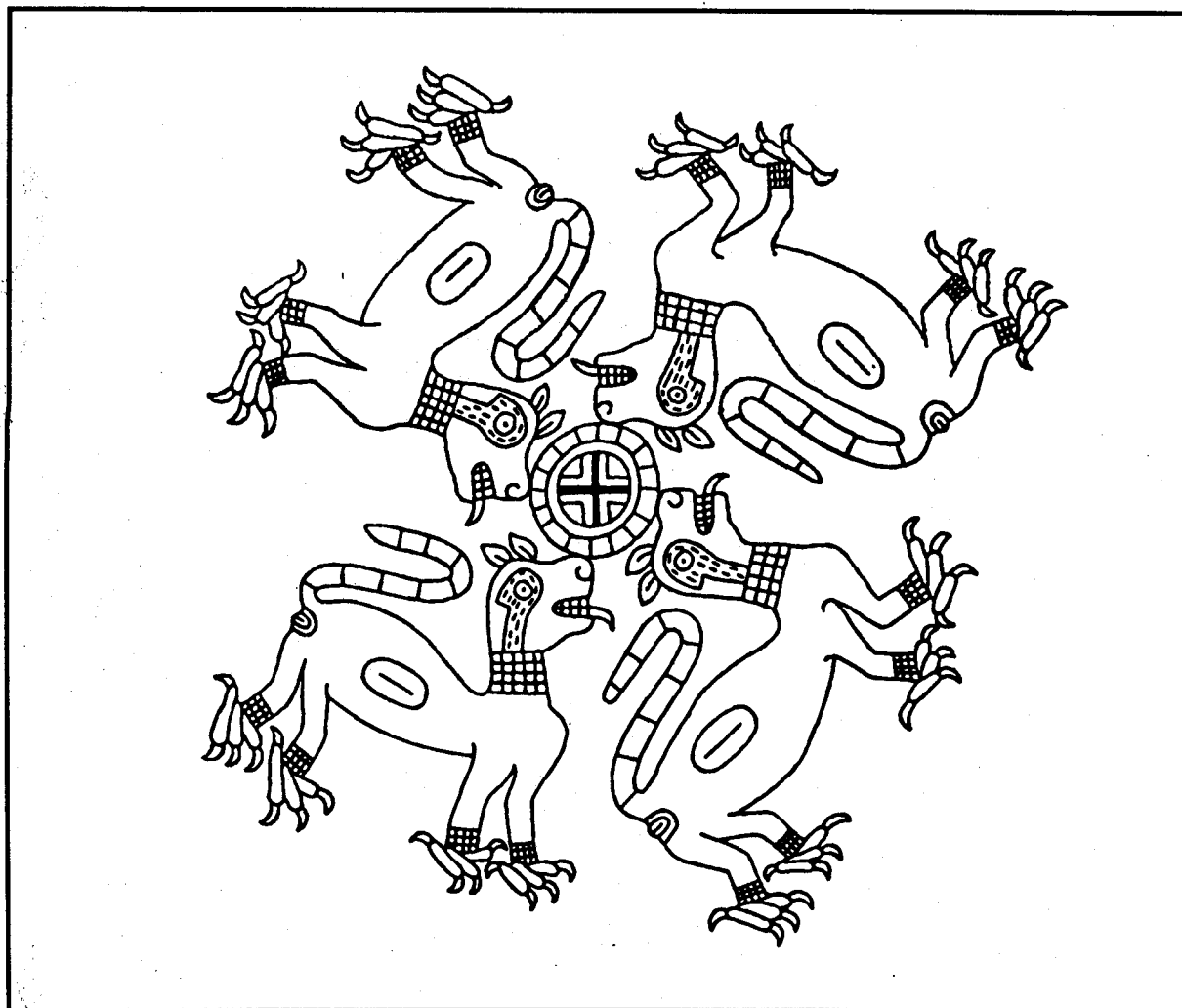


CADDOAN
ARCHEOLOGY
NEWSLETTER



Volume IV, Number 3

October, 1993

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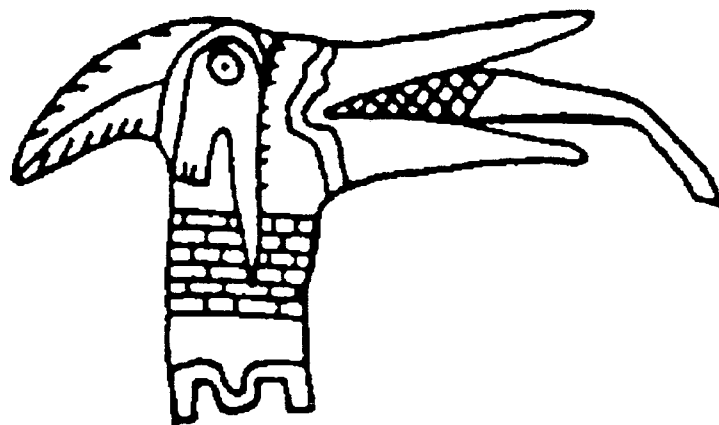
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NOTE: The cover illustration and other line drawings used in this issue were adapted from Phillip Phillips and James A. Brown (1978). *Pre-Columbian Shell Engravings from Spiro*. Peabody Museum Press

THE EDITOR'S PAGE



**IT'S THE CADDO
CONFERENCE/CADDOAN
ARCHEOLOGY NEWSLETTER LOGO CONTEST!!!**

In the last issue, I promised that a contest for a newsletter logo would be announced in the next issue. Well, this is the next issue, and the information about the contest is presented herewith. After further rumination, I decided that the idea of a logo for the newsletter only was narrow, and that a good logo could also serve the Caddo Conference. After conferring with others, I found that this idea was accepted enthusiastically. Several people have agreed to serve with me as judges for the contest. They are: Jim Corbin, Stephen F. Austin State University, for Texas; Pete Gregory, Northwestern State University, for Louisiana; George Sabo, University of Arkansas, for Arkansas; Julietta Rachel, Oklahoma Archeological Survey; and a Caddo artist, Mary Lou Davis of Oklahoma City. Julie will help us decide whether the design could be easily reproduced. Cecile Carter, the Caddo tribe's cultural representative, helped find an artist willing to serve on the panel. These six people, including your editor, will choose three of the best/most appropriate designs submitted. These three designs will be presented at the Caddo Conference in March. All those attending the Conference will be able to vote for their choice of the designs to be used as a logo. The artist submitting the winning design will receive a prize to be announced later; this will be something like publications, or a T-shirt, or who knows

what riches lie in store! The other two designs chosen for submission to the Caddo Conference vote will win a year's subscription to the Caddoan Archeology Newsletter for their designer. If the designer is already a subscriber, the subscription will be extended one year.

Every contest must have rules. Anyone who is interested may enter a design except the judges. The rules are as follows: 1) the design must relate to Caddoan archeology/the Caddoan area/the Caddoan people. It could incorporate a design or a portion of a design from shell, pottery, etc., or it could be an original design; 2) it must be a black and white line drawing, between about two and six inches on a side or in diameter. Square or round designs would probably work best. Remember that it potentially could be used for anything from a newsletter page or letterhead to a T-shirt; 3) it must be easily reproduced (in other words, not too complex, not too much shading, etc.); 4) it must be appropriate for representing the Caddo Conference. The deadline for submissions is January 15, 1994. Send the designs to:

Lois E. Albert, Caddoan Archeology Newsletter, Oklahoma Archeological Survey, 111 E. Chesapeake, Norman OK 73019. I will send copies of the designs to the other judges.

ARTICLES AND NEWS NEEDED FOR NEWSLETTER

Once again, I am calling for articles to be published in future issues of the newsletter. If volunteers are not forthcoming, I'll start using the phone again. We also need news about people, projects, etc. Keep others informed about what is happening in your area. Too frequently, Caddoan area researchers and interested amateurs

don't know what is planned or is in progress in the region, just in their immediate area. Also, if you know (with sufficient lead time) about a meeting, an exhibit, or other event in your area, send me the information to put in the upcoming events section.

REGIONAL NEWS



LOUISIANA

Several interesting projects are underway in northwestern Louisiana. The following information was obtained during a telephone conversation with Pete Gregory. We'll try to get more information on these from the archeologists working on the projects, and include it in later issues.

David Kelley of Coastal Environments, Inc. is testing sites in the Grand Bayou Reservoir area of Red River Parish. He will be in the field for a total of six weeks. Jeff Girard of Northwestern State University, Natchitoches, has been working at the Pace site in Toledo Bend Reservoir. He is

conducting limited testing of the mound at this site. Joe Saunders has also been working at a mound site. A date of 3300 BC was obtained for a sub-mound deposit. Associated with this deposit were beads and Evans points.

Dr. Kass Byrd has moved to Northwestern Louisiana State University at Natchitoches. She now heads the Department of Social Sciences and is the interface for the department with the new National Center for Historic Preservation Technology. Brian Clive of the National Park Service serves as the interim director of the center.

OKLAHOMA

Three archeologists from the Oklahoma Archeological Survey have received grants from the Oklahoma State Office of Historic Preservation for this year. Larry Neal's proposal was for "An Archeological Survey of Historic Native American Sites in Association with Military Posts of Oklahoma". He will be working in southeastern Oklahoma again. Lois Albert's grant is for "An Archeological Survey of Osage Historic Sites in Northeastern Oklahoma". Fieldwork is currently underway on these two projects. Around November 1, Richard Drass will start fieldwork on "An Archeological Survey of Protohistoric Sites in the Drainage of the North Fork of the Red River". State Archeologist Bob Brooks also received funds for a "Public Archeology Program: Budget Year 93-94".

Other surveys in the state have been carried out recently by Dr. Don Henry of the University of Tulsa on Spring Creek in Ottawa County and by Geo-Marine, who surveyed Camp Gruber in Muskogee County. Dr. Henry added 22 sites to the state records and Geo-Marine found 23 new sites.

The Oklahoma Archeological Survey has hired Marjorie Duncan to replace Francie Gettys to work with the Community Action Program.

Marjy had worked for the Survey as a graduate student in Anthropology at The University of Oklahoma. She is currently completing her masters' thesis.

A booth at the Oklahoma State Fair in Oklahoma City was sponsored again this year by the Oklahoma Archeological Survey, the Oklahoma Historical Society, and the Oklahoma Anthropological Society. Forty volunteers from the Survey, the OAS, and students from OU's Anthropology Department manned the booth during the 17 days of the fair. People's attention was drawn by a mammoth tusk exhibit; the tusk was reconstructed and the exhibit put together by OAS member and Survey volunteer Dave Morgan. Larry Neal, one of the Survey's archeologists, put together an exhibit of historic artifacts from southeastern Oklahoma. Another device used to generate interest was a guessing game: a gallon jar was filled with flakes. The person with the closest guess of the number of flakes in the jar won a one-year membership in the Oklahoma Anthropological Society. This year's poster theme was "Archeology: Oklahoma's Window to the Past". Four scenes, ranging in time from mammoth hunters to log cabins, were enclosed within a muntined window. The scenes for this poster were painted by Bill

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Thompson, an OAS member from Oklahoma City. During the fair, 7000 posters were given away; additional people visited the booth who didn't take a poster. The Oklahoma City fair booth has been such a success that the Survey may help sponsor a booth at Tulsa's State Fair next year.

A new chapter of the Oklahoma Anthropological Society has recently been chartered at Ada, Oklahoma. It will be known as the Bushmill Springs Chapter. The OAS Spring Dig for 1994 will be at the Cooper site near Fort Supply in western Oklahoma. This site was a bison kill of the Folsom people. Four five-day sessions will be run; all will start on a Thursday and end on Monday. The first session will cover the Memorial Day weekend with dates of May 26 - 30; others sessions will run from II) June 2 - 6, III) June 9 - 13, and IV) June 16 - 20. Session IV will run only if needed to complete the work. Space in the bone bed is quite limited; only a few excavators at a time can be accommodated. The most experienced diggers will be assigned to the bone bed. However, other activities will be going on at the same time, such as screening the dirt from the bone bed, screening the slump below the bone bed, mapping the bone bed, and surveying

the area around the kill site in an attempt to locate the associated camping area. Shovel/posthole testing or coring with the Survey's coring rig may be done in association with the survey. Enrollment in each session will be limited to 25 or 30 people. Camping will be at Ft. Supply Lake; the campground here has restrooms with hot showers, RV and trailer hookups (electricity and water), and a dump station for RVs. The campground is about six miles from the site. Parking will be limited to an improved area about 1/4 mile from the site. In case of rain, only four-wheel drive vehicles will be able to negotiate the dirt road between the campground and site. You must be a member of the Oklahoma Anthropological Society in order to attend the dig. More information will be available in future issues of the Oklahoma Anthropological Society Newsletter, or contact Dave Morgan, Dig Committee chair, at the Oklahoma Archeological Survey, 111 E. Chesapeake, Norman OK 73019; telephone (405) 325-7211.

Dr. Frank Winchell has moved to Tulsa to work in the offices of the Corps of Engineers. Frank will be working with review and compliance surveys of oil and gas leases under an agreement with the Osage tribe.

CADDO TRIBE

Mary Cecile Carter sends word that the tribe is the recipient of a \$35,000 National Park Service grant for documenting the Turkey Dance. The money will be used to produce a videotape with transcriptions in Caddo and English. Another aspect of the documentation will be setting down instructions for making women's dance dresses.

Former tribal chairman Tony Williams died recently. He was a leader in tribal cultural matters; few people were as enthusiastic and knowledgeable as he. The tribe was shocked and saddened by his loss. He will be greatly missed.

Work is underway to find funding for expanding the tribal language classes. For the past year or so, a group has met weekly in Gracemont to work with Laura Anderson, a graduate student in linguistics with the Department of Anthropology, and native speakers.

Tentative plans have been made for a group of Caddos to go to Fayetteville for the next Caddo Conference to attend the meetings and to do another session of traditional dances.

TEXAS

A mini field school was recently held by the Northeast Texas Archeological Society at a Caddoan site which may have been a minor ceremonial center. Tom Middlebrook reports that a 6 x 6 m block was dug, probably mostly, if

not all, in the interior of a Caddoan house. Three large basin shaped pits, a little more than a meter in diameter, were found. One of the pits showed signs of burning. A few postholes were found, some with posts burned in place. Some daub was

also noted. The most notable features found were two infant burials with abundant grave goods; one was very elaborate. It had associated pottery, beads, an earspool, a lithic toolmakers kit and debitage, and a turtle carapace with holes which

could have been a rattle. The other infant had some pottery and lumps of potters clay associated. These burials were probably below the house floor. More information on this site will be given in the next issue of this newsletter.

STABLE ISOTOPE ANALYSIS FROM THE SANDERS SITE (41LR2)

Diane Wilson and Diane Cargill

Analysis and Status of Samples

Nine samples have been taken from the Sanders site (see Wilson, p. 7), Burial 17, for stable isotope analysis of carbon and nitrogen on bone collagen. All individuals, five females and four males, from this multiple burial were chosen as an initial sample. This sample was chosen with a belief that it represented a discrete period of time.

Two separate hypotheses are being tested in this analysis. The first was put forth by Barbara Burnett (1990). She states (1990:397) that the absence of subadult infections and the low incidence of porotic hyperostosis, both of which correlate with maize dependency, indicate that the people occupying the Sanders site had sufficient protein, and that if they were agriculturalists, they did not appear to have been adversely affected by a diet based on maize agriculture. The reconstruction of diet for the Sanders population will enable us to evaluate whether persons occupying the Sanders site had C13 values indicative of maize agriculturalists.

The second hypothesis is based on a popular belief that individuals (males) interred in a central place within burials had a higher social status than individuals surrounding them. Testing all individuals from one burial with the premise that

individuals of higher status are afforded better diets, we are able to test this hypothesis.

Only three of the samples have been analyzed for C13 so far. These samples were ground until fine enough to pass through a one mm screen, demineralized in a 0.25N HCl bath overnight, and oven dried into crystalline form. The samples were then combusted and the resulting gases collected and measured against the PDB standard.

Sample 1 was an adult male that yielded a $\delta^{13}\text{C}$ reading of -10.00 ‰. This was the lowest of the values. Sample 2 was an adult female that yielded a $\delta^{13}\text{C}$ value of -12.93 ‰. Sample 3 was another adult female that yielded a $\delta^{13}\text{C}$ reading of -11.90 ‰.

These values are very high and indicate a diet rich in maize. When a +5 fractionation factor is accounted for, a $\delta^{13}\text{C}$ value of -9 ‰ is predicted for bone collagen from individuals adhering to a strictly maize diet. A $\delta^{13}\text{C}$ value of -21.5 ‰ is predicted for individuals adhering to a strictly C3 based diet.

In order to discuss differences between individuals we must await future results. Nitrogen analysis also needs to be completed in order to test Burnett's hypothesis, since these values will provide insight to the protein portion of the diet.

Reference Cited

Burnett, Barbara A.

1990 *The Bioarcheological Synthesis of the Gulf Coastal Plain Study Area, Part 1 - The Bioarcheological Synthesis of the Eastern Portion of the Gulf Plain*. In *The Archeology and Bioarcheology of the Gulf Coastal Plain: Volume 2*. Dee

Ann Story, Janice A. Guy, Barbara A. Burnett, Martha Doty Freeman, Jerome C. Rose, D. Gentry Steele, Ben W. Olive, and Karl J. Reinhard. *Arkansas Archeological Survey Research Series 38:385-418*.

ARKANSAS

From Ann Early comes information on recent and current fieldwork in the Ouachita Mountains for western Arkansas. Jack Stewart has carried out evaluation testing in the Ouachita National Forest at a quarry extraction location. The raw materials found at this site indicate that this was a source of cherts similar to those found in the Ozarks, such as Boone chert.

Although archeologists had previously known about the geological phenomenon of exotic cherts embedded in deposits in the northern Ouachitas,

this is the first documentation of the extraction of these materials by the prehistoric people.

The Ouachita National Forest archeologists are currently doing evaluation testing at a prehistoric site in the Fourche la Pave River valley of western Arkansas. At present, the site appears to be primarily Middle to Late Archaic period. It isn't yet certain whether there are earlier deposits. The Archaic occupation is similar to that tested at Shady Lake earlier this year. It could represent an Archaic phase in the western Ouachitas which has been not been previously documented.

UPCOMING EVENTS



Meetings



November

17-21 American Anthropological Association Annual Meeting. Washington DC. Contact: AAA, 1703 New Hampshire Ave NW, Washington D.C. 20009. Telephone: (202) 232-8800.

February, 1994

28-23 American Association for the Advancement of Science, Annual Meeting. San Francisco CA. Contact: AAAS, 1333 H Street NW, Washington DC 20005. Telephone: (202) 326-6400.

March, 1994

24-27 36th Caddo Conference. Continuing Education Center, Fayetteville, AR. This center is connected to the Hilton Hotel, which will be the official conference hotel; there will be a block of rooms reserved for the conference. A number of restaurants are located within walking distance of the center. On Thursday evening, March 24, there will be a welcoming reception. Papers will be scheduled on Friday and Saturday, with a tour of the

Spiro Mounds Archeological State Park on Sunday. Official conference announcements will be sent soon. If you are interested in attending and are not sure that your name is on the mailing list, contact Dr. George Sabo, Department of Anthropology, University of Arkansas, Fayetteville AR 72701.

April, 1994

18-24 59th Annual Meeting, Society for American Archaeology. Anaheim CA. Contact: SAA, 1511 K Street NW, Washington DC 20006. Telephone: (202) 223-9774.

May, 1994

17-21 International Tree-Ring Conference: Tree Rings, Environment, and Humanity-Relationships and Processes. Hotel Park Tucson, Tucson AZ. Contact: International Tree-Ring Conference, Laboratory of Tree-Ring Research, Building 58, University of Arizona, Tucson AZ 85721. Telephone: (602) 621-2191; Fax: (602) 621-8229.

EXHIBITS AND OTHER EVENTS

October 5

Oklahoma Museum of Natural History, The University of Oklahoma. Opening of exhibit "Spiro Mounds: Prehistoric Gateway, Present Day Enigma", which will run until about the first of the year. Hours: Tuesday through Friday, 10AM to 5PM, Saturday and Sunday, 2 to 5 PM, closed Mondays. Location: 1335 S. Asp Avenue, Norman OK 73019 (south of the stadium). For more information, contact OMNH at the address given above or call (405) 325-7411 (exhibits and hours) or (405) 325-7412 (for other information).

Current.

Oklahoma State Museum of History. Exhibit on hunting and fishing in Oklahoma from prehistoric time to the present. Contact: State Museum of History, 2100 Lincoln Blvd, Oklahoma City, OK 73105. Telephone: (405) 521-2491.

September 17 - December 5.

National Cowboy Hall of Fame, Oklahoma City. Exhibit "Thundering Hooves: Five Centuries of Horse Power in the American West". This is a major Quincentenary exhibit organized by the Witte Museum in San Antonio TX, and traces 500 years of the horse in the American Southwest, focusing on the growth of the four major cultures of the region that centered around the horse -- the Conquistadores, the Vaqueros, the Indians of the Southern Plains, and the North American cowboys. The exhibition also examines the phenomenon of the popular cowboy culture of the 20th century. Contact: National Cowboy Hall of Fame, 1700 NE 63rd St, Oklahoma City OK 73111. Telephone: (405) 478-2250.

September 26, 1993 - January 2, 1994.

Gilcrease Museum, Tulsa, Oklahoma. Exhibit "First Artist of the West: Paintings and Watercolors by George Catlin from the Permanent Collection of Gilcrease Museum". Gilcrease

Museum's collection of 435 works by George Catlin is second only to that of the Smithsonian Institution in importance. It includes by far the most significant group of Catlin's portrait watercolors, a number of the only surviving versions of the original Indian Gallery and several unique works such as "The Rattlesnake Den (Fountain of Poison)". "First Artist of the West" will present a rare opportunity for the public to see a wide cross-section of Catlin's work since only a fraction of the museum's holdings is exhibited at any one time. Following the Gilcrease Museum venue, this exhibition will tour the United States. Exhibit "American Nature and Natives: Early Accounts of the Frontier from the Rare Book Collection". This exhibition features texts and illustrations depicting instances from the ever-changing American frontier. Volumes on display range from the 1663 Atlas Major, providing information of European explorers and concepts of North America and its native inhabitants, to Thomas Moran's chromolithographs (published in 1876) of the region that became Yellowstone Park. Other volumes record the unique features of early American Indian society and recount travels on the western frontier. Hours: 9 AM to 5 PM, Monday through Saturday, 1 to 5 PM, Sundays and holidays. Location: 1400 Gilcrease Road. Telephone: (918) 596-2700.

February 11 - April 4, 1994.

Gilcrease Museum, Tulsa, Oklahoma. Exhibit "Beyond the Prison Gates: The Fort Marion Experience and its Artistic Legacy". This exhibit includes photographs, documents, and the most extensive collection of Fort Marion art ever exhibited. Also included is a landmark three-dimensional photographic exhibit, featuring near-lifesize murals made from portraits of Fort Marion prisoners. Stereoscopic viewing boxes loaded with standard size stereo cards further enhance the experience. An innovative audience-

THE SEXUAL DIVISION OF LABOR AT THE SANDERS SITE (41LR2), LAMAR COUNTY, TEXAS

Diane Wilson

Department of Anthropology, The University of Texas

INTRODUCTION

This study examined evidence of stress on human bone in order to reconstruct the sexual division of labor for the prehistoric Caddoan culture represented at the Sanders site (41LR2). Specifically, the repeated action stress seen in degenerative joint disease was quantified in order to infer culturally prescribed and habitual actions.

Overall, the division of labor at the Sanders site was somewhat unusual among agricultural societies. Males from the Sanders site had evidence of greater stress loads. In particular, agricultural activities appear to have been participated in by all, regardless of sex. Although the Sanders site burial population was believed to be of high social status based on burial location within the mound and grave goods, degenerative joint disease was high and activities evident from patterns of stress could not be associated with a life of leisure.

THE SANDERS SITE

The Sanders site is located in the northwestern corner of Lamar County, Texas, on Bois D'Arc Creek, a tributary of the Red River. The known site consists of two mounds and a low ridge of midden located on the eastern bank of the creek.

Absolute dating within the Caddoan region has been limited and the Sanders site is no exception. The Sanders site has not been radiocarbon dated, although in general it is believed to be representative of the earlier manifestations of the Caddoan culture, and was initially placed in the Gibson aspect. Artifacts recovered from the site

suggest nearly continuous use of the site up to historic times.

Excavation of the site took place in the summer of 1931 under the direction of A.T. Jackson and B.B. Gardener from the University of Texas. Jackson fully excavated Mound 1 and trenched Mound 2 and the midden area (Figure 1).

Jackson recovered some 60 individuals from two locations in Mound 1. One group was scattered over the top of the mound, whereas the other group was located on the eastern slope of the

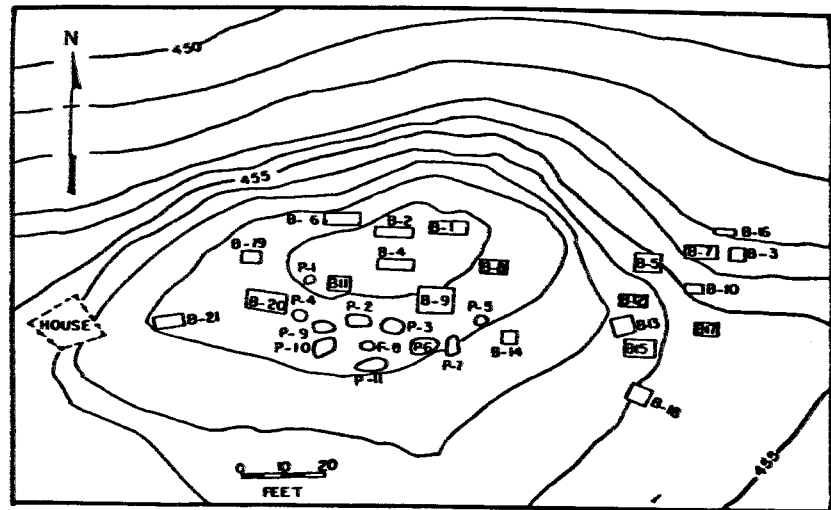


Figure 2. Mound 1 of the Sanders site with burials (B) and refuse pits (P) (from Krieger 1946:176).

mound (Figure 2). There was no difference between the two groups in burial form or offerings. Both groups contained single or multiple burials, and all individuals were extended supine or on their side. Additional burials were recovered from later excavations and pothunter backdirt. In total, 29 adult females, 25 adult males, 18 adults of indeterminate sex, and 20 children were disinterred.

DEGENERATIVE JOINT DISEASE

Degenerative joint disease (DJD) is often termed osteoarthritis, although the latter represents a more generalized condition. DJD is caused by the wear and tear of repeated action stress on joints and by the aging process. In the joints, the first response to stress is cartilage deterioration, followed by a bone reaction. The reaction of bone is the only evidence of DJD found in the archaeological record. Bony outgrowths (termed osteophytosis and lipping) are the first and most common response to cartilage destruction (Miller 1985:392). Bone involvement, therefore, only occurs after stress in the afflicted joint when it has had some time to transpire, unless it is the result of a stress related, single event injury. Thus, reconstruction of past activities based on DJD patterns can only give an indication of the activities participated in, not the duration of time spent engaged in the activity.

Since DJD is linked to repeated actions, it has been used to reconstruct activity patterns for skeletal populations (Angel 1966; Merbs 1983; Pickering 1984; Miller 1985; Dutour 1986; Striland 1987; Bridges 1990). The term activity patterns has been taken from Merbs' (1983) study to mean habitual or culturally prescribed and sanctioned postures and practices. In this study, osteophytosis has been used to reconstruct some of the activity patterns engaged in by the Sanders burial population.

METHODS

All 55 adults curated at the Texas Archeological Research Laboratory were examined for presence of joint surfaces. Juveniles were not examined because DJD is primarily associated with repeated actions occurring over an individual's lifetime. Of these 55 adults, 43 were selected for use. Of these individuals, 14 were female (two over 50 years of age), 19 male (three over 50 years of age), and 10 were of indeterminate sex.

Bone lipping was scored from 0 to 2, in increments of 0.25, with 0 representing condition absent, 1 representing moderate expression, and 2 representing severe expression of the condition.

Scores were recorded on 113 distinct joint surfaces. Separate articular surfaces were examined rather than regions. For example, the ankle was not scored as one region, but the tibia

articular surface for the talus, fibula articular surface for the talus, superior articular surface of the talus, and the calcaneal tuberosity were individually scored. By doing this, a more accurate account of specific activities could be gained.

The joints highly effected by preservational and recovery bias were omitted. These included carpals, tarsals, and distal phalanges. Other joint surfaces were lumped into group categories. These included ribs, and proximal phalanges of the hands.

Although the Sanders site was initially chosen for its good state of preservation, only 23% of the possible (if all individuals were complete) joint surfaces were present. Very few individuals were complete. This meant that examination of specialists within the population was impossible. Examination of individuals by sex, however, was feasible because individuals represented by specific joint surfaces could be compared with other individuals of the same sex. From this, behavioral differences between the sexes could be inferred.

RESULTS

The incidence of DJD was high among the Sanders population, with 34 (78%) of the individuals showing evidence of affliction. In general, males were more afflicted than females, exhibiting both higher relative frequencies and higher average scores.

Activities with mean scores of 1 or more. This category contained all activity patterns with average scores for all involved joint surfaces of 1 or greater. In this way, activities that were performed most often and/or were most stressful could be inferred.

Ground clearing, planting, and soil tilling. DJD of the back was very common in the Sanders population among both sexes. This is not uncommon for agricultural populations and the patterns exhibited by both females and males were equivalent to other Mississippian related agricultural populations (Pickering 1984). Low to the ground activities such as soil preparation and ground clearing were indicated in the high levels of lower back stress seen in the lumbar and lower thoracic vertebrae. Such activities would require much bending and a stooped posture that tends to strain the lower back.

Because the Caddo were known maize agriculturalists, lower back stress was expected. There were many artifacts in the Sanders site assemblage that indicated that ground clearing and soil tilling were taking place, such as bison scapula hoes and stone hoes.

Both lumbar and lower thoracic body scores were examined in the determination of these activities and both were well represented. Differences between the sexes were slight, indicating that both sexes participated in these activities. Both had higher scores in the lumbar region (females averaged 1.12 and males averaged 1.33; Figure 3), than in the lower thoracic (females averaged 1 and males averaged 0.94).

Differences between the sexes were slight in this region and may imply that females and males participated in some different activities that resulted in lower back stress. Carrying loads on the back may have accounted for these differences.

Carrying loads on the back. Osteophyte development on the sacroiliac facet has been shown to result from carrying heavy loads on the back (Trotter 1937). Males from the Sanders site had bony growths at this location, as well as high scores in their lumbar vertebrae. High scores in the sacroiliac joint suggest that weight from the load carried was directed downward through the back.

There was also evidence that females carried loads on their backs, although in a different manner than males did. Carrying loads on the back can also result in stress in the lower thoracic region of the back (Merbs 1983). In this case weight from the objects transported would be dissipated across the lower back, rather than being directed downward.

The different patterns suggest that females and males used different mechanisms to support items on their backs. This may have been a result of dissimilar objects that were normally transported.

Supporting loads on the head. Use of the head for supporting objects has resulted in cervical vertebrae spinous process bone lipping (Pickering 1984:78,97), anterior subluxation of the body (Scher 1978:97), body compression (Pickering 1984:164), locked facets (Scher 1978:97), and dorsal body compression (Merbs and Euler 1985:389). The upper cervical vertebrae were

highly affected by DJD among the Sanders population.

The DJD evidence is consistent with balancing loads on the top of the head in an unaided manner. Balancing a load in this way pushes the head forward and into the chest, creating pressure and consequent osteophyte development along the anterior margins of the cervical vertebrae, as well as anterior subluxation. Osteophyte development within the Sanders female population followed this pattern. None of the individuals examined exhibited osteophyte development along the dorsal margin, as would be expected with the use of a tumpline (Merbs and Euler 1985:389). It is interesting that supporting loads on the head was not documented in either ethnohistoric or traditional accounts.

Long distance walking, running, or dancing. The posterior calcaneal tuberosity often produces a large bony outgrowth in response to long distance travel by foot (Dutour 1986:222; Figure 4). Both females and males had high scores at this locality, and both with a considerable degree of unilateral expression. Females had a more bilateral distribution with mean scores of 2 on the right and 1.33 on the left, while males averaged 1.5 on the right and 0 on the left. The unilateral distribution seen in males may simply reflect the low number of observations on the left side (four among the males, 10 among the females).

The unilateral distribution was not found as strongly among males in other joint surfaces associated with these activities. The femur patella articular surface, femur tibia articular surface, and the patella lateral and medial articular facets all exhibited mean scores above one for both sexes (Figure 5). Results from these surfaces are all indicative of much movement at the knee, which is also associated with walking, running, and/or dancing.

The material culture from the Sanders site suggests that the members of this population may have traveled great distances to participate in exchange. The Caddo from the Sanders site may also have traveled great distances on foot to gather and/or hunt. Both females and males may have participated in these activities. Ethnohistoric accounts described women accompanying men on hunting expeditions, although only females were said to gather (Swanton 1942).

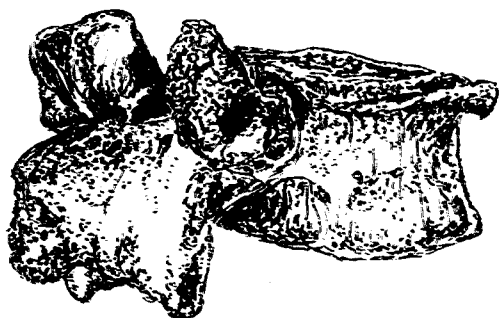


Figure 3. Lumbar vertebra from an adult male (397) with osteophyte on the superior margin of the body (drawing by Kaylee Stallings).

Unilateral distribution in the calcaneal tuberosity, particularly among the males, may have resulted from frequent or stressful par-

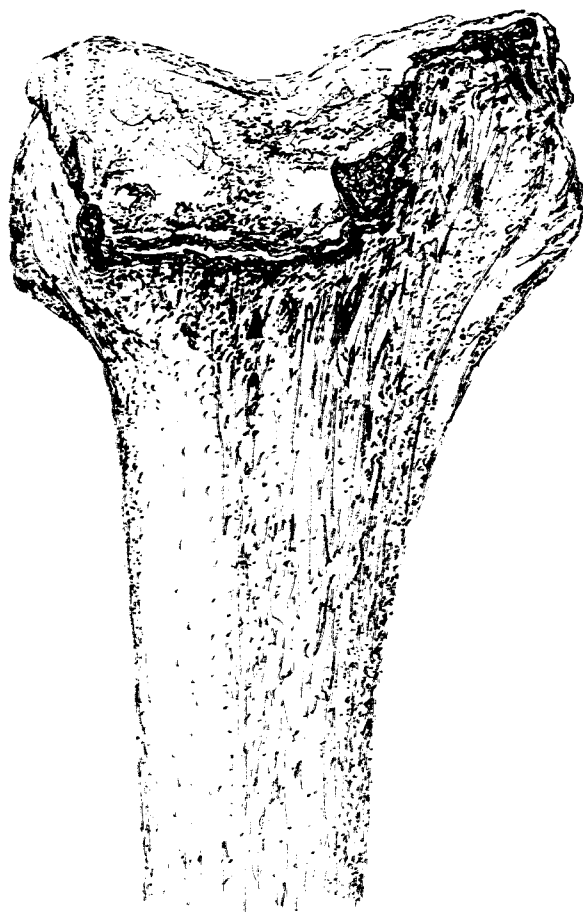


Figure 5. Left distal femur of an adult male (787). The rugged looking marginal bone growth is osteophytosis on the patella articular

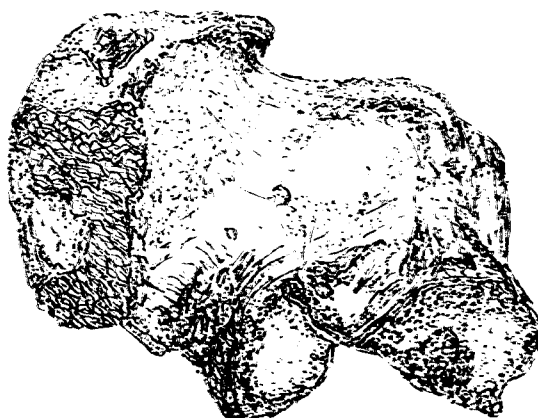


Figure 4. Adult male's (787), right calcaneus with large hook-shaped bony lip on calcaneal tuberosity. The bone in this region is normally smooth (drawing by Kaylee Stallings).

ticipation in dances that required specific foot movements balancing more weight on the right heel than on the left.

Paddling. Evidence of paddling is found in the elbow region where lipping scores are greater on the trochlea than on the capitulum of the same hand. This type of degeneration is found on both sides of the body when individuals are responsible for steering in both directions, as in paddling a canoe or rowboat. The movement is primarily flexion and extension, with rotation occurring when only one paddle is employed. This was found at the Sanders site among males with mean capitulum scores of 1.05 and mean trochlea scores of 1.19. Oddly, scores were slightly higher on the left side.

Since the Sanders site is located on Bois D'Arc Creek, approximately three miles south of the Red River, it is likely that the river was used as an important transportation route.

Activities with mean scores of 0.75 or greater. Lowering the level of stress severity allowed the analysis of activities that were performed less often and/or were less stressful.

Sewing, basket weaving, ceramic production, and shell working. The high level of stress seen in the palmar side of the proximal phalanges of the fingers among

females (0.94 average) suggests that females were involved in activities associated with fine finger manipulation of objects. It has been directly associated with sewing (Merbs 1983:155). Bone awls were found in burials of both sexes, and pottery disks that may have functioned as spindle whorls were recovered from the Sanders site midden. The level of stress in males was much less (0.25 average).

Ceramic manufacture and basket weaving both require extensive manipulation of small objects and the use of the fingers as tools. Both of these activities were attributed to females ethnohistorically (Swanton 1942).

Other possible activities include flint knapping and shell work, both suggested from the artifact assemblage. Further activities that would require extensive finger manipulation include husking maize, although this activity was documented traditionally as performed by both females and males (Newkumet and Meredith 1988).

Wood cutting. Osteophyte development seen in the olecranon process of the right ulna (0.83 mean) indicated that males may have performed wood cutting. The spicule-like growth observed on the olecranon process results from wood cutting and other activities where the arm is horizontal and the elbow flexed (Dutour 1986:222). Many stone axes were recovered from the Sanders site in the midden.

Hide scraping. DJD data indicate that scrapers were held palm-down and used in a back and forth, trough-like motion among males. This type of movement affects the distal humerus, proximal ulna, and marginal areas of the radial head (Merbs 1983:154,156; Miller 1985). The sternal and acromial facets were involved as well. Artifactual data indicate that hide scraping took place.

Carrying loads with the arms bent. Males show evidence of carrying heavy loads with their arms bent. This activity is suggested by radial tuberosity degeneration (Dutour 1986:222). However, degeneration of the radial tuberosity is the result of flexion of the elbow, hence it could also have been the result of paddling behavior.

DISCUSSION AND CONCLUSION

The activities described above are those recognized as most stressful to the Sanders burial population. The amount and frequency of DJD

does not necessarily correspond to the amount of time engaged in a particular activity, although time is often a primary factor in stress induction. Many activities were not discerned here that were expected (bow and arrow use, for example). The activities not exhibited by stress markers on the bone (DJD) were therefore either not emphasized culturally or were not stressful to individuals who may have performed such activities, either rarely or often.

The activities emphasized by the Sanders population supported an agricultural subsistence economy with a great deal of travel, most likely due to participation in an extensive trade network.

Sex and status differences in food production and related activities were not as expected. Participation in these activities may seem surprising since the Sanders population has been considered an elite group. Participation in agricultural activities was found in both females and males, including planting, cultivating, ground clearing, and hoeing. However, participation in food preparation and hunting techniques was not clarified.

The patterns of DJD also may suggest a limited degree of differentiation between elite and non-elite among the Caddo. Unfortunately, a village population has not yet been analyzed for comparative purposes. Since so many individuals were afflicted, either a considerable amount of time was spent in the activities outlined, or high stress loads were endured by the population.

Stress loads were examined for females and males. It was expected that females would exhibit greater stress loads than males, as has been found in Mississippian populations (Bridges 1987; Pickering 1984). The opposite was true for the Sanders population. Males exhibited higher stress loads in terms of greater mean scores and greater relative number of articular surfaces afflicted.

The DJD evidence may suggest a ritual importance of maize agriculture. This would explain participation in activities associated with agriculture, but limited food preparation and hunting activities. Ritual importance of agriculture is also suggested by Newkumet and Meredith's (1988) depiction of men beginning each day by walking the fields of maize.

This study was unable to determine precisely which members of the population endured greater workloads than others because the representation of articular surfaces was low. Instead, individuals were grouped by sex in order to determine a sexual division of labor. The sexual division of labor does not appear to have been strict because individuals of both sexes practiced many of the activities associated with agriculture. However, some activities not directly associated with agriculture appear to have been sex specific.

ACKNOWLEDGEMENTS

I wish to thank Dr. Thomas Hester and Dr. Darrell Creel for their encouragement throughout this project. I also wish to thank the following individuals for editorial assistance as well as help in preparing various parts of this paper: Dr. Thomas Hester, Matthew Tomaso, Kaylee Stallings, Christine Lee, and Elizabeth Andrews. In addition I would like to thank The Friends of the Texas Archeological Research Laboratory and the Potts-Sibley funds for providing me with the ability to present this data at the 1993 Caddo Conference.

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BOOK REVIEWS

AN ARCHEOLOGICAL SURVEY OF THE SPIRO VICINITY, LE FLORE COUNTY, OKLAHOMA. By Dennis A. Peterson, J. Daniel Rogers, Don G. Wyckoff, and Karen Dohm. Oklahoma Archeological Survey, The University of Oklahoma, Archeological Resource Survey Report 37. 87 pp., figures, tables, references cited.

This report describes the findings of a 1984 survey around the Spiro site, summarizes information from the newly located sites, and reconciles some sites with locations investigated by WPA archeological teams. For a variety of reasons, some I mention below, it will not contribute directly to the current debates of the nature and identity of the Spiro site itself or of the character of Spiroan society. It is, however, the result of a salutary effort to collect new information on this part of the Arkansas River Valley, and should be used as a springboard for more research to address the currently irresolvable differences of opinion about late prehistoric society in this region. It is also a valuable reminder that unless we act now to locate significant sites and secure either their long term preservation or new information from them, we may never have answers to our questions about this remarkable place.

Funded by a grant from the Oklahoma Office of Historic Preservation to the Oklahoma Archeological Survey, the survey goals are listed in the introductory chapter along with a brief overview of Spiro area culture history, maps of the survey area, and a useful table of previously known WPA era sites and references. The overview is a very brief summary, encapsulating essentially the published literature on Spiro area research up to the mid-1980s.

The survey was originally conceptualized as an intensive search of a six-mile radius around the Spiro site to locate and assess the integrity of all

prehistoric and historic sites, and to ascertain the effects of current land use practices on them. Unrecorded Harlan phase, Spiro phase, and Ft. Coffee phase sites were to be sought, and their potential for new research was to be assessed in particular. The actual survey, carried out by Dennis Peterson in 1984, was scaled down to a block roughly two miles on a side with the Spiro site near its center. Most of this tract not included in the Spiro site proper, the Arkansas River, or areas of modern disturbance, was in pasture and forest.

Unfortunately, the survey methodology was limited to surface survey, and with the extensive ground cover and potential for alluviation in the floodplain, both the goals and the results of the project were probably significantly compromised by the absence of subsurface investigation.

Chapter 2 describes the effective natural environment of the Spiro area and the data categories collected on each site, and Chapter 3 describes the 34 sites located during the survey.

Among the information in this inventory are pertinent WPA data and citations reconciled with modern site locations, an inventory of the 1984 artifact findings, and assessments of site type and cultural affiliation. Chapter 4 concludes the body of the report with a brief summary, by Woodland period, Harlan, Spiro, and Ft. Coffee phases, and the Historic period, of the survey results. An Appendix contains an inventory of the artifacts by class/type.

The site and artifact descriptions are the heart of the report, and make this a useful volume for anyone concerned with Spiro area studies. However, the tiny artifact collections, and what I believe are premature assessments of site type and cultural affiliation weaken the concluding interpretations of Spiro area culture history. Site types are based in part on the number of houses

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believed to be present, and presumably contemporary, at several sites. Without independent evidence that structures were contemporary instead of sequential, how does one sort hamlets from villages on the basis of a handful of artifacts? And what criteria are sufficient for sorting affiliation of residential features -- crucial elements in the larger interpretations of the evolution and character of Spiroan society -- into phases or periods? Alternative phase assignments would have led to significantly different summaries in Chapter 4.

To take the Ft. Coffee phase as an example, the survey results suggest that sites attributable to this phase are "nearly non-existent" (p. 65) in the survey area, and include only the Moore site (Lf-31; actually outside this survey area), and Lf-75, where the two centerpost House #4 found by the WPA yielded a mid-16th century radiocarbon date (p. 42, Skidgel site description). According to the report, Lf-75 was not relocated during the 1984 survey, but may have been at or near new site Lf-401, where only 11 flakes were found. Yet, Lf-401 is identified as a Spiro phase hamlet. According to Rohrbaugh (1984:280), Woodward Plain ceramics dominate Ft. Coffee assemblages. If true, why then are not other sites with (undated) two centerpost houses and small assemblages with plain, shell tempered sherds (Woodward Plain, or undecorated portions of vessels like Woodward Applique, Braden Incised, Emory Punctate and so forth) just as likely to be possible Ft. Coffee phase residences as Spiro phase residences?

And, why are some 'villages' not sequential occupations belonging to more than one phase?

Estimates of population size and settlement density through time are important elements in testing ideas of the character of Spiroan society, and need to be based on hard data. Whether temporal benchmarks are grounded in quantifiable small scale changes in technological and stylistic attributes of artifacts, as Jim Brown has proposed for years, or in tightly controlled and adequately dated depositional contexts, or both, the criteria used to identify changes in Arkansas Valley settlement history need a cold, hard evaluation and independent test, not simply uncritical application to new studies. The summary of settlement history presented in the concluding chapter of this report may prove to be accurate with time, but it may be more useful as a hypothetical construct subject to a real test with further work at several of the sites listed here.

Some final technical notes: The volume is attractive and well put-together, as is typical of the OAS reports. Maps are clear and useful, although some lack scales and an overlay of the survey area. Because site designation in the Spiro area is so confusing to those of us who don't work with the WPA data regularly, a cross-reference of modern and WPA site numbers in a table at the end of the report would have enhanced the final product. And, one more review before publication would have eliminated a scattering of typos and omissions; a couple of references are missing from the bibliography or are misspelled, and a line is dropped on page 10.

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Arkansas Archeological Survey

The Culture of Oklahoma. Edited by Howard F. Stein and Robert F. Hill, 1993. The University of Oklahoma Press, Norman. xxvii+264 pp.

This book explores the question: is there a distinct Oklahoma culture, or Oklahoman cultural identity? The editors' basic premises (pages xvi and xviii) are that Oklahoma is "first and foremost a state of mind" and that Oklahoma is a "culture with boundaries and distinctive features identified both from within and without".

In the effort to characterize the culture and identity of Oklahoma, the editors and contributors to the volume focus on a diverse array of topics and viewpoints. This includes chapters on the geography and landscapes of the state to its various origin myths, and chapters on the history of blacks in Oklahoma; German, Mexican, and Vietnamese ethnic adaptations; and the health behavior of rural Native American adolescents. One chapter is on petroleum exploration and financing, another investigates the boom-bust cycle at Sulphur, Oklahoma -- a town famous for its mineral springs -- and what book on Oklahoma would be complete without a contribution on the significance of sports in Oklahoma's identity? To conclude the book, are chapters on architectural styles of Oklahoma homes and public buildings, and wheat farming and ranching. Finally, the

editors attempt to pull together common themes on Oklahoma's image and cultural identity.

So, what is the cultural identity of Oklahoma? In the book's foreword, Fred R. Harris (page xi) seems to sum it up rather succinctly. The culture of Oklahoma is "part cowboy and part Indian. It is part land rush and part Trail of Tears. It is part oil and part dirt". Most of all, Oklahoma is a state of pioneers; almost everyone who first came to the state -- including many Native Americans -- came from somewhere else.

According to Stein and Hill (page 198), the core cultural elements in the culture of Oklahoma are "sports, wetness and dryness, cowboys and Indians, flat land, and the psychology of Oklahoma cultural geography".

What of the Native Americans who live in the state, and who gave us the name Oklahoma, meaning "Red People" (from the Choctaw; Okla, "people", and humma or homma, "red")? They are missing from much of the discussion of Oklahoma's culture and cultural identity, except in juxtaposition to cowboys, land runs, and pioneer origin myths, or indeed as a curiosity in part of a "complex reality" that is ignored because of the editorial emphasis on the "ideological dimension" of Oklahoma culture (page xxvi).

It is a sad and distressing commentary on the culture of Oklahoma, and on the current mind-set of some anthropologists and psychoanalytic anthropologists, to have a book-length treatment on Oklahoma's cultural identity which concludes that "Native Americans.... are accorded at best a ceremonial presence in Oklahoma's visual identity...for all practical purposes, Indians [do] no exist in Oklahoma at all....Their day-to-day life...is wholly set apart from mainstream white society and imagination [page xxv]". While not necessarily denying the validity of this characterization, it seems painfully obvious that the editors made no attempt to grapple with understanding the rich culture of Native Americans in

Oklahoma, or of how Native American contributed -- and continue to contribute -- to the distinctive history and way of life that is Oklahoma.

Thus, *The Culture of Oklahoma* is far from a comprehensive treatment on all the cultures of Oklahoma. Debo (1940), Foreman (1948), Gibson (1973), Newkumet and Meredith (1988), and Wright (1951), for example, are excellent available sources to consult on the Native Americans in Oklahoma.

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