures. However, they proposed the Sinagua social organization was "a fairly egalitarian system with an emphasis on flexibility in both subsistence and social strategies" (1990:19).

My initial examination of the sites containing modeled whorls in combination with other Hohokam traits revealed a similar pattern to the Kamp and Whittaker (1990) study. Only two of the sites with a ballcourt (Winona and Ridge Ruin) and one with a Hohokam structure (Winona) had modeled whorls. Yet, the percentages of whorls at the larger centers were only slightly higher than the remaining smaller centers. Moreover, many of the sites with modeled whorls were not contemporaneous and spanned a 200 year period. Thus, I agreed with Kamp and Whittaker's (1990) conclusion that the Sinaguans were not necessarily supporting full-time craft specialists.

The modeled whorls found in the Flagstaff area did suggest the existence of site and/or community yarn specialization. The narrow range of sizes indicated the Sinagua were producing specific yarn types (Teague 1996). I agreed that the modeled whorl technology originated from the south because the forms of the modeled whorls in the Sinagua and Hohokam areas were so similar. I think, however, that yarn production occurring in the Sinagua area was the product of local artisans. All of the material culture in the area indicates a southern influence, but not necessarily a southern presence. Sinagua area pottery with Hohokam styles were clearly replicated but were often poorly executed. Thus, social relations with the south appear more fluid with respect to yarn technological ideas when compared to the northern Plateau cultures. However, the Sinagua appear to have their own ethnic identity in relation to the production of cotton yarn.

So here we are today, I would like to take a closer look at yarn production specialization in the Flagstaff area. I plan to briefly review the evolutionary models that examine the socio-political implications of craft production. Then I will compare yarn production specialization in three communities in an effort to resolve the discussion regarding the two competing models of Sinagua social organization. Specifically, I examine whether or not the Sinagua were organized as a chiefdom supporting the efforts of full-time craft specialists; or were they an egalitarian society with independent, part-time specialists?

Based on a statistical analysis of spindle whorls, I determine if the Sinagua, during the transition period between A.D. 950 – A.D. 1150, organized yarn production at the community or household units of analysis. Specifically, was one community or one household within a community producing a finer, standardized yarn; or were all the households and each community producing the same non-standardized products? My

results direct a discussion of how and why the Sinagua do not ideally fit into these evolutionary schemes.

Here I define craft specialization as routine production above and beyond the household for distribution to other households (Stark 1995:231). *Independent* versus *attached* specialists has been recognized as the two opposing types of specialized producers along a varied continuum defined by the *degree* and *type* of specialization. (Brumfiel and Earle 1987; Clark and Parry 1990; Earle 1991; Costin 1991). Costin (1991) reviews in detail the relationship between socio-political organization and craft production. However, the general idea suggests that the *degree* and *type* of craft specialization becomes more differentiated, standardized, and perhaps institutionalized (Costin 1991:4) as a society becomes more complex along the evolutionary spectrum. For example, in a state-level society, the elite tends to sponsor the production of *attached* craft specialists who produce highly standardized utilitarian products en masse or high quality prestige items. This evolutionary approach is extremely productive for the study of social organization, however, the direct correlation between *degree* and *type* of craft specialization and level of social organization may not always occur.

Johnson (1989) deviates from a strict evolutionary framework by recognizing the important distinction between a single trajectory, vertically, differentiated society and a horizontally, differentiated society. The vertically, differentiated society follows a strict evolutionary framework -- societies fall into the egalitarian through to the state-level spectrum. The horizontally, differentiated society, like many of the prehistoric Southwest societies, is what Johnson (1989) termed a "sequential hierarchy" (Johnson 1989:378). Households and lineages cooperated in an egalitarian fashion for production purposes (Johnson 1989). Ritual structures, rather than an elite administration, served as the integrative mechanisms above households. Differential access to environmentally restricted resources led to production intensification in particular regions. Thus, any extra-household exchange served as a buffering mechanism during times of stress. By recognizing the distinction, Johnson (1989) avoids the typologies following a strict evolutionary scheme. Thus, a one-to-one relationship between *type* and *degree* of craft specialization and level of social organization may not exist in the horizontally, differentiated society.

Now that I have quickly laid the theoretical groundwork, let's turn to my example. First off, who were the Sinagua and how were they socially organized along the evolutionary spectrum? Fortunately, my task today does not involve explicitly defining who the Sinagua were and locating their boundaries. **(Overhead 1)** I will say that the Sinagua culture area, beginning around A.D. 700 and ending approximately A.D. 1450, was ever-so fuzzily bounded by the Little Colorado River, the San Francisco Peaks, and just west of the Verde River (Kamp 1998:6). Archaeologists typically differentiate between the northern Sinagua who lived above the Mogollon Rim and the Southern Sinagua who occupied the area in the Verde River Valley (Kamp 1998). Sinagua material culture displayed a great deal of variability over time and space. Currently, Alameda Brown Ware, a plain ware made from local clays using a paddle-and-anvil technique, remains the only material culture attribute defining the Sinagua as a separate cultural entity (Colton 1946; Downum 1995??).

The period under scrutiny, A.D. 950 to 1150, witnessed a considerable population increase following the initial Sunset Crater eruptions in A.D. 1064 and 1066 (I recognize

these dates are currently under scrutiny by Elson et al. 2001 but we will await the publication) (Pilles 1996). It is during and soon after this transition period that the two competing models of social organization come into play. The four lines of evidence (1) differential access to burial goods, (2) site settlement hierarchy, (3) evidence of redistribution, and (4) labor-investment in public works have been interpreted to suggest that the Sinagua represented either (1) a chiefdom or (2) an egalitarian society. The chiefdom model cohorts recognize a four-tiered settlement hierarchy with field houses at the bottom and large redistributive centers at the top. Burial practices are interpreted to indicate ascribed status with some individuals having increased access to prestige, power and resources (Kamp 1998:187). Furthermore, large, labor-costly, public architecture such as ball courts, community rooms, and walled plazas, are interpreted as the products of elite coercive power.

On the other hand, the egalitarian Sinagua have “essentially equal access to critical resources and to an unrestricted flow of information about those resources” (Gumerman and Dean 1989:132-133). Leadership develops through “achievements, personal abilities, and even hereditary status, so long as the status does not convey the right to restrict access of others to critical resources” (Gumerman and Dean 1989:132-133). Furthermore, the egalitarian model subscribers recognize a settlement hierarchy with central pueblos that possibly served as multi-pueblo communities. Additionally, they identify intra-village, integrative structures (Adams 1991; Burchett 1990), and community planned and organized labor investment (Dean 1969). However, these authors (1989) interpret the social organization as nothing more than loosely defined communities (Dean 1969) exhibiting no evidence of social or political vertical differentiation (Gumerman and Dean 1989). I propose to look at one more variable – the organization of craft production – to further examine the two strikingly different interpretations of Sinagua social organization. My primary analytical assumption presupposes that different spindle whorl variants represent different production groups.

Several variables affect variation in spindle whorl properties, particularly whorl weight, spindle shaft diameter and length, spinning technique, and the intended size of the yarns produced (Parsons 1972; Teague 1996; Winthrop and Winthrop 1975). I suspect the different variants for this analysis will identify differences in production activities. More importantly, the presence of smaller inner diameters and lighter whorls will indicate the spinning of a finer or single-ply yarn.

My sample consisted of 123 spindle whorls from the Museum of Northern Arizona's collections. The ceramic spindle whorls included 79 disk whorls and 44 modelled whorls. The whorls originated from sites defined as three communities based on relative contemporaneity and spatial clustering. I used the term community to serve as an arbitrary, analytical divider. However, I realize that each site cluster may not represent an anthropological equivalent of a community.

(Overhead 4) All three communities occur within the northern Sinagua heartland and include Winona Village, Ridge Ruin, and sites clustered near the Rio de Flag. Winona Village and Ridge Ruin are located just west of Flagstaff whereas the Rio de Flag community is located closer to the Peaks and a bit north. Community size may be deceptive in that probably only 10 to 20 people or perhaps two to five families coexisted at any one time (Kamp 1998:167). However, a majority of site occupation clusters around A.D. 1065 – 1135 **(Overhead 5)**. Ridge Ruin dates to the latter end of this

transition period, whereas the Rio de Flag and Winona communities have earlier dates. However, occupation at all three communities probably had considerable overlap.

The following tables and graphs summarize spindle whorl frequencies by material type, site and community (**Overhead 6**). I realize the sample is small particularly when looking at individual site collections. However, pattern recognition studies such as this one are a necessary first step when attempting to sort out all the variables affecting craft production and social organization.

Using exploratory data analysis, I determined that no one community was producing a finer more standardized yarn. The inner diameter, best reflecting differences in yarn production activities, illustrated no significant difference existed between each community (**Overhead 7**). Moreover, within each community no one site was producing a more standardized yarn product. So can we say there was no specialization at the community or household level?

To further test this inquiry, I calculated a variability coefficient for each whorl variable by community (**Overhead 8**). The variability coefficient gives a percentage of variability about the mean -- the smaller the percentage, the less variability, and the more standardized the product. The weight and inner diameters are the best indicators of standardization because thickness and outer diameter directly reflect weight determinations. The coefficients are summarized in this table. The inner diameters of the modelled whorls from the Ridge Ruin and the Rio de Flag communities exhibited the lowest degree of variation about the mean – 9.8% and 10.6% respectively. Granted the Ridge Ruin sample is small (N=5), a histogram with a unimodal distribution suggests production of only one yarn size (**Overhead 9**). On the other hand, where the Rio de Flag modelled whorl inner diameters have 18.64% coefficient variability, a histogram shows at least two and possibly three modes were present. This indicates two and possibly three distinct yarn sizes were being produced. The modes probably represent differences in activities such as single-ply versus dual-ply yarn production. This evidence indicates community specialization in some shape or form was present in the Rio de Flag and possibly the Ridge Ruin communities.

(**Overhead 10**) If you recall, the box plots demonstrated that no one community was producing a significantly different or specialized product. However, the coefficient variabilities demonstrated that the Ridge Ruin community was making one standardized yarn size and the Rio de Flag community was participating in two or possibly three different specialized yarn production activities.

The results of this analysis appear anomalous when compared to the craft specialization models initially proposed. We do not appear to have independent craft specialists suggesting the Sinagua were egalitarian. However, the degree and type of specialization falls short of full-time craft specialists indicative of a chiefdom-level society. No one community is making a more specialized product, however, one and possibly two of the communities are participating in specialized production activities.

So why do the Sinagua do not ideally fit this classic evolutionary scheme? In the evolutionary classification systems, part-time independent specialists, often associated with egalitarian societies, primarily produced household utilitarian products (Brumfiel and Earle 1987; Clark and Parry 1990; Costin 1991; Earle 1991). On the other hand, full-time attached specialists create prestige goods that represent elite symbols of power and authority.

Clearly, power is a loaded term having numerous meanings. Rappaport (Nee, 2001, 1971a; 1971b) recognizes two types of power: effective and affective. Effective power is enforced through large administrative institutions capable of social action by coercion (Drennan 1976:346). Affective power is directly associated with lower population societies that would not be capable of supporting an administrative structure -- such as many of the societies in the American Southwest, including the Sinagua (Drennan 1976:346). Rappaport (1971a) suggests that these societies use ritual as a form of symbolic communication, acting to assure the acceptance of social conventions. Ritual, then, is the affective power or political control used for purposes of social integration.

The part-time specialist and the attached specialist dichotomy breaks down when examining horizontally, differentiated societies. A part-time specialist may also participate in the production of prestige goods. However, the prestige goods in a horizontally, differentiated society sanctify ritual not the elite administration. In the Sinagua case, the transformation of raw cotton into cotton cloth was an active and material expression of ritual affective power. Thus, the power and wealth of a community related to the possession of these ritually charged items. To conclude, it appears that in a horizontally, differentiated society, the simple distinction of part-time independent specialists and full-time attached specialists once again has obscure boundaries. Thank you.

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