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Caddo Nation Chemistry: Art, Commerce, Pottery, and Tools

Joe Jeffers

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Figure 2. Caddo house (courtesy Texas Historical Commission thc.texas.gov)

Each community had a leader, a caddi, and at least one religious building on an earthen mound. Sacred objects were kept at this mound, and important ceremonies were performed here. The caddi oversaw planting and harvest ceremonies, approved arranged marriages, and organized the building of new houses. The position was hereditary.

Each regional center, comprised of several communities, had a religious leader, a xinesi, whose house was on a mound. He rarely left his house; his needs were met by members of the clan. He was the line of contact with Ayo-Caddi-Amay, the supernatural supreme being of the Caddo. The xinesi was also hereditary, with the nearest male blood relation succeeding him (4, 5).

Additional community positions of importance included medicine men, known as connas, and tribal police, known as tmmas. The former used herbal remedies to treat the sick, while the latter punished idlers by whipping them with sticks. Even though the communities were hierarchical, there were no slaves. House building was a community event.

Burial mounds were common, especially for the upper echelon. Burial objects included pottery and other artifacts. These mounds provided a rich resource of Caddo pottery upon archeological excavation. Often, when one leader died, either caddi or xinesi, he was buried in the mound, his dwelling was burned, and the mound was built higher for the next leader. Some mounds have revealed several generations of leaders buried in the same mound.

Corn was the major crop, and the Caddo did two plantings each year, one in April, another in June. They always kept two seasons worth of seeds as protection

against a bad year's harvest. They stored the corn in reed baskets and covered it with ashes to protect against weevils. They covered the baskets to keep out rats.

First contact with Europeans came from the Spanish DeSoto-Moscoco exploratory expedition in 1542, looking for gold. By the time the Spanish contacted the Caddo, DeSoto had died. The Caddo had little friendly contact with the Spanish, but the Spanish brought disease, which mostly came indirectly from Caddo trade partners. The second European contact was in 1685 with the French LaSalle expedition. The French were more interested in trade, but disease continued to decimate Caddo populations, which dropped from 200,000-250,000 prior to European contact to fewer than 10,000 over the period up to 1880 (6).

Trade with Europeans gave the Caddo access to metal objects—guns, knives—as well as horses, cloth, and other goods in exchange for furs. This trade led to changes in the many aspects of Caddo daily life. The population loses, European incursions, and later American ones continued to restrict Caddo territory until eventually they were moved to the Oklahoma Indian territory.

Art

Rock art was common in the Arkansas River Valley with the discovery of 46 rock art sites by 2005 (7, 8). Rock art is mostly from AD 900-1541, but some date as far back as 650 BC. Sites were in sandstone overhangs rather than in limestone caves because sandstone was harder and more durable. Caddos generated both petroglyphs and pictographs. Petroglyphs were carved or scratched images made in stone, whereas pictographs were painted. Some petroglyphs were also subsequently painted. Images fall into several categories—geometric, abstract, animal, and human forms. The human forms typically contained a headdress. Archeologists speculate that these sites were used for religious and ceremonial purposes.

Paint was applied either with fingers or with brushes probably made from sticks with the ends beat to pulp or by the application of plant fibers or hair to stick ends. Pigments were hematite (Fe_2O_3), magnetite (Fe_3O_4), lemonite ($\text{FeO}(\text{OH}) \cdot n\text{H}_2\text{O}$), goethite ($\text{FeO}(\text{OH})$), all iron oxides; and charcoal, pyrolucite (MnO_2), and manganite ($\text{MnO}(\text{OH})$) for black. Pigments were probably mixed with a binder of blood, animal fat, egg, fish oil, or plant oil. The binders were not durable enough to persist. Examples of a petroglyph and a pictograph are shown in Figure 3 a and b, respectively (9).



Figure 3. (a) Petroglyph and (b) pictograph (with permission of Arkansas Archeological Survey)

Probably equally old is body art. The Caddo painted their bodies or even tattooed them. Men often painted themselves with red ochre (containing hematite) or cinnabar (HgS), which was common in the Ouachita Mountains. In addition to decoration, such painting provided some protection against insects. This pattern, whether in preparation for battle or not, led Europeans to call Indians redskins. Men tattooed their faces with rings around the eyes, lines along their faces, and animal forms on their bodies. Women tattooed themselves, often from a young

age, on their faces and breasts, usually using flower or animal forms. Tattoos were made by pricking the skin, then applying finely ground charcoal or another coloring agent and rubbing it into the wound. Such tattoos were permanent (10). Additional art adorned leggings, mats, and pottery.

Pottery

Caddos made crude ceramic vessels during the Woodland Period, as early as 1000 BC (Table 1). Clays were locally sourced, usually from alluvial sites, non-clay temper was added to prevent shrinkage and cracking during firing, and clay was rolled into ropes. These ropes were then coiled on a base to make the walls of the vessels. The coils were smoothed together. Firing was done on open fires or on fires which then had a tepee of wood added around the vessel. Early ceramics contained large chunks of bone for temper. The bowls and jars were undecorated and thick. They moved to using grog (old ceramic pieces), sand, and crushed bone for temper. During AD 400-800, Caddos began decorating some pottery by incising, stamping, or painting.

Table 1. A chronological framework for Caddo archeology (11)

Woodland Period	ca. 1000BC-AD 800
Formative Caddo	ca. AD 800-1000
Early Caddo	ca. AD 1000-1200
Middle Caddo	ca. AD 1200-1400
Late Caddo	ca. AD 1400-1680
Historic Caddo	ca. AD 1680-1840

In the Formative Caddo period (800-1000), they used complex curvilinear patterns. By the Early Caddo period (1000-1200), they began making fine ceramic wares with thin walls. Temper was more finely crushed. Many vessels were carinated, having rounded bottoms rather than flat ones. Fine lines and geometric patterns were added, as shown in Figure 4 (12). The incised lines were often rubbed with red hematite or white kaolin for added color. Vessels were polished or brushed and slip was often added after firing. Refinements continued with calcined bone and shell tempers until the historic period, when Europeans entered the scene.



Figure 4. Caddo pot shards showing decorative techniques (with permission of Arkansas Archeological Survey)

Because fine wares and some utility wares were buried with the dead, archeological excavation of burial mounds led to the discovery of exquisite ceramic vessels. Examples are shown in Figure 5.



Figure 5. Caddo ceramics in JEC Hodges Collection, Henderson State University (with permission of Arkansas Archeological Survey)

Commerce

The edge of the Ouachita Mountain orogeny is in Caddo country. The Gulf Coastal Plain begins at its edge,

as shown in Figure 6 (13). As the sea retreated in the Cretaceous period (145 to 66 million years ago), salt water was trapped below the surface. Salt wells and springs remain today. The Caddo collected the waters and, using ceramic evaporating pans, retrieved the salt. They used salt for seasoning and preserving their own foods. They also made salt into loaves of two or three pounds each and traded these loaves for other goods. The Caddo had been harvesting salt since at least 1200 AD (14). They continued this trade with the Europeans. They found shell temper allowed for higher firing temperatures and less breakage with repeated heating, so shell was the temper of choice for salt pans.

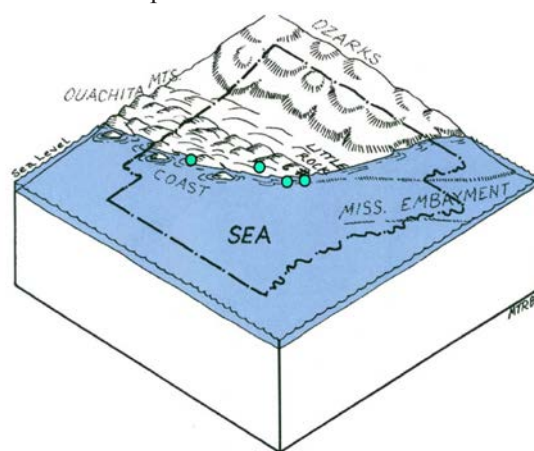


Figure 6. Sea coast in Arkansas during the Cretaceous Period (courtesy Arkansas Geological Survey)

The Caddo also traded bois d'arc, bow wood. The Osage orange trees (*Maclura pomifera*) grew in abundance in Caddo country, and its wood made superior bows. Members of other tribes traveled great distances to obtain it from the Caddo. Likewise, the Caddo peddled it far and wide. "A Plains Indian brave would gladly trade a horse and blanket for a bow made of the wood." It was stronger than oak and more durable than other woods, lasting 20 years or more (15). They used buffalo ligaments to string the bows (10).

While salt and bow wood were the Caddo's major items of commerce, they routinely traded pottery too. Some of the pottery found in grave mounds was ornate and came from elsewhere. With the advent of Europeans, furs became a major commerce item.

Tools

Prior to the Europeans, tools were made from animal bones, wood, shells, and stone. Shoulder bones from buffalo and pieces of walnut trees were used for hoes. Caddos used wood for mortar and pestles to grind corn

into flour and to start fires. Arrows from bow wood were completed with novaculite for arrowheads attached with glue from buffalo hooves (Figure 7). Like other cherts and flints, novaculite is primarily composed of silica (99 % silica with traces of Al, Fe, Mn, Ti, Ca, Mg, Na, and K). As the Ouachita Mountains were formed, metamorphosis thermally altered and recrystallized novaculite, giving it distinctive textures (16).



Figure 7. Novaculite dart points from the JEC Hodges Collection (with permission of Arkansas Archeological Survey)

Novaculite had other uses, as knife blades, scraping tools, and drills. Caddos discovered that heating novaculite made chipping and shaping easier. Arrow heads were also items for trade. The map in Figure 8 shows the location of novaculite in Caddo country.

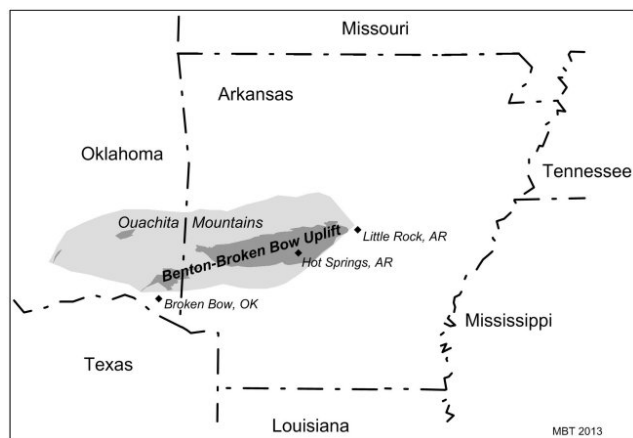


Figure 8. Arkansas novaculite of the Benton-Broken Bow Uplift (with permission of Arkansas Archeological Survey).

Conclusion

Modern studies of Caddo artifacts utilize carbon-14, archaeomagnetic, and thermoluminescence dating

techniques; instrumental neutron activation analysis; mass spectroscopy; scanning electron microscopy; X-ray diffraction; and X-ray fluorescence spectroscopy. Archeologists in Arkansas, Louisiana, Oklahoma, and Texas continue to study Caddo artifacts.

The proud Caddo Nation still exalts its culture, heritage, traditions, and language centered in Binger, Oklahoma, where they have the Caddo Heritage Museum. The museum has 10,000 prehistoric items and a reference/research library with audio/video recordings of songs, dances, and stories. Works of recent and current Caddo artisans are on display (17).

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About the Author

Joe Jeffers is Professor Emeritus of Chemistry at Ouachita Baptist University (OBU). He had previously served OBU as Dean of Natural Sciences. He received his B.S. in Professional Chemistry from OBU and his Ph.D. in Biochemistry/Molecular Biology from Purdue University. He is author of *Frederick Sanger: Two-Time Nobel Laureate in Chemistry*, Springer Briefs in Molecular Science: History of Chemistry, Springer International Publications. He is currently Chair Elect of HIST, having been Program Chair of the division earlier.

9th Norwegian Conference on the History of Science

The 9th Norwegian Conference on the History of Science will be held November 29 to December 2, 2023, at the Norwegian University of Science and Technology, Trondheim, Norway. The theme of the conference is "Short Years, Long Years, and Round Years: Anniversaries in the History of Science." The organizers invite papers on any aspect of the history of science, technology or medicine and particularly welcome papers engaging with the issue of anniversaries, broadly defined. The deadline for submissions is June 1.

Historians can be ambivalent about anniversaries. On one hand, they offer an opportunity to reassess and mobilize interest in topics that otherwise would not receive widespread attention. Anniversaries are an occasion to reflect on the enduring importance of history to the contemporary world and are frequently used to argue for funding specific projects. On the other hand, not all topics of historical interest have anniversaries; anniversaries may isolate topics from their historical context or facilitate an arbitrary juxtaposition of past and present; and they may foster expectations that the past must be celebrated rather than critically analyzed.

Submissions from scholars at all career stages are welcome—early career researchers especially so. For more information, see the conference webpage, <https://www.muv.uio.no/forskning/the-norwegian-conference-on-the-history-of-sci/9th-norwegian-conference-on-the-history-of-science.html> or contact Annette Lykknes, annette.lykknes@ntnu.no.