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## Article Title: Plains Caddoan Relationships: The View from Craniometry and Mortuary Analysis

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Article Summary: This is one of a series of articles based on presentations at a mini-symposium "Toward Plains Caddoan Origins: A Symposium" held at the Smithsonian Institution in November, 1976. This article presents the use of cemetery excavation and subsequent skeletal analysis to provide cultural data and mortuary customs as well as biological affinities of the groups studied.

# PLAINS CADDOAN RELATIONSHIPS THE VIEW FROM CRANIOMETRY AND MORTUARY ANALYSIS

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Most scholarly attention on the intriguing problem of prehistoric origins of the Plains Caddoan speaking populations has focused on archeologically recovered materials, largely ceramics. Another line of investigation which has seldom been consulted on this particular problem consists of cemetery excavation and subsequent skeletal analysis. This area of research provides two types of data which are relevant: (1) comparative cultural data or mortuary customs; and (2) human skeletal morphological data which directly relate to the biological affinities of the groups concerned. This essay discusses both data types as they relate to the problem of Plains Caddoan origins.

## *Biological Evidence*

Due to the extensive salvage operation of the River Basin Surveys, the University of Kansas and others in the last several decades, numerous prehistoric and early historic cemeteries have been excavated intensively and approximately documented as to date of use and cultural affiliation. Sufficient numbers of documented skeletal samples are now available to enable us to search for morphological patterns and tentatively suggest biological relationships. In recent years computerized multivariate methods of analysis have been developed to enable a more sophisticated and hopefully more accurate assessment to be made. The analysis requires the following assumptions: (1) morphological similarity among populations as expressed through cranial measurements, reflects their actual genetic relationships; (2) that the cultural affiliation and date of each sam-

ple are correct; and (3) the skeletal samples are representative of their parent populations. Assumption 1 is presently being debated in physical anthropology as to the extent of nongenetic, environmental influence on morphological expression and which data most accurately characterize that expression. Responsibility for assumption 2 rests squarely with the archaeologist and dating laboratory; however, an additional complication consists of the possibility that, especially in late sites, cemeteries may contain individuals from broader populations than those represented at the associated habitation site. Future refined skeletal analysis may be able to screen out such individuals, but at present they remain as "noise" in the system. Assumption 3 is largely a problem of sampling. Samples composed of a few or single skulls may give an erroneous picture of that population's morphological variability.

The biological approach to the problem of Plains Caddoan origins then consists of defining samples which characterize documented historic Caddoan groups and their Siouan-speaking neighbors and comparing them with the earlier samples. In the Northern Plains at least, this approach is possible.

Table 1 summarizes the skeletal samples used in this analysis. Crania from different sites and sources have been pooled to form eight samples; five representing historic tribes (Ponca, Pawnee, Omaha, Mandan, Arikara) and three prehistoric archeological groupings (Lower Loup, St. Helena, Upper Republican). This was done to (1) increase individual sample sizes and (2) produce samples which are relevant to the problem of Caddoan origins. Additional information on the specific sites is provided by Jantz (1977) and references cited therein.

Thirteen standard measurements were taken on each skull: basion-bregma; endobasion-nasion, endobasion-alveolar point, minimum frontal breadth, bizygomatic breadth, upper facial height, nasal height, nasal breadth, maxillo-alveolar length, maxillo-alveolar breadth, biorbital breadth, basion-porion and auricular height. Maximum length and breadth were not taken due to slight deformation of some crania. All measurements were taken following the techniques described by Bass (1971). Only males were included since previous research has demonstrated that males and females yield similar results, and

the male pattern is often easier to interpret. The measurements were analyzed using the BMD07M stepwise discriminant function program (Dixon, 1975). This analysis reveals which measurements maximally discriminate the samples. Three functions developed for the St. Helena and the five tribal

TABLE I  
SITE NAME AND CULTURAL AFFILIATIONS OF MALE CRANIA  
USED IN THIS ANALYSIS

| Cultural Affiliation | Site Name                | Site Number | Number of Crania |
|----------------------|--------------------------|-------------|------------------|
| Ponca                | Ponca Fort               | 25KX1       | 4                |
| Ponca                | Davis                    | 25KX6       | 1                |
| Ponca                | Niobrara Landing         | 25KX13      | 1                |
| Pawnee               | Linwood                  | 25BU1       | 3                |
| Pawnee               | Hill                     | 25WT1       | 6                |
| Omaha                | Ryan                     | 25DK2A      | 3                |
| Omaha                |                          | 25DK10      | 2                |
| Mandan               | Sperry                   | 32BL4       | 1                |
| Mandan               | Double Ditch             | 32BL8       | 1                |
| Mandan               | Larson                   | 32BL9       | 2                |
| Mandan               | Huff or Jennie<br>Graner | 32MO11-12   | 2                |
| Mandan               | Slant Village            | 32MO26      | 2                |
| Mandan               | Scattered Village        | 32MO31      | 1                |
| Mandan               | Modern (1928)            |             | 1                |
| Mandan               | ?                        | ?           | 2                |
| Arikara              | Rygh                     | 39CA4       | 15               |
| Arikara              | Leavenworth              | 39CO9       | 20               |
| Arikara              | Sully                    | 39SL4       | 37               |
| Arikara              | Mobridge                 | 39WW1       | 17               |
| Arikara              | Larson                   | 39WW2       | 45               |
| Lower Loup           | Barcal                   | 25BU4       | 1                |
| Lower Loup           | Wright                   | 25NC3       | 1                |
| St. Helena           | Murphy                   | 25DK9       | 4                |
| St. Helena           | —                        | 25DK13      | 14               |
| Upper Republican     | Boone                    | 25BO7       | 1                |
| Upper Republican     | Graham                   | 25HN5       | 1                |
| Upper Republican     | Sondegard                | 25HW3       | 1                |
| Total                |                          |             | 189              |

samples explained 76 percent of the total variation. The Upper Republican and Lower Loup samples were then evaluated on these three functions. The resulting scores of all eight samples were then plotted as coordinates on three geometric axes which correspond to the three discriminant functions. Figure 1 represents a visual plot of each of the eight samples on the three axes. The "square" shown for each sample represents its relative location in the three dimensional space. The vertical line attached to each square represents the discriminant function and should be viewed as the "height" of each square in three dimensional space. The positions of the squares relative to each other represent our estimate of the biological relationships of the samples, subject to the assumptions and limitations defined earlier.

Several patterns are apparent in the three dimensional plot: (1) All five historic tribes are well separated. (2) Of the five tribes, only the Pawnee and Arikara show affinity, largely in factor III (length of vertical line). (3) Lower Loup is clearly affiliated with the Pawnee and not with the Arikara or Mandan. (4) Upper Republican is nearly equidistant between Arikara and Pawnee. (5) St. Helena is distinct from Upper Republican, but also intermediate between Arikara and Pawnee.

#### *Caddoan Mortuary Practice*

Although mortuary patterns for Plains Caddoan groups vary in details, they historically shared a pattern of primary flexed burial in individual graves, soon after death with small mounds sometimes constructed. This method is similar to that described for the Omaha, but contrasts with the scaffold procedure of the Mandan and Hidatsa.

*Caddo*—For the Caddo, Hidalgo (1927:57), Solis (1931:61), Espinosa (1927:162-164), Morfi (1932:37), Casañas (1927:297-299), Dorsey (1905:65), and Parsons (1941:36-39) all document burial in the ground. According to Solis (1931:1) "those who die are buried in a sitting position, with their guns, etc. . . ." Morfi (1932:37) adds that they "keep the corpse in the house for some hours, during which time the laments do not cease. . . . This done they take the body to the grave which is already dug, with sufficient depth and size, and sit it up in it, with much propriety."

*Wichita*—For the Wichita, Yarrow (1881:102-103) relates a

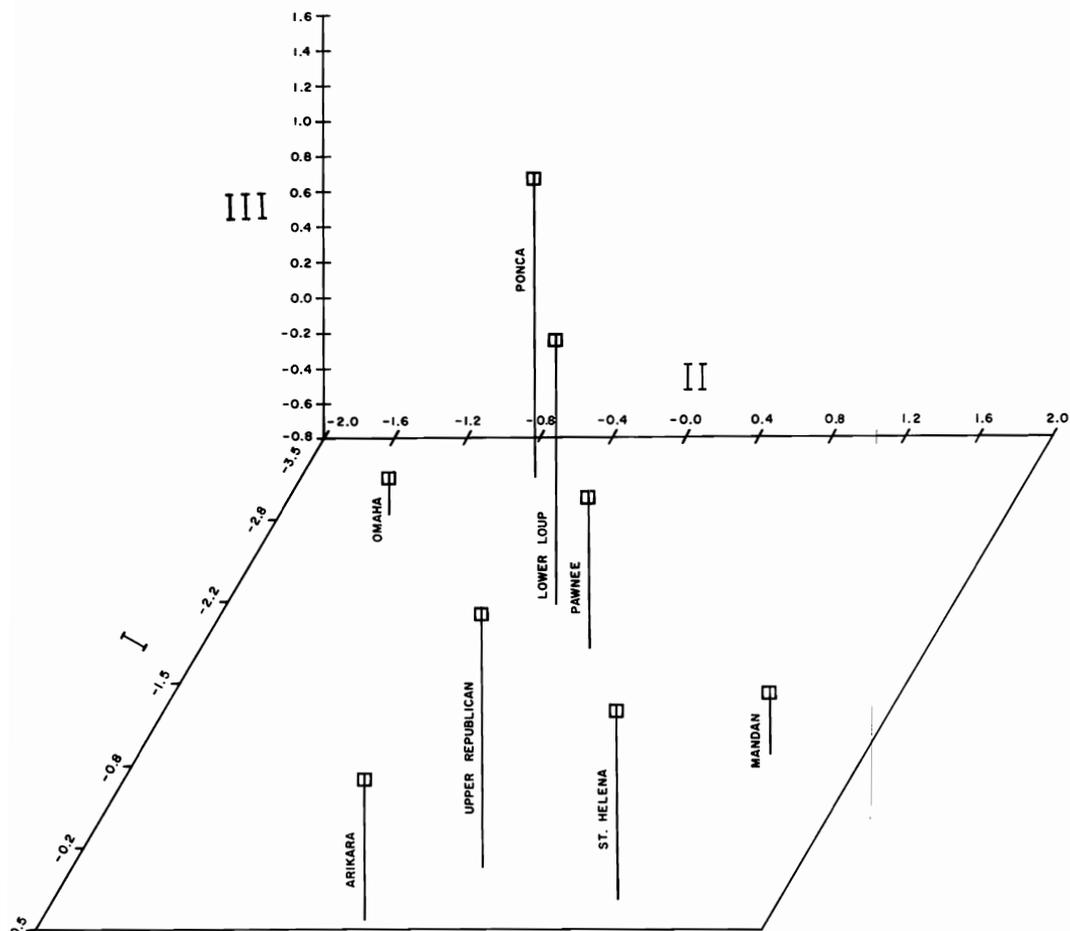


Figure 1. Three dimensional plot of morphological relationships between eight samples, based on cranial measurements.

comment by a physician with the Wichita Agency, Fordyce Grinnell, that they placed bodies in graves three or four feet deep, covered with small mounds.

*Pawnee*—According to Irving (1835:116) and Dunbar (1918:601-602) the Pawnee buried their dead in graves. Bushnell (1927:79-80) citing La Flesche adds “the bodies were placed in the graves in a sitting position. . . . Small, low mounds of earth evidently surmounted the graves. . . .the groups of small mounds, the cemeteries belonging to the several villages, were evidently situated on high ground some distance from the lodges.” A photograph of a Pawnee cemetery is published as Bushnell’s plate 16. He credits La Flesche with the information that the photograph was taken 50 years earlier “near the great Pawnee village then standing on the banks of the Platte.” The photograph shows at least 11 roughly made mounds with very steep sides.

*Arikara*—Arikara mortuary customs have been summarized recently by Ubelaker and Willey (1978) where all reliable sources indicate that since the beginning of the 19th century, dead were deposited in graves (primary burials) soon after death. Maximilian (Thwaites, 1906:394) states “The Arikaras affirm that God said to them that they were made of earth, and must return to earth; on which account they bury their dead in the ground. Various things are sometimes cast into the graves of eminent men; the corpse is dressed in the best clothes, the face painted red, and sometimes a good horse is killed on the grave. If the deceased has left a son, he receives his father’s medicine apparatus, if not, it is buried with him in the grave.”

Since all of these groups share a common mortuary practice in historic times, one would expect that if they share a common origin, this uniformity would extend into prehistory as well. This logic was exercised as early as 1811 when after discussing the Mandan practice of scaffolding the dead, Brackenridge noted “this custom prevails amongst all the wandering tribes; but amongst the Arikara, the dead are deposited in a grave as with us, which I think clearly proves their origin to be different from that of their neighbours,” (Thwaites, 1904:140).

Unfortunately reliable prehistoric data are available for only the northern groups. Ubelaker and Willey (1978) have recently presented data to suggest that Arikara mortuary customs may have been changing at the time the ethnohistoric record begins.



*Figure 2. Articulated skeleton from the Mobridge Site, South Dakota.*

Ethnographic accounts by Tabeau (Abel, 1939:201-212) and Culbertson (1851) suggest that the primary burial practice may have included a temporary scaffold stage prior to burial in the 18th century. This is also suggested by archeological evidence at 39WW1, 39WW2, and 39CO9. Excavation of cemeteries associated with these probable Arikara village sites produced fly and beetle remains which indicate at least some individuals were exposed above ground perhaps several weeks, before burial (Ubelaker and Willey, 1978).

Of 2,158 skeletons recovered from cemeteries associated with 8 Arikara sites (39CA4, 39CO9, 39CO32-33, 39SL4, 39ST1, 39ST215, 39WW1, 39WW2), 52 percent were found as primary burials, (Fig. 2) 28 percent may have been primary but were later disturbed by rodents, recent looters or Indians digging new graves. The remaining 20 percent were found as undisturbed secondary burials (Figures 3 and 4) and constitute further evidence for a possible temporal shift in Arikara mortuary practice from prehistoric secondary burial to historic primary burial.

As in Pawnee cemeteries, Lower Loup burials are primary, flexed, single inhumations. However, both the St. Helena and Upper Republican samples used in the cranial analysis originate from secondary skeletal deposits in ossuaries.

### *Conclusions*

Cranial analysis suggests that historic Arikara, Ponca, Omaha, Pawnee, and Mandan samples are distinct from each other, but among these samples, the Pawnee and Arikara show the greatest similarity. Comparison of prehistoric Lower Loup, St. Helena, and Upper Republican samples with these historic tribes shows Lower Loup lining up with the Pawnee and the other two intermediate between Pawnee and Arikara. Historic Pawnee and Lower Loup also show similarity in mortuary practice. The secondary nature of the St. Helena and Upper Republican samples suggests a temporal shift in mortuary customs from secondary to primary, if these populations are ancestral to the Arikara or Pawnee as the crania suggest. If the Arikara and/or Pawnee ancestral mortuary pattern included secondary burial, it is puzzling that all historic Plains Caddoan groups uniformly practiced primary inhumation; however the history of Mandan mortuary procedure may also show change.



*Figure 3. Skeleton from the Mobridge Site with disarticulated leg. Note that the left leg is lying above the skull. . . .(Below) Figure 4. Secondary burial of several individuals at the Mobridge Site.*



Historically, the Mandan deposited their dead on scaffolds, whereas most of the material listed in Table 1 found at Mandan sites comes from primary inhumations.

It is clear that we lack sufficient skeletons and documentation to further elucidate these problems at this time. Additional prehistoric material may substantiate the preliminary patterns suggested here, and could also illuminate the relationship between the Upper Republican, St. Helena, Arikara, and Pawnee populations.

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