

Elemental Interaction: Stylistic, Compositional, and Residue Analyses of Copper Age Ceramics on the Great Hungarian Plain

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Abstract

The questions surrounding the social changes that occurred at the transition from the Late Neolithic (ca. 5,000-4,500 BC) and the Early Copper Age (4,500-4,000 BC) in the Carpathian Basin remain largely unanswered. The period is marked by evidence in the archaeological record that indicates a social transformation affecting both the structure of individual households and the organization of cultural groups across the region; at the end of the Neolithic, populations dispersed from large nucleated tell sites to numerous small settlements across the plain.

Over the last seven years, members of the Körös Regional Archaeological (K.R.A.P.) project have attempted to shed light on the causes of the shifting settlement patterns and changes in household organization through ceramic analysis aimed at exposing trade relationships, human movement, changes in exploitation of domesticated animals, and the use of secondary products. This research has included stylistic, petrographic, and chemical analyses. Thus far, the results have provided us with as many new questions as answers. However, continuing research including residue analysis, trace-element studies, and further compositional analyses of ceramics on a regional scale may identify previously unrecognized patterns of social interaction.

Introduction & Background



Since 1998 the Körös Regional Archaeological Project has been investigating the transition from the Neolithic to the Copper Age (ca. 4500 B.C.) in the eastern Carpathian Basin (see Figure 1). This transition coincides with dramatic changes in house form, settlement layout, settlement distribution, and mortuary customs. These changes affected nearly every aspect of social organization. Several years of excavation at two adjacent Early Copper Age settlements (Veszto-Bikeni and Körösladány-Bikeni—see figure 2) has produced many independent study projects related to ceramics. The projects described here examined ceramics from other sites in the study area as well (see figure 3) in order to gain a regional perspective on the social changes that occurred during this transitional period.



Figure 1. Map of Hungary, with the study region boxed.



Figure 2. Map showing the spatial relationship between Veszto-Bikeni (upper right) and Körösladány-Bikeni (lower left).



Figure 3. Map of parish, showing the location of all sites studied.

One unique aspect of the Körös Regional Archaeological Project is its imperative to get undergraduate students involved in both excavation and producing research projects that examine one particular aspect that interests them. Because of generous support from the National Science Foundation's REU-Sites project, the Körös Regional Archaeological Project has given ten undergraduate students per year the opportunity to get international archaeological experience without having to worry about the cost of doing fieldwork abroad. Undergraduates who get involved with a dynamic research project are more likely to get excited about archaeology as a career. Two of the authors of this poster got their start as undergraduates at K.R.A.P.



Stylistic Analysis

- Parkinson 1999
- Comparative examination of frequency of incised ceramic decoration between sites in the study area of both Late Neolithic and Early Copper Age ceramic assemblages
- Compared to the Late Neolithic pottery, Early Copper Age ceramics revealed a pattern of stylistic homogeneity and uniformity.
- Combined with settlement data, it appears that boundary maintenance (inferred by pottery style) was relaxed during the Early Copper Age, likely as a result of "tribal cycling" or changes in social and economic structure and relationships from centralized villages to more dispersed hamlets.



Close-up of incised decoration



Early Copper Age ceramic



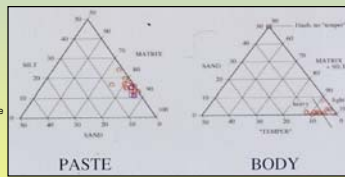
Early Neolithic ceramic



Early Copper Age pedestal ceramic

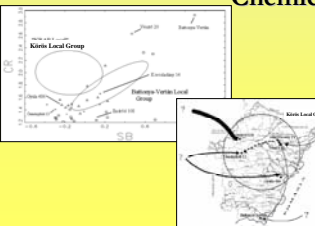
Petrographic Analysis

- Parsons 2005
- Qualitatively and quantitatively examined ceramic and daub samples from four sites in the study region, aimed at identifying compositional variation in the fabric of ceramics from different sites.
- All samples fit within a certain range of similar characteristics. Petrographic point counting revealed no quantitative distinction between samples collected from the four sites.
- Although indistinguishable based on point-counting, ceramic and daub samples are easily qualitatively differentiated.
- No discernable pattern emerged that explains the few samples that do not fit the overall description perfectly.
- Concludes against an extensive pottery trade network, and instead argues for the local gathering of clay and production of ceramics.
- However, it must be remembered that the uniform geology of the region and, therefore, the homogeneity of the raw materials used in ceramic production, may confound petrographic results and obscure evidence for trade in pottery during the Early Copper Age.

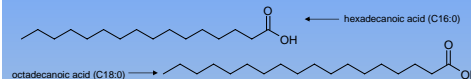


Chemical Analysis

- Testing of possible variation in the chemical composition of the Körös region's clay, establish local versus non-local sherds; using these results to infer the degree of social interaction and boundary permeability in the Early Copper Age using time of flight-laser ablation-inductively coupled plasma-mass spectrometry (TOF-LA-ICP-MS) at CSU, Long Beach.
- Assumption: despite uniform loess deposits in the region that contribute to geologic homogeneity, large river systems of the Tisza, Körös, and Maros that drain from the Carpathian Mountains may carry foreign materials from which the clay weathers, thus allowing for trace chemical composition of archaeological clay sources.
- Found that based on both clay and ceramic samples variability does exist between the sites on the Körös drainage and the site 80 km away on the Maros River (Battonya-Vertan), thus allowing for interpretations of ceramic circulation.
- When the presence of non-locally produced pottery is examined, it appears to be highly exchanged but non-directional, suggesting a high degree of social interaction and low boundary maintenance that concurs with Parkinson's (2006) results.



Residue Analysis



One of the ceramics sampled in 2006

- Is dairy related to the Neolithic/Copper Age transition? Bokkányi (1988) suggested that the shift in settlement patterns observed during the Neolithic/Copper Age transition was related to an increase in cattle husbandry, which is the local manifestation of the secondary products revolution.
- When testing for milk residues, there are 2 key fatty acids (lipids) that should be present. They are hexadecanoic acid (C16:0) and octadecanoic acid (C18:0).
- Initial testing of 20 samples (pedestalled vessels) did not find any milk residues. During the K.R.A.P. summer season 2006, 339 more samples were collected to be analyzed. These samples come from 10 sites dating from the Early Neolithic to the Late Copper Age. They represent the full range of vessel types used and a variety of in-site contexts.



Conclusions

Using these techniques together can help us identify regional patterns of social interaction.

- Initial residue analysis did not find any dairying residues in pedestalled vessels. An expanded field of vessels hopefully will reveal a pattern of vessel use that illuminates the initial extent of dairy use.
- Despite the lack of variability shown by stylistic analysis (a pattern later repeated in petrographic analysis), it initiated a line of study that is beginning to yield useful information for understanding the transition between the Neolithic and the Copper Age in the Carpathian Basin, primarily in the use of chemical characterization analyses of ceramics and clay.
- Initial petrographic results do not dispute the conclusions from the stylistic research, specifically in the use of homogenous technology and style.
- Ceramic stylistic variability, as well as the results from the TOF-LA-ICP-MS analysis, have substantiated the interpretation of relaxed social boundaries and social and economic transformation during the transition to the Early Copper Age.

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