Book Review: *THE DYNAMICS OF STYLISTIC CHANGE IN ARIKARA CERAMICS* By James Deetz.

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THE DYNAMICS OF STYLISTIC CHANGE IN ARIKARA CERAMICS.


Review by Craig Johnson

James Deetz's study, The Dynamics of Stylistic Change in Arikara Ceramics, is an attempt to link the chronological changes in social structure with the changes in ceramics which would follow such a process. It consists of four parts: an introduction, a description of Arikara culture history, the demonstration of change in late Arikara ceramics and a conclusions section which ties the last two parts together.

The introduction stresses several generalizations and gives an idea of what is to come. Deetz states that a basic aim of archaeology is to derive the intangible or nonmaterial from the tangible or material. In his analysis, social structure is the nonmaterial aspect of culture; ceramics the material. Since artifacts are the product of culturally patterned behavior, the regularity or organization of culture should be reflected in such things as ceramics. One facet of social organization is residence pattern. Matrilocal residence would result in artifact patterning to a greater degree than other types of post-marital residence, assuming females made the pottery. Therefore, according to Deetz, alteration in residence away from matrilocality would lead to a reduction in the association of ceramic attributes through time. He maintains that the Arikara underwent such a change in social structure which produced a decline in ceramic patterning.

In the next section, Deetz uses the Willey and Phillips system to give a broad description of the events which are connected with that period in Middle Missouri archaeology generally recognized today as the Coalescent Tradition. More specifically, he is interested in the movement of Arikara peoples from Nebraska into South Dakota and their settlement along the Missouri River. Deetz feels that somewhat before the 17th century, a group of the Skidi Pawnee in Nebraska split off and began moving up the Missouri River. The prehistoric tie between the forerunners of the Arikara and the antecedents of the Pawnee (the protohistoric Lower Loup phase) is evident in the increasing similarity between Arikara and Lower Loup pottery back through time and other similarities such as language, migration traditions and tribal locations.

One of the earliest possible manifestations of the Arikara in South Dakota, according to Deetz, is at the Arzberger site. Here he is in basic agreement with Strong and Wedel as well as in his notion of Arikara origins in Lower
Loup, as he points out. Ceramic ties between Arzberger and the Upper Republican and Lower Loup phases are evident. Whether or not the Arzberger site is the product of the Arikara, the Arzberger phase (A.D. 1300?1600) surely included some Arikaras. This phase is largely the product of a migration of Upper Republican and Nebraska peoples (Aksarban phase) into South Dakota. The Aksarban phase dates at A.D. 1500 and before. The movement of people from the Central Plains to the Middle Missouri region intruded upon the already existing Middle Missouri phase (A.D. 850-1300); creating a mixing called the Coalescent Tradition or Arzberger phase in Deetz' terms. Fortified villages were common at the time. Following the Arzberger phase in the Middle Missouri region are the LaRoche (A.D. 1600-1700), Stanley (A.D. 1700-1750) and Snake Butte (A.D. 1750- ) phases, essentially defined by Lehmer (1954). Although the phases overlap geographically, there is a general trend to the northern part of South Dakota with time. Snake Butte sites are historic Arikara, among which are the Leavenworth and Phillips Ranch sites.

In the Central Plains after the Aksarben phase is a period in time relatively unknown from A.D. 1550-1650, followed by the Lower Loup phase (A.D. 1650-1700) and terminating with the historic Pawnee.

Deetz then postulates an original Crow type kinship system for the Pawnee and Arikara. He then goes on to point out several events which changed Arikara social structure and almost led to the total disintegration of their culture within a matter of 200 years. One was the more frequent relocation of villages every 5 or 6 years due to wood shortages. This produced a change in Arikara social organization to the use of more generational type kinship terms in an attempt to adapt to a more mobile way of life. A second change came about because of the drastic population decline caused by smallpox. House size declined and there was a shift away from the matrilocal ideal. The third disrupting influence was the increased trading carried on by the Arikara men. Deetz cites Murdock's idea (1949) that patrilocality is encouraged by the accumulation of movable property or wealth and the attendant increase in social status by men at the expense of women, non sororal polygny, the disappearance of matrilocality through the institution of bride price and patrilineal inheritance of the newly discovered riches of men. All were characteristic of the Arikara. The fourth and final factor which Murdock says brings a change towards patrilocal residence is warfare and slavery. This is documented in the case of the Arikara and the many altercations they had with the Dakota in the 18th and 19th centuries. Along with the increased generational aspects of kinship mentioned earlier, some Arikara formed age-graded mens societies. It was also an attempt to adapt to a more mobile way of life. All of these developments were reflected in Arikara ceramics.

In the next section, Deetz attempts to demonstrate the
reduction in attribute patterning as a result of the breakdown in matrilocal residence. His analysis is based on a site in the Big Bend region: Medicine Crow (39BF2). He also used a surface collection from the Lower Loup Bruketett site in northeastern Nebraska for comparative purposes.

The Medicine Crow site consists of three components. Component C dates from A.D. 1690 to 1720, B from A.D. 1720 to 1750 and component A from A.D. 1750 to 1780. All three are characterized by circular earth lodges with four central support posts. Rim bracing on ceramics tends to increase with time. Component C was spatially isolated from Components A and B, which were in the same area (A) and in a few cases were represented by super-imposed houses. His method of separating these last two components is rather interesting. Anything below the roof fall limits (marked by a zone of burned structural matter) was considered part of the floor of the feature. Anything above the floor was classified as fill. The fill from A and B was assigned to Component B, since Component A houses would use the sod, soil, etc. from the earlier B for their construction.

Based on this superimposition of a few houses, a dichotomous typology of the rest of the houses in area A was developed representing Components A and B. Component C was tied onto the beginning of the Medicine Crow sequence by use of "ceramic typology" (percentage of rim bracing) and limited stratigraphic control. The validity of three components at the site was further supported by a bimodel distribution of projectile point lengths, a questionable practice at best.

The sample of rimsherds from the site numbered some 2500. Matched together they represented over 2000 vessels, which were the units of analysis. The attributes used had to exhibit three properties: 1) nominal level of measurement; 2) stylistic - "one which results from a choice on the part of the manufacturer from a number of possibilities, made to produce a certain effect on the finished vessel"; 3) significant - those which show a marked increase or decrease in relative quantity (%) through time. Eighteen classes of attributes were recognized. Each component was broken down by the percentage of each type of attribute in a class that it contained. For example, component C might contain 25% smooth surfaced vessels, 25% cord-roughened and 50% simple stamped to make up 100%. From these distributions, significance of an attribute could be determined for use in correlating with other significant attributes.

Once a significant attribute (e.g., simple stamping) was chosen, it was crosstabulated against all those significant attributes of a single attribute class as a whole (e.g., lip profile square, pointed, braced). This means that a vessel had to have two significant attributes to be counted. The mutual occurrence of two attributes, by percentages, was
presumably based upon the marginal frequency of an attribute class. In the example above, simple stamping might occur on 20% of square lips, 40% on pointed and 40% of braced lips. Six histograms, two for each component, were then constructed. Along the horizontal axis are percentages in intervals of five and ten (hence two for each component) from 0 to 100%. The vertical axis is represented by the number of cases. The percentage of vessels exhibiting two significant attributes counts as one case at the appropriate percentage level. Using the example above, if simple stamping and square lips occurred 20% of the time, one case would be put at the 20% mark and two cases at the 40% level. A case of perfect association would be if two attributes were to occur 100% of the time and the others 0% of the time. In the case used before (lip profile), no association would occur if all three co-occurrences were 33%. This procedure was done for every combination of two significant attributes and plotted on a histogram for each component. An increase in the number of cases at the low to mid percentages and a drop at the higher ones with time would be indicative of a decline in attribute association. This pattern is what Deetz claims when the significant attributes of seven attribute classes are correlated with the other attribute classes: surface finish, rim profile, shoulder-neck angle, lip profile, lip decoration technique, lip design elements and angle of rim to body. Combining the seven histograms into three (one for each component) yielded results even more convincing of a breakdown in attribute association with time.

Throughout his analysis, Deetz uses his data for other purposes such as comparisons with other sites in the area and the Burkett site. He also points out the increased experimentation and innovation with pottery in component B at Medicine Crow. This, along with the decline in attribute associations in component A, represents a response to the pressures mentioned earlier in this review. Arikara sites somewhat later than Medicine Crow show a trend towards greater ceramic uniformity, perhaps indicative of cultural reorganization.

In his conclusion, Deetz attempts to establish a link between the changes in residence and ceramic patterning in a more systematic way. He points out that there can be three possible relationships between the two. First, there is no relationship between changes in social organization and ceramics. This denies the relationship between social structure and ceramic design in general. If true, other examples of this articulation would not be found in archaeological contexts. But there are two cases which Deetz cites to refute this hypothesis. One is the similarity of his Lower Loup sample and component C pottery at Medicine Crow. Both are similar in the distribution of percentages in the histograms. That is, they both have a substantial degree of attribute association and since the proto-historic
Pawnee were matrilocal, this pattern is to be expected.

A second explanation is that the relationship is indirect with a third factor responsible for both the changes in residence and ceramics. Incorporation of new Middle Missouri attributes could have dulled ceramic associations. Deetz points out however, that most ceramic variation occurred in component B and that by the latest occupation the experimentation was reduced. This is the reverse of what it should have been, assuming the second argument was true. In relation to this example, he does not point out that borrowing ceramic ideas from Middle Missouri peoples could not be related to a change in residence rules. He also passes up Arikara experiences such as warfare, epidemics and mobility as causative factors in ceramic change.

The third possibility, that Deetz endorses, is that changes in ceramic patterning and social organization are mutually interrelated. His whole study has been geared to this hypothesis and together with other considerations is proof enough for him. One of these is the interaction of females and the resulting higher degree of standardization of pottery in matrilocal households vis-a-vis residence patterns where mother and daughter are separated. Once this point is established, Deetz maintains that the breakdown in matrilocal residence was the result of an increase in non-sororal polygyny and rapid population decline.

Two other facets of Deetz' study yet remain. One is the method in which he relates descent and residence to the degree of attribute correlation in ceramics. With three kinds of descent (matrilineal, bilateral and patrilineal) and four residence rules (matrilocal, bilocal, neolocal and patrilocal) he constructs a 3 x 4 or 12 celled table with each cell giving the relative degree of attribute association that might be expected. Residence is the main variable in this system with matrilocality having a value higher than bilocal residence, followed by neolocality and patrilocality, both of which have the same value.

The second idea which Deetz puts forth is that Medicine Crow ceramics are intermediate between the earlier Arzberger and La Roche phases and the later historic Arikara. Therefore, Medicine Crow establishes a link between those people who came before (including the Lower Loup phase) and those who followed.

As a whole, Deetz' analysis of Medicine Crow ceramics is stimulating and along with other studies such as the ones by Hill (1970) and Longacre (1970a) represent a pioneering effort to go beyond the material aspects of culture which many archaeologists are content with. In fact, Deetz' work with Medicine Crow, originally written in 1960 as a Ph.D. dissertation at Harvard no doubt had a part in the thinking
of Hill (1970a:1-2) and Longacre (1970b:27). It represents a growing trend in archaeology in its explanation of ceramic variation and not just its description. In a sense, it is an attempt to say that the degree to which archaeological interpretation can be carried is largely dependent on the individual. Stressing the limitations of working with material culture is to some degree a self-fulfilling prophecy in that what one thinks can be derived out of his data is largely what one will get. By the standards of the mid-sixties (and even today) Deetz' optimistic attitude toward archaeological data does not assume any inherent limitations or inadequacies. A philosophy of this sort is sometimes referred to as positivism (Longacre 1970b:130-1). With sound methodological and theoretical assumptions, insight and imagination, material culture can shed light on the nonmaterial and vice versa.

Despite Deetz' admirable effort, several criticisms can be lodged against his methodology, interpretation of the data and contradictions relating to various explanations of the material. Although there is nothing in these flaws that would necessarily negate the results of the study, they do raise questions which need to be considered. Various issues not considered here are considered by Hurt (1966).

One of these is a string of methodological ambiguities, errors and deficiencies. Misapplied or ambiguous terms include the use of scattergram for a contingency or bivariate table involving nominal data (p. 45), the use of the word scattering or association of attributes for what are in reality one way univariate frequency or percentage distributions. Perhaps the most serious problem is his failure to be explicit as to the method used to obtain the percentages for the histograms. On page 51, percentages seem to be based on the total frequency of mutual occurrences between one significant attribute and others as an attribute class. Yet the contingency table on page 50 suggests that the percentages might be based on all attributes of a class and not just the significant ones. My interpretation is that the former method is used.

Several alternatives to this method might be suggested. For example, percentages could have been calculated on the total ceramic sample and not just a sub-sample. Another method is based on the difference between the observed and expected frequencies. Taking only those cells which had a greater value for the observed vis-a-vis the expected frequency, the results could be squared and divided by the expected frequency to produce a probabilistic statement of attribute association. These values could then be compared across components. A decrease in these values through time would support Deetz' hypothesis. Another method would be to construct ceramic types as Stoltzman (1973) did, based on the chi-square test. Decline in percentages of attribute clusters or types through time might suggest disintegration of ceramic pattern-
Several errors in statistical methodology are apparent. One is his attempt to test Spaulding's notion of a substantial association between interior lip decoration and outslanting rims. Unfortunately, Deetz takes an indirect approach which is in gross violation of statistical logic (p. 75). He tries to test this idea by noting the trends of outslanting rims through time (increase from component C to A) and inside lip decoration (decrease through time). He therefore concludes that there is less of an association here compared to the Arzberger site (Spaulding 1956). The proper way in this case would have been to directly compute the mutual occurrence of these two attributes as Spaulding had done rather than through a third variable, namely time.

The second error with regard to statistics is found in at least one, if not all, of his histograms comparing component trends. Theoretically, the number of total cases in the three histograms should be equal. This appears not to be the case. For example, the total number of cases in the histograms broken down by 5% in Figure 22 were added up with differing results: component C-66, B-71 and A78. What this means is that a difference of cases might influence the number of cases at certain key points along the histogram (e.g., at both percentage extremes). This in turn might mean a greater or lesser degree of attribute association among components.

Several deficiencies also crop up in Deetz' study. One is the lack of mutually exclusive percentage classes in the histograms. That is, categories are broken down in such a manner that they share their borders with other classes (e.g., 0-5%, 5-10%, 10-15%). Where does one place a figure of 5%, in the 0-5% or 5-10% class? Another problem is that Deetz does not provide the frequencies associated with the attribute cross-tabulations (using percentages) broken down by component. Inclusion of this data would provide an added standard to judge the significance of attributes and raw data amenable to manipulation by other researchers. The final shortcoming is the failure to correlate all attributes together, and not just those deemed significant. Deetz seems to feel that only those attributes that show a trend through time were important to the potters. He fails to realize that stable ceramic traits may also be important, for the single fact that they did not change in relative frequency through time. The problem of determining significance raises serious problems. How can one infer what is important to people, as far as ceramics go, if the only thing to base such a judgement upon are the ceramics alone? There is also the interpretive problem of determining significance. Deetz seems to have problems with this and allows for a number of exceptions to his rule of linear change in percentages (pp. 60, 68). Also, a number of trends he considers significant do not change more than 1% from component to component (p. 81). This is perhaps another reason for using all attribute
associations and not just the "significant" ones. Some very surprising things might turn up. It is indeed puzzling to see that on page 45 Deetz says that "since it is not possible to determine which attributes are most sensitive to change... and since those not sensitive are still potentially important to the study, every attribute present and observable must be considered as it functions with every other attribute in the sample". Yet this is not what Deetz does in the actual manipulation of the data.

Interpretation of the results is another area of contention. This involves the trends in attribute association with time. Deetz interprets the histograms on pages 57, 59, 64 and 67 as supporting his hypothesis of a decline in attribute patterning with time. But it appears that these trends are not as marked (some are even reversed) as Deetz would have us believe. Perhaps a better method, using the statistics to determine the temporal trends would be to multiply each percentage class by the number of cases represented there, add them up, then compare. This might prove effective since the greater the number of cases that accumulate at higher percentages, the greater the number and the higher the attribute association. It would eliminate interpretation by sight, sometimes a variable process from individual to individual. Yet, this would not eliminate a judgement as to the significance of any differences between components. One way to make such a probabilistic determination has been mentioned earlier in reference to the use of the chi-square and Stoltman's (1973) work.

Two other matters remain to be discussed, neither of which relate to methodology. One is Deetz' 3 x 4 table computing the mutual effects of descent with residence on ceramic attribute patterning (p. 93). He equates neolocal and patrilocal residence in relation to pottery. It seems more likely that patrilocal residence would reduce ceramic association to a greater degree than neolocality. After all, the results of women from a number of families living together could very well be greater ceramic heterogeneity than if these same women lived away from either family.

The final criticism has to do with the explanation Deetz gives for the underlying causes of Arikara ceramic change. Refuting the explanation that change in social organization (e.g., residence) and pottery is a result of a third factor, Deetz rules out warfare, epidemics and mobility as primary causes of ceramic change (p. 90). Yet on pages 30-37 and 98 he stresses just these factors as causing a change from the matrilocal ideal of residence to patrilocality. Although not directly related to ceramic change, these disturbing events worked through post-marital residence to produce a reduction of ceramic "quality" or attribute associations. Residence and ceramic patterning are directly related in Deetz' mind, but he fails to realize that all three are related, directly or
indirectly, with one another.

In summary, Deetz has provided archaeology with a new and insightful approach to relate various levels of human behavior. The theoretical basis seems to be logical and basically sound, but needs some work on the application, especially in relation to quantitative analysis.

References Cited

Hill, James N.

Hurt, Wesley

Lehmer, Donald J.

Longacre, William A.
1970a Archaeology as Anthropology: A Case Study. Anthropological Papers of the University of Arizona, No. 17, University of Arizona Press, Tucson.


Murdock, George P.

Spaulding, Albert C.
1956 The Arzberger Site, Hughes County, South Dakota. Occasional Contributions from the Museum of Anthropology of the University of Michigan.


Stoltman, James B.
1973 "The Laurel Culture in Minnesota". Minnesota Prehistoric Archaeology Series No. 8, Minnesota Historical Society, St. Paul.