

Book Review

Verwandschaftsanalyse im alemannischen Gräberfeld von Kirchheim/Ries (Analysis of Relationships within the Alemannic linear graveyard of Kirchheim/Ries [In German]) By Kurt W. Alt and Werner Vach. Basler Hefte zur Archäologie Volume 3 2004. Archäologie-Verlag Basel.

Archaeologists have long been stymied when confronting a fundamental aspect of ancient social systems—kinship. While kinship terms and systems are featured in every beginning cultural anthropology textbook, archaeologists were left wondering if their ceramic design motifs or the spatial patterning in cemeteries really provided insight into relations of marriage and descent in ancient societies. In response to this need, Alt and Vach set out to develop a method of assessing genetic relationships among individuals in skeletal samples derived from archaeological contexts. The method has been used on skeletal material collected from a large variety of archaeological contexts of varying sample sizes, such as a mass grave from the Roman Imperial period, Neolithic mass graves in Germany and Abu Dhabi, a Paleolithic triple burial, an Early Iron Age cemetery, a late Slavic cemetery, and a Merovingian cemetery, several reports of which have also been published in English (Alt *et al.*, 1995a; Alt *et al.*, 1995b; Alt *et al.*, 1997; Alt and Sedlmeier, 1990; Alt and Vach, 2001; Alt *et al.*, 1995c; Alt *et al.*, 1992).

This monograph concerns the skeletal sample at the Alemannic cemetery of Kirchheim/Reis, which represents the largest sample yet investigated using their methods. The body of the monograph is written in German, although summaries in French, Italian and English present basic information about the cemetery, the methodology, and the results. The authors begin Chapter 1 with a consideration of the goals of a biological kinship analysis and how it can serve to further the traditional archaeological goal of understanding ancient social systems. They include a critical consideration of how the terminology and concepts employed in biological kinship analysis intersect with established (although sometimes contentious) concepts within socio-cultural anthropology and archaeology. The authors make it clear that socially defined kinship relations do not necessarily have biological components and therefore cannot be investigated using techniques that rely on genetic relationships among individuals. The authors realize that the results of their analyses provide only part of the picture and that additional sources of archaeological and anthropological data must be consulted.

In Chapter 2, the authors present the methodological foundation of their approach for investigating

biological kinship among ancient populations. Dr. Alt, a physical anthropologist, and Dr. Vach, a statistician, have developed a statistical method to assess biological kinship based on the comparison of similarities among individuals using a large catalog of non-metric traits of the skull, jaws, and teeth (Alt, 1997). Certain assumptions and potential issues must be considered when using this approach. For example, the method relies on a comparison of phenotypic similarities. In other words, it relies on the portion of any shared genetic information that is actually expressed as traits in common among individuals, and therefore does not directly identify the specific genetic relationship between individuals. In addition, the analysis is based on the observation of non-metric traits with varying penetrance and expressivity. This means that family members can only be identified in the event that they express traits typical of their family and that such traits are observable. In many cases, traits are obliterated by dental wear and disease as well as taphonomic processes. For a large, relatively well-preserved sample such as Kirchheim/Ries, these problems are minimized.

In order to find related individuals, the method employs a statistical search procedure that compares each individual and each trait to create combinations of individuals (termed “structures”). Significant structures are based on non-metric traits with low frequencies in the population, which also have a low global probability of conspicuousness (G-value), indicating a low probability of observing the same combination by chance among unrelated individuals in the sample. More detailed discussions of the method and its statistical basis have been published in English (Alt and Vach, 1991; Alt and Vach, 1992; Alt and Vach, 1993; Alt and Vach, 1998).

In Chapters 3 and 4, Alt and Vach present the results of their analyses of the cemetery at Kirchheim/Ries. In total, 460 individuals were scored for 933 non-metric traits of the skull, jaws, and teeth. Since the sample of individuals from the total cemetery was quite large, the authors were able to investigate subgroups within the cemetery and still maintain reasonable sample sizes. This procedure ensured that the analysis was not dominated by large, very robust groups or individuals with a large number of well-preserved, rare traits. They looked for both general patterns based solely on the non-metric traits, and on subgroups created using archaeological attributes such as chronological time period, sex of the individual, spatial organization, wealth of grave goods, and types of grave goods.

Results of the analysis of all graves revealed eight familial structures, some of which have additional archaeological characteristics that indicate a social relationship as well. An unexpected result from the analysis of all graves is the relatively large number of individuals who appear in more than one of the eight

groups, which suggests genetic interrelationships among the eight possible families that used the cemetery.

Archaeological mortuary analyses rely upon spatial patterning in cemeteries, grave construction, and assemblages of grave goods to recreate a sense of the social identity of an individual. Comparison of these data for all the individuals in a cemetery facilitates the reconstruction of the social organization as expressed in burial practice. However, there has been debate as to which aspects of burials reflect which aspects of social organization, for example vertical social status (wealth), horizontal social status (one's position in relation to others within the same level of a hierarchy), or membership in other types of groups such as kin groups, trades, or religious groups. In their analysis of the cemetery at Kirchheim/Ries, Alt and Vach demonstrate that, for some types of grave goods, it is possible to identify biological kin structures that are at least partly correlated with certain types of grave goods.

In a previous cemetery analysis, Jorgensen (Jorgensen *et al.*, 1997) identified 14 likely familial groupings of graves based on archaeological mortuary data. Tests seeking a biological basis for the 14 archaeologically defined familial groupings revealed only one convincing biological family structure (Group IV), although sample sizes for some of the hypothesized archaeological family groups were small due to poor preservation. Analysis of subgroups defined by the presence of specific grave goods met with more success. Several new familial structures were identified, and these frequently showed spatial clustering as well. In many cases, the structures contained several graves with a particular item, but also some graves without it. Additionally, the same items also occurred in graves that were not in the structure. This phenomenon illustrates the difficulties of identifying familial structures based on archaeological evidence alone, as well as the utility of testing archaeological subgroups in biological kinship analysis.

Perhaps the most powerful results for the understanding of the social organization at the cemetery of Kirchheim/Ries come from the analysis of the "traditional aristocracy" (those showing unusual wealth) within the main cemetery and the analysis of the spatially distinct "noble burial compound", which contained wealthy burials dating only to the final three chronological phases of the cemetery. Previous archaeological interpretations had speculated that the nobles were locals originally interred as part of the general population, who later founded their own distinct cemetery to emphasize their separate identity. Analysis of the "traditional aristocracy" within the main cemetery shows biological kinship structures among its members, as well as possible connections to other burials within the main cemetery. Analysis of

the spatially distinct noble burial compound revealed fundamental differences between its population and the main cemetery that can only be explained by the presence of two genetically distinct populations. Archaeologically, individuals interred in the noble burial compound show affinities to the Avars (an eastern tribe contemporaneous with the Alemanni) in both material culture and burial rituals.

A contentious area of archaeological research lies in understanding the process of the introduction of new material culture and cultural practices. It is often unclear whether the appearance of new elements indicates the movement of actual people or the diffusion of goods and ideas, especially in times of intensive population movement. Although the geographic origin of the individuals within the noble burial compound cannot be identified based on their skeletal traits, the biological kinship analysis did reveal that the appearance of foreign material culture and burial practices at the cemetery of Kirchheim/Ries coincided with the arrival of a genetically distinct population.

Alt and Vach's analysis of the Alemannic cemetery at Kirchheim/Ries provides an excellent example of the effective use of non-invasive, non-destructive methods for analyzing dental and skeletal data in a truly bioarchaeological context. The results of their analyses demonstrate the potential for biological kinship analysis to add a new dimension to mortuary analysis and a new source of data that can be applied to some of archaeology's most perplexing problems.

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