The Use of Female Crania in Demonstrating Racial Relationships as Exemplified in Two Upper Mississippi Amerind Groups[1]

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Introduction

This study considers three distinct but interrelated problems, which can be set forth as follows:

Problem 1. In previous studies that have dealt with the assessment of the degree of relationship between a number of racial groups of prehistoric American Indians, almost exclusive use has been made of male crania. Because of the practical problem of assembling a statistical sample of skeletal material from widely scattered areas, and, in addition, the very paucity of prehistoric crania which have been excavated under test conditions or are otherwise fully documented, the data from female cranial series cannot afford to be disregarded. It would therefore be of considerable benefit to determine whether female crania, if used, would be as suitable as those of males in determining racial relationships. In this study, two cranial series, each consisting of approximately an equal number of males and females, are examined and compared to determine the degree of similarity in their respective metrical, indicial, and morphological characteristics. Both series have been assigned to the Upper Mississippi Phase, one to the Fisher, or Heally, Focus (Oakwood Mound), and the other to the Anderson Focus (Fort Ancient Aspect).

Problem 2. Given the above archaeological relationships for the Oakwood and Anderson skeletal series, it would also be of value to determine to what extent these two geographically separated groups are physically related. This study attempts to determine the degree of physical similarity that exists between these two series, independently using both male and female crania in making the metrical, indicial, and morphological comparisons. Following this, an effort is made to place the Anderson and Oakwood series into the overall physical, archaeological, and linguistic framework of American Indian racial history as proposed by G. K. Neumann (6; 7).

Problem 3. A third problem, implicit in problems 1 and 2, is primarily methodological. A test is made of the reliability of the specific combination of metric measurements, indices, and morphological observations used to demonstrate the closeness of relationship of skeletal material that has been placed into the same varietal category. This study is also useful in demonstrating the validity of certain varietal groupings that have been assigned previously.

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Discussion

It might be asked why past studies have used male crania more or less exclusively. Although much of this male emphasis probably "just happened," and subsequently became "traditionally acceptable," two additional reasons, one anatomical, the other practical, might be given. First, the greater absolute body size of males, which has probably permitted greater allometric growth, has resulted not only in greater relative male variability, but has also made any diversity that does appear between male groups more obvious, both to the eye and the anthropologist's calipers. Second, and closer to the point in this particular study, G. K. Neumann's exclusive use of male crania, in his extensive field work with regard to American Indian racial history, was primarily a result of the great amount of work involved and time consumed in collecting widely dispersed data; quite simply, the addition of female cranial data to research that had already reached major proportions was, for that particular study, literally out of the question.

The Oakwood Mound, near Joliet, Illinois, was excavated in 1928 by a University of Chicago field party, G. K. Neumann being responsible for the collection of the skeletal material. Because of its rather close resemblance to the artifactual material in the uppermost level of the Fisher site (10), the Oakwood Mound Component is considered to be part of the Fisher (or Heally) Focus, of the Upper Mississippi Phase. The Fisher Focus no doubt constitutes a separate, though as yet unnamed, Aspect. W. K. Moorhead himself excavated the Anderson village site and cemetery between 1887 and 1891. Sites of the Anderson Focus are situated along the central valleys of the two Miami rivers in Ohio (5), making the Anderson Focus the most northwesterly of the four foci of the Fort Ancient Aspect, Upper Mississippi Phase. A complete description of Fort Ancient may be found in Griffin (4).

The framework of American Indian racial history as utilized in this study may be briefly summarized as follows. The first well-documented Amerind populations in the eastern United States appear in Archaic times. By ca. 4000 B.C., an ancestral Paleoamerind biological population had differentiated into the Iswanid variety, found predominantly in the river basin areas south of the Ohio valley and represented by the Archaic Indian Knoll series, and the Lenid variety, a more northern Great Lakes area population, exemplified by the several Old Copper-Early Woodland skeletal series. Beginning in Middle Archaic times (2500-1500 B.C.) however, physically larger and more brachycephalic Meta-amerind populations began to appear in a number of areas in the Eastern United States. Thus, by Late Archaic-Early Woodland times, the Iswanids had given rise to the derived Walcolid variety, a group that later came to be associated with the Middle Mississippi cultural manifestation and the Muskogean linguistic family. The Lenids, on the other hand, had differentiated by Middle Woodland (Hopewellian) times into a derived Ilinid variety that is associated with both late Woodland and Upper Missssippi cultures in the areas south of the Great Lakes. Linguistically, these Ilinids are mostly of Central Algonkian stock.

The Walcolid and Lenid-Ilinid varieties were therefore contemporaries in the Middle West through the prehistoric period, from Archaic times onward. However, in Late Archaic-Early Woodland times, the distribution of the early Walcolids increased, as they expanded, probably from the Middle Mississippi area, northward up the Missouri and Mississippi, and east and southward up the Ohio and Tennessee-Cumberland, drainage basins. During this period the Lenid-Ilinid variety was peripheral. By Middle Woodland times, however, with the appearance of the Hopewellian and related cultures in Ohioan, Illinoian, and other centers, renascent Ilinids seem to have replaced the earlier Walcolid "invaders" and again became dominant in the Great Lakes area. After the demise of the Hopewellian culture(s), a second Walcolid northward movement occurred in Early Mississippi times (ca. 1000-1200 A.D.) in the form of the Middle Mississippi culture. By the late prehistoric period, these Middle Mississippi Walcolids dominated the Mississippi, Missouri, and Ohio river valleys where, often in close contact with indigenous Late Woodland Ilinid peoples, the Upper Mississippi culture formed. Many transitional Walcolid-Ilinid and Middle Mississippi-Late Woodland physical and cultural traits are evident, for example, in the Fort Ancient Aspect of southwestern Ohio. The Anderson Focus, considered in this study, is probably the most Ilinid and Woodland-like of the four Fort Ancient foci. In the northeastern plains area, the Dakotid variety, derived from an earlier Cenoamerind Deneid-like population (7:68), came into contact with Walcolid Caddoan-speaking Middle Mississippi peoples advancing up the Missouri River, borrowed freely of their culture and subsequently pushed eastward, coming as a result into considerable contact with Late Woodland Ilinid groups in the Iowa, southwest Wisconsin, and northern Illinois area and here contributing to the formation of what is known archaeologically as the Oneota Aspect. The Fisher Focus (Oakwood Mound) peoples are related in part to this Oneota development.

In dealing with the data obtained from the skeletal series used in this study (ie.-121 male and female crania), the following statistical procedure was employed. Some 38 absolute measurements were taken from various points on the skull, 27 indices then being calculated from these measurements. Of greater genetic value, 46 morphological observations were also made on each skull. Arithmetic means, standard deviations, and their respective standard errors were then computed for each of the measurements and indices. Finally, both male and female series were compared (male with male, female with female) by means of Student's "t" test, and significant differences, if they existed, were determined at the 10%, 5%, and 1% levels of significance. It should be emphasized that in demonstrating racial similarities and dissimilarities, the procedure described above makes use of an entire constellation of measurements, indices, and morphological observations in an attempt (1) to determine which characteristics reflect the common descent of two populations of the same variety, and (2) to determine the direction of variability of the two biological populations. Significant differences in one, a few, or even several of these traits do not therefore necessarily imply varietal differences.

Rather, such differences are only demonstrable when many traits or groups of traits show significant variation. This procedure is thus consistent with G. K. Neumann's view that a variety (race) is a zoological group of a certain order of differentiation (30%-80%) characterized by the possession of a combination of a selected number of inherited morphological attributes that reflect its history. A more detailed treatment of statistical method may be found in Smail (11:19).

The measurements and indices of the Anderson and Oakwood series were paired and compared as follows: Oakwood males with Anderson males; and Oakwood females with Anderson females. At the 10%, 5%, and 1% levels of significance, the results in Table 1 were obtained. At the 5% level, the specific measurements and indices which showed statistically significant differences were as shown in Tables 2a and 2b.

The above tables illustrate two factors concerning this study's use of female crania in determining racial relationships:

1. Comparisons of female skeletal series tend to show more significant differences at all levels (ie.-10%, 5%, and 1%) than comparison of values of male series. This is more obvious with regard to indices (9 females: 3 males at 5% level) than measurements (8 females: 5 male at 5% level).

2. Of the measurements and indices that actually do vary, there is much similarity between the male-male and female-female comparisons. In the total (for both sexes) of eight significantly different measurements, five are identical. As for the indices, two of the three significant differences in the male series find their counterparts in the female series. In addition, as mentioned above, the female series comparisons show several additional significant differences (i.e.-3 measurements and 7 indices) that do not occur in the male series comparisons.

On the basis of this particular study, it would seem that comparisons of female series show greater variability (i.e.—statistically significant differences) than comparisons of male series from the same sites. It is evident that additional research of a similar nature should be undertaken to ascertain whether this would apply to other American Indian populations as well, ar whether in some, male series comparisons vary more than females. In this connection, three precautionary statements might be made concerning the above "male vs. female" problem:

1. First, if it could be shown that, on the whole, comparisons of female series consistently show greater statistical variability than comparisons of male series, or vice versa (i.e.—male series consistently vary more than females), it would probably be best for accuracy's sake to use both male and female series comparisons in problems concerning the assessment of racial and varietal similarities and differences, even though this would undoubtedly involve considerable extra time.

2. Second, if it could be shown that comparisons of male series and comparisons of female series from the same sites show quite similar degrees of statistical variability, then either male or female series comparisons could accurately be used, depending on whether it were

males or females that occurred in the greater number or better condition.

3. Third, and in some respects most important, if further study shows that, in some Amerind racial or varietal groups, the female series consistently shows greater statistical variability than males, while in other groups the male series demonstrates greater variability than females, several problems are raised. For example, in a comparison between hypothetical populations A and B where this situation might occur, should the investigator chance comparing males that show more variability than females in population A with males that are less variable than females in population B, or vice versa? In this case, the only way that the investigator could compare hypothetical populations A and B would be to compare the males of one group with the females of the other. This of course raises even more problems. Absolute metrical comparisons would be essentially useless, while indicial comparisons could well be difficult to correlate effectively. In addition, the morphological traits selected would have to show a relative absence of linkage with sex. These problems are certainly worthy of further experimental verification.

As has already been pointed out, the measurements and indices in this study that do show significant differences in the male and female series comparisons are to a considerable extent the same measurements (i.e.—B, DS, SMN, MB, LOBD) and indices (SMN/MN, MB/ML). In other words, both males and females of the Oakwood and Anderson series are different in similar respects, the only exception being the aforementioned greater overall variability of the females. It is evident, however, that in the final analysis, taking into consideration all metric and morphologic factors, that differences that are not significant far outweigh those that are. The two populations under consideration here, Oakwood and Anderson, in actuality show a high degree of overall similarity.

Still further, there is a strong suggestion that the indices that do show significant differences, especially with regard to the Oakwood female-Anderson female comparisons, are mostly concerned with the general breadth of the skull (and face). For example, seven of the nine significantly different indices are computed by using the measurements B (maximum breadth), TFB (total facial breadth), and IOB (interorbital breadth). These differences do not appear to any significant extent in the male series comparison. Two reasons might be suggested for this:

1. Statistical sampling error—possibly an accidentally biased sample, which in this case, at the 5% level of significance, could occur one time in twenty.

2. Exogamy—Oakwood broad-skulled females could have been brought into the tribal group from some outside broader-skulled population (see below).

How then may the Oakwood and Anderson materials be fitted into the physical, archaeological, and linguistic framework proposed by G. K. Neumann (6:7)?

1. A comparison of the physical variability, with the exception of tendency toward skull broadness and somewhat greater variability in the Oakwood females, shows the two groups to be highly similar, if not virtually identical. Both the Oakwood and Anderson groups fit metrically, indicially, and morphologically into the Ilinid physical variety.

2. As can be demonstrated from several archaeological studies (4;10) of the Oakwood and Anderson sites, both assemblages may be placed in the Upper Mississippi Phase, the Anderson Focus in the Fort Ancient Aspect and the Fisher Focus (Oakwood) "near" to the Oneota Aspect.

3. From a historical standpoint, the probability is quite high that both groups are of the Central Algonkian linguistic family. The Oakwood Cemetery group has previously been identified with the historic Miami tribe, who were known to have been in the northern Illinois area during the late prehistoric period (9:50). The Anderson Focus group has been equated with the historic Shawnee (3;4;12), a tribal group that centered in the Ohio Valley at this time. Since both the historic Miami and Shawnee spoke Algonkian languages, it seems quite likely that their late prehistoric forbears did also.

Demographic Considerations

From the above data, it may be surmised that the Anderson and Oakwood populations, though geographically separated by some 300 miles, were similar physically, culturally, and linguistically. Physically, both populations were Ilinids. Archaeologically, both populations were Late Woodland groups on the peripheries of the Walcolid Middle Mississippi expansion up the Ohio, Missouri, and Mississippi rivers. Even though, as shown by the archaeological record, each absorbed a considerable number of Middle Mississippi culture traits, much of it no doubt by diffusion, neither shows much physical admixture from groups of the Walcolid varety. The Anderson Focus population, in G. K. Neumann's estimation, represents a relatively inbred Ilinid stock, an observation that is especially interesting in view of the fact that the other foci of the Fort Ancient Aspect (ie.—Feurt, Baum, and Madisonville) have been classified as predominantly Walcolid (8). The location of the Anderson Focus on the northwest periphery of the Fort Ancient Aspect, where it is known that Late Woodland Ilinid groups can also be found, perhaps explains this. The Oakwood skeletal series, like that of the Anderson Focus, also indicates a preponderance of Ilinid physical characteristics. Archaeologically, this seems compatible with Caldwell's (2:37) view that sites of the Upper Mississippi Phase (including those of the Fisher Focus) show mixture with older indigenous culture elements. Since these indigenous culture elements are of unquestionable Woodland affiliations, it can be seen that the Oakwood population fits quite well into G. K. Neumann's Woodland-Ilinid equation.

The somewhat greater broadness of skull (and perhaps face) indicated in the Oakwood Ilinid population, especially obvious in the fe-

males, would seem to be evidence of what may be termed a Dakotid influx or admixture, emanating probably from the north central plains. This would seem consistent with the known physical and cultural facts. According to G. K. Neumann (7:68), it is evident that the Oneota culture complex, to which the Oakwood material is related, owes much of its Upper Mississippi flavor to the fact that it was introduced by Chiwere-speaking Siouan groups. These Siouan populations have previously been identified as at least partially of the Dakotid variety (6).

Another possibility for the seeming appearance of Dakotid traits in the Oakwood population revolves around the known fact that the Indians of the "woodland" area adjacent to the great plains made yearly forays into the grasslands to hunt bison. It is quite likely that in the course of their travels, the Miami, Iliwinek, and other woodland hunters often came into not so friendly contact with plains Dakotid groups, and when victorious, brought back both Dakotid women and children. According to Bauxar (1:45), the Iliwinek, and undoubtedly others, "took wives and captives from all the surrounding tribes and from Chiwere, Dakota, and Dhegiha Sioux to the north, west, and south. Their bravest feat was to steal live captives from their enemies. Male captives taken in raids or warfare were put to death, while children and marriageable women were kept as 'slaves', the former growing up as members of the tribe and the latter generally becoming concubines of their captors".

It can thus be hypothesized that the greater broadness of skull (and face) indicated in the Oakwood females, and, to a smaller extent the Oakwood males, has, tentatively at least, both a genetic and historical explanation. It is interesting to observe in this respect that had only male crania been used, this rather significant relationship would probably not have appeared. In addition, the generally greater statistical variability of the Oakwood female-Anderson female comparisons can perhaps also be explained on the basis of the above-mentioned Dakotid admixture. In other words, both Oakwood and Anderson males were quite Ilinid, and thus varied little in comparison with each other, whereas the degree of variability between the unmixed Anderson females and the mixed Ilinid-Dakotid Oakwood women was relatively greater.

Conclusions

Problem 1. On the basis of a metric and morphologic comparison of the Oakwood and Anderson cranial series, it is evident that data from female cranial series, heretofore used rather sparingly in studies of prehistoric midwestern Amerind populations, should be taken into consideration whenever possible. The essential identity that is indicated between these two series when male crania are used is closely corroborated by comparisons of the females.

Problem 2. Comparison of the cranial data from the Oakwood and Anderson sites, independently comparing Oakwood males with Anderson males, and Oakwood females with Anderson females, reveals a high degree of physical similarity, or virtual identity, between these late

prehistoric populations. The possibility is suggested that a tendency toward broadness of skull (and face) in the Oakwood females is explainable by admixture with the Dakotid physical variety from the great plains.

Problem 3. The reliability of the specific combination of metric measurements, indices, and morphologic observations used in this study is amply demonstrated by the fact that independent comparisons of male and female series from the Oakwood and Anderson sites give virtually identical results. In addition, this high degree of similarity between the results of the male and female series comparisons further validates the Ilinid physical variety as originally defined.

TABLE 1

	Total Significant Differences at —% Significance Level		
	10%	5%	1%
Measurements: (total 38)			
Oak. male vs. And. male	9	5	4
Oak. female vs. And. female	13	8	4
Indices: (total 27)			
Oak. male vs. And. male	6	3	3
Oak. female vs. And. female	11	9	6

TABLE 2a

Measurements Significant at 5% Level

Oak. male vs. And. male	Oak. female vs. And. female	Explanation of Symbols
B	B	Maximum breadth
DS	DS	Dacryal subtense
SMN	SMN	Subtense minimum nasal breadth
MB	MB	Maxillo-alveolar breadth
LOBD	LOBD	Left orbital breadth
	UFH	Upper facial height
	SIOB	Subtense interorbital breadth
	RL	Minimum ramus breadth

TABLE 2b

Indices Significant at 5% Level

Oak. male vs. And. male	Oak. female vs. And. female	Explanation of Symbols
DS/DC		Nasal root height
SMN/MN	SMN/MN	Nasal bone height
MB/ML	MB/ML	Maxillo-alveolar
	B/L	Cranial
	H/B	Breadth-height
	H/(L+B/2)	Mean height
	MF/B	Trans-fronto-parietal
	UFH/TFB	Upper facial
	MF/TFB	Zygo-frontal
	SIOB/IOB	Facial flatness

Literature Cited

1. Bauxar, J. J. 1959. The Historic Period. Illinois Arch. Surv., Bull. No. 1:40-58.
2. Caldwell, J. R. 1959. The Mississippian Period. Illinois Arch. Surv., Bull. No. 1:33-39.
3. Faulkner, C. H. n.d. Prehistoric-Historic Continuities in the Western Great Lakes Area. (unpublished manuscript)
4. Griffin, J. B. 1943. The Fort Ancient Aspect.

5. Morgan, R. G. 1952. Outline of Cultures in the Ohio Region. In J. B. Griffin; Archeology of the Eastern United States, pp. 88-98.

6. Neumann, G. K. 1952. Archaeology and Race in the American Indian. In J. B. Griffin: Archaeology of the Eastern United States, pp. 13-34.

7. ——————, 1960. Origins of the Indians of the Middle Mississippi Area. Proc. Ind. Acad. Sci. **69**:66-68.

8. Neumann, H. W. 1960. Diagnostic Morphological Traits for the Walcolid Variety of American Indians. Proc. Ind. Acad. Sci. **69**:69-72.

9. Omoto, C. E. 1960. Identification of a Prehistoric Indian Skeletal Series from Will County, Illinois. M.A. Thesis, Indiana University.

10. Skinner, R. R. 1953. The Oakwood Mound. An Upper Mississippi Component. Jour. Illinois State Arch. Soc., n.s. 3:no. 1.

11. Smail, J. K. 1965. The Use of Female Crania in Demonstrating Racial Relationships: A Comparison of Two Prehistoric Upper Mississippi American Indian Populations. M.A. Thesis, Indiana University.

12. Temple, W. C. 1958. Indian Villages of the Illinois County, Illinois State Mus. Sci. Pap. 2:pt. 2.