The Hybrid Origin of the Arikara Indians

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Abstract

The hypothesis of a hybrid origin of the historic Arikara of the Great Plains was examined by multivariate-discriminant computer analysis applied to samples of Arikara and related skeletal material. The ethnohistorical and archeological evidence bearing on the Arikara was summarized, and the skeletal material utilized was described. Three putative ancestral groupings were examined by F and t significance tests for cranial measurements and indices, and were subjected to multivariate analysis with Arikara sample series to determine their relationships. The initial hypothesis of the Arikara being closely related to the protohistoric and historic Pawnee, and less closely related to Siouan groups such as the Mandan and the Ponca and Omaha, was supported.

The purpose of this study was to examine the hypothesis of a di- or tri-hybrid origin of some of the populations of the Great Plains, as initially advanced by the late G. K. Neumann in 1942 (5). This hypothesis was tested through the application of multivariate computer analysis. The Caddoan-speaking Arikara of South Dakota were utilized as an example. In their migration up the Missouri River, the Arikara came into contact with the Siouan-speaking peoples of the Middle Missouri Tradition. Despite the occasional war-like nature of the contacts, considerable mixture did occur, especially in the northernmost Arikara villages. Contacts of lesser importance may have been made with the Siouan bison hunters of the Dakota and Dhegiha divisions. Physically, the analysis primarily involved populations of the Muskogid and Dakotid varieties, following the terminology of Neumann (6). These groups include: 1) historic and protohistoric Pawnee represented by samples of the Upper Republican and Nebraska Culture aspects and historic Pawnee (Muskogid Ancestral Group); 2) a Plains Woodland and Mandan-like Siouan population (Dakotid A Ancestral Group); and 3) the possibility of significant contribution of a second type of the latter (Dakotid B Ancestral Group), represented by the Ponca and Omaha. It is to be understood that the term "putative ancestral group", particularly in the case of the Dakotid B Ancestral Group, does not infer direct descent, but rather the possibility of mixture through contact. It has long been suggested that the Arikara are descendants of the Pawnee (3, 9, 10, 11, 14). Most of the evidence for this is linguistic in nature. The history of the Arikara prior to the close of the 18th century is not perfectly known, and can only briefly be summarized here. Northernmost of the Caddoan-speaking people, the Arikara were the last of that linguistic stock to come in direct contact with white chroniclers. Archeologically, some time after circa A.D. 100, but still several centuries before the arrival of the first white men in the Central Plains region, the Middle Woodland-Hopewellian complexes were succeeded by a group of semi-horticultural pottery-making cultures implying a much more stable pattern of settlement. Included in these semi-sedentary complexes were several prehistoric manifestations featuring small loosely arranged unfortified settlements—

the Nebraska Aspect of northeastern Kansas and eastern Nebraska, and the Upper Republican Aspect of western Kansas and Nebraska (16). There is archeological evidence that the Arikara were established in present central South Dakota by the 15th century, as represented by the Initial Coalescent Variant (4). The Initial Coalescent sites appear to represent the first stage of an amalgamation of the Central Plains and Middle Missouri into the Coalescent Tradition. There is a considerable gap in the archeological record between the Upper Republican and Nebraska Cultures and the Pawnee, perhaps due to the dry years of the 1400's in the Central Plains. The close similarity in houses, pottery, and other artifacts between the Initial Coalescent and the Central Plains Tradition however leaves little doubt that the Initial Coalescent groups were immigrants from the Central Plains. Few studies in physical anthropology have been done on the remains from the Great Plains. Wedel (15) says of this area: "For various reasons it has remained one of the last major geographical provinces to attract the interest of trained students of prehistory—strange to say, despite the demonstrable richness of this upper Missouri region for the study of human prehistory, no comparable body of data correlating cultural and somatological materials on the Arikara—or for that matter on any of their neighbors—has yet been published".

Crania of 169 nondeformed adult males comprise the 9 series used for the study. All of the crania were measured and examined by Georg K. Neumann, and the data placed in the files of the Laboratory of Bioanthropology, Indiana University, prior to his death. The original data is now in the possession of his surviving family. The samples used are well-documented temporally, and are based on specimens whose cultural affiliations are known either from archeological materials or historic records. Identical measurements and observations were employed in assessing each series; error on the part of non-comparable data from different observers was eliminated. The samples represent the totality of available materials which adhere to the above criteria, and are considered adequate for estimations of the parameters of the actual populations involved. The question of the particular characteristics which are similar and different between the groups should hopefully be examined in light of what is known of the heritability of anthropometric traits. However, estimates which have been made show a considerable variability in results, depending on the methods used. Twin studies appear to show a fairly high agreement (12) in that certain traits such as stature, limb lengths, facial height, and the cephalic index appear to be highly heritable, having little within-pair variability among dizygous twins (1, 2, 7, 8, 13). Despite the claim that such studies show agreement among themselves (12), discrepancies do exist. Osborne and DeGeorge (7) find the cephalic index to have the highest heritability, while the same trait is listed as "unstable", inferring a low heritability, in Ostertag's study (8). In a study mentioned above (13), twins were compared in terms of 64 anthropometric traits, of which only 3 were not significant at or beyond the 0.05 level of probability. Of the remaining 61 variables, all but 6 were significant at or beyond the 0.01 level. This implies that nearly all anthropometric traits have very significant heritability factors, while being little influenced by environment. However, the length of the left ear is significant at the 0.05 level, while the right ear

shows considerably more significance (p=0.01) between mono- and dizygous twins! Given such difficulties and inexplicable results, it would seem that heritability studies point to very different conclusions. Given also the questionable nature of mandibular traits due to developmental influences, these problems make it unwise, in the opinion of the author, to base any interpretation of the traits which emerge from the analysis on these grounds.

The ancestral groupings were initially arrived at by an examination of the temporal, spatial, and apparent biological similarities of the series involved. Three statistical methods were used to substantiate this consolidation of the material, including analysis of similarities of qualitative variables, F tests of homogeneity of variance, and t tests for significant differences in means. Eighteen multivariate-discriminant functions were calculated, using all possible combinations of the ancestral groups with the two initial Arikara series and the pooled "tribal" Arikara series, for both measurements and indices. The initial separation of the total Arikara sample into two series, the Muskogid Arikara, and the Dakotid A Arikara (after the terminology of G. K. Neumann) was made for two reasons. The available information indicated that the skulls grouped as the Muskogid Arikara originated in earlier, more southerly sites where the population would be more likely to resemble the proposed original parental (Muskogid Ancestral Group) population, and that the Dakotid A Arikara skulls originated in sites later in date and more northerly in the territory occupied by the Arikara, and would be more likely to resemble the groups contacted later in Arikara history (the Dakotid A Ancestral Group). Also an examination of the material by the author and G. K. Neumann indicated that the samples were slightly different in morphological characteristics. The results of the initial multivariate functions appeared to bear out this contention. However, the differences between the Arikara samples was slight, and in the opinion of the author the total Arikara sample, or pooled "tribal" Arikara series was the best indicator of overall relationships. The final multivariate-discriminant functions which deal with this grouping are therefore considered to be the most applicable to the examination of the hypothesis, and are summarized here.

The analysis indicated that the Arikara were most closely related to the Muskogid Ancestral Group, and that this similarity was greatest in the region of the cranial vault, both by size and by proportion. The overall conformation of the facial area was also very similar, including the facial length, and nasal and orbital breadths. The Dakotid A Ancestral Group was the next most closely related grouping, with the similarity greatest in the nasal region as expressed by the nasal height, nasal root height index, and the nasal index. There was some similarity in the facial breadth and the flatness of the face. The Dakotid B Ancestral Group was the least similar to the Arikara. No particular region of the cranium was related as a unit to the Arikara. The greatest similarity between the Arikara and the Dakotid B Ancestral Group was in the high nasal bones, and in a moderate amount of the flattening of the cranial base; the cranial vaults were quite different. This general picture was in agreement with that proposed by the original hypothesis. The relationships between the

ancestral groupings and the Arikara may be summarized by the use of a generalized multivariate D^2 value, considering all variables, which indicates general biological distance between populations. To place these values in perspective, if the statistic were applied between the Arikara and a remotely related American prehistoric population such as the Indian Knoll Archaic series from Kentucky, a value of $D^2 = 24.00$ would obtain. The close relationship between the Arikara and the Muskogid Ancestral Group was reflected in a D^2 value of 4.65. The Dakotid A Ancestral Group was not far behind, with a D^2 value of 4.90, and appeared to have contributed significantly to the historic Arikara. The Dakotid B Ancestral Group was the least related of all the putative ancestral populations tested, but the dissimilarity was not great; $D^2 = 5.13$. In this regard, the Dakotid B Ancestral Group appeared to be close enough to retain it as a viable putative ancestor, a question which was left open in the initial formulation of the hypothesis.

The available evidence, as summarized here, appears to lend considerable credibility to the hypothesis of a hybrid origin of the Arikara. Certain sets of characters which serve to identify the samples employed have been identified, and may serve as a guide to workers planning further craniometric studies on similar material.

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