

THE EPIGRAVETTIAN OF GRUBGRABEN: AN OVERVIEW OF THE 1986/87 EXCAVATIONS

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The 1986-87 excavations of a 12m by 4.5 m trench that parallels the sunken road of the Grubgraben sampled 4 of the 5 archaeological levels previously identified on the graben profile. The exposed area was part of a wide channel that formed the bottom of the ravine during the late Pleistocene. Series of cores have shown that the site extended beyond the channel, onto an adjacent knoll which occupied the middle of the ravine floor. Examination of the exposed deposits along the present day sunken road in addition to series of cores, test-pits and excavation trench have provided an understanding of the dynamics of the site geomorphology. It has become apparent that the placement of paleolithic campsites shifted through time perhaps in response to the changing landscape. The archaeological assemblages derived from the 1986-87 trench which exposed about 1/50 th of the estimated surface area of the site, provide samples of the kinds of activity areas, habitation structures and workshops associated with the deeper parts of the graben. Sampling of the knoll area begun in 1989 will, it is hoped, continue in the next few years. The high density and the nature of debris recovered from AL4 which included hearths, butchering areas, hearth cleaning heaps and other trash middens indicated that a whole range of activities and probably the center of the settlement were located within the deeper section of the ravine. The maximum extension of AL4 was along the north-south axis of the graben. AL3 was not as extensive in the channel but there are strong indications that the occupation extended over the knoll. Debris from AL3 represent primarily the remains of butchering activities. A complex series of stone paved structures marked the AL2 occupation(s) which occupied the ravine bottom as well as the higher ground to the east. The AL2 excavated area was interpreted as a domestic unit. At the time of the AL1 occupation, the depression had been filled, the knoll had disappeared and the ravine floor was a nearly horizontal surface. The settlement center was to the east in the area which had been a knoll in earlier times and was then at the center of the ravine. The excavated area was a workshop at the edge of the campsite.

First priority was given to the study of the site stratigraphical sequence with the double objective of (1) placing the sequence into a regional framework and (2) establishing the environmental conditions under which Paleolithic groups had been able to survive in the area.

To a large extent, the site of Grubgraben owes its significance to its geographical location in the Middle Danube Basin, just beyond the narrow stretch of the Wachau and at the edge of the northwestern extension of the central European Plain. The loess and loam sediments of the ravine fill are an integral part of the wide loess belt which extend in a west to east direction, south of the Bohemian and Moravian uplands, from the Wachau (upper Austria) to the Carpathians (northeastern Hungary). The 12 meter thick series of sedimentary units recorded at Grubgraben constitute an almost complete sequence of the Late Pleistocene. The information the Grubgraben sequence provides correlates with, and completes, the

stratigraphic scheme derived from other archaeological sites in the region, most especially those of Willendorf (Felganhauer, 1954-57), Aggsbach (Felgenhauer, 1953), Stillfried (Fink, 1962), and Stratzing (Neugebauer, 1989). Data from Lower Austrian sites combine now to produce a revised regional sequence which covers most of the Upper Pleistocene.

The archaeological levels are stratified within the middle section of the Grubgraben stratigraphical sequence. The artifactual content of levels AL1 to AL4 can be placed within the cultural sequence of the region. They are attributed to two phases of the Epigravettian which have been recognized in northeast and central Hungary (Dobosi, in press) but were unknown within the vast area of the Middle Danube Basin west of Budapest. Series of C14 dates obtained from bone samples from AL4 corroborate the attribution of the archaeological levels to a time period beginning at 19,000 BP.

On the basis of the Grubgraben data, it has been possible to revise previous interpretations of the loessic record during and after the last glacial maximum, a time period which, until recently, was poorly documented in Central Europe. The paleolithic occupations correspond to periods marked by interruptions in the loess sedimentation. Levels AL4 and AL3 are placed between two loess series, LP1 and LP2, and correspond to periods of climatic amelioration marked by increased humidity and less severe temperatures during which humic horizons formed. The lower soil horizon (HH1) within which AL4 is contained is the most developed of the series. During its formation, clusters of cembra pine and juniper were part of the local vegetation. The abundance of faunal remains indicate that animal life, most especially horse and reindeer, was relatively plentiful in the area; however, the rich and varied fauna that had characterized earlier phases of the Gravettian at Willendorf was greatly reduced. The second humic horizon which corresponds to the AL3 occupation is weak and discontinuous. There is no information on the vegetation as pollen are not preserved at that level. The large quantities of bones recovered from AL3 suggest that a steppe vegetation still supported large herds of horse and reindeer.

AL2 is at the base of a loess series (LP2) and a thin humic horizon was noted just above the pavement. Therefore it can be said that the AL2 occupants probably settled on a stable surface and that loess deposition began immediately after the occupation. They too derived their subsistence from the exploitation of reindeer and horse. AL1 is placed at the interface between 2 loess series. Occupants of AL1 settled on a sub-horizontal erosion surface. Environmental information is still missing since the excavated section of AL1 yielded neither bones nor pollen. It should be pointed out, however, that the 1989 excavations uncovered an area of AL1 where faunal remains were well preserved, with reindeer as the dominant, if not the unique, element. About a meter of loess (LP3) sealed and covered the debris of AL1 occupation(s). Then, a system of channels cut through the LP3 loess and were later filled with sands and sandy ioams. This episode of down cutting and alluvial activity relates to a period of much greater humidity. Finally, a two meter mantle of culturally sterile loess constitutes the last unit of the sequence. The absence of cultural remains within the topmost loess unit must be emphasized. This negative evidence raises the question of human presence in the area during the final episode of loess deposition in the region. It may be that for a relatively limited time period climatic and environmental conditions had reached a threshold beyond which Paleolithic groups could not survive.

A long and complex sequence of loessic accumulation interrupted by episodes of soil formation, colluvial and erosional processes marked the time period from the last glacial maximum to the end of the Pleistocene. It is now well established that loess sedimentation continued, at least intermittently, in the region well into the Tardiglacial. More important to an understanding of the human prehistory of the area, it appears that a significant climatic amelioration occurred at the beginning of the 19th millennium and that a series of oscillations, during which climate was cold but slightly more humid, took place during the following 2 to 3,000 years. It was during these periods of increased humidity that, in spite of the cold conditions, human groups found sufficient resources to survive in the area. The

malacofauna from LP2 confirm that the local environment remained relatively humid even during periods of loess formation perhaps because there were springs somewhere in the ravine. The presence of water sources was probably the major factor that attracted human populations into the Grubgraben. According to sedimentological and malacological data, much dryer conditions prevailed, at least locally, during the last period of loess deposition. We found no trace of cultural remains within these deposits. It appears then that lack of water was the factor that prevented human groups from settling again at the Grubgraben.

The archaeological data from Grubgraben establishes two important points: first, that the so-called arctic desert, inasmuch as there ever was an arctic desert in the Kamp Valley, did not occur during the period of the maximum extension of the glaciers but during a more recent phase; and second, that the period of time during which the area was unoccupied was relatively short, in any case, much shorter than had been previously thought.

The humid episodes associated with the formation of the two humic horizons HH1 and HH2 correspond in time to the climatic episode noted at Sagvar and correlate with the Laugerie/Lascaux intervals identified in Southwestern France (Leroi-Gourhan, 1962). The Grubgraben data confirm the interregional character of climatic ameliorations dated between 18,500 and 18,900.

A second research focus of the project was to establish the boundaries of the territory within which the Late Paleolithic groups of Grubgraben operated. A number of sites dated between 19,000 and 15,000 BP have been recorded in Hungary (Gabori, 1988; Dobosi, 1987). campsites like Pilismarot near the bend of the Danube, Sagvar, a winter camp near Lake Balaton, and a series of small hunting camps along the Danube and the Tisza Rivers. The evidence suggests that the western edge and the southern region of the Central European Basin offered a series of refuge niches to late Paleolithic hunters. In that context, Grubgraben could be interpreted as marking the northwestern end of the region in which Epigravettian groups established long term or seasonal base camps. Similarities in the technology and in the range and varieties of processing tools and more important perhaps, similarities in the type of armatures they used support the view that some degree of relationship and interaction existed between occupants of these various sites. Specialized hunting of reindeer and horse characterized their subsistence base.

The area occupied by large, seasonal Epigravettian campsites did not apparently extend beyond the Danube Valley into the Moravian plateau. Recent finds at Milovice, Southern Moravia, confirm the commonly accepted view that major Gravettian settlements belong to an earlier time period. Dates of 25,250 $\pm$ 280 SP (GrN 14824) and 22,900 $\pm$ 490 SP (ISGS 1690) place the mammoth bone hut of the main cultural layer at, or before, 23,000 BP (Oliva, 1988). At the base of the upper loess series which overlays the main occupation layer at Milovice, scattered mammoth bones, a few lithic artifacts and habitational features mark the existence of a more recent occupation with a date of 22,100 $\pm$ 1100 BP (GrN 14825). Oliva emphasizes that the more recent layer represents "the latest traces of Gravettian settlement in Moravia" (Oliva, 1988 :112).

And yet, the analysis of flints and radiolarites provide good evidence that the Grubgraben occupants, among others, crossed the Moravian plateau at least to the area of Stranska Skala and probably all the way to the Upper Oder Basin to obtain flint and to the Vah Valley to get radiolarites. From Grubgraben, raw material acquisition perhaps handled by hunting parties or done as part of yearly group migration meant traveling 400 to 500 km long trails. This could be possible only inasmuch as the environmental conditions and game resources were sufficient to support at least short term camps along the way. The bone and lithic scatters within the upper loess series at Milovice may well represent the remains of short term camps of Paleolithic groups whose base territory was farther south in the Middle Danube Basin.

On the basis of archaeological evidence from Lower Austria, Moravia, and Hungary and taking into account the results of raw material origins, it can be said that the limits of the hunting and raw material acquisition territory of Epigravettian groups extended well beyond the core area where the larger long term camps were located and which encompassed a series of ecotone niches along the western edge of the Central European Basin. The core area was surrounded by hunting territories to the south and east within the Danube and Tisza Plains and by hunting and raw material acquisition territories to the north along the Morava and the Vah Rivers. The movement or migration patterns within the territory and the strategy of raw material acquisition remain unknown. The evidence is too scanty even to discuss hypothetical models of how and when Paleolithic people moved within their territory.

The Grubgraben artifact and faunal assemblages contribute a great deal of new information toward a better understanding of the technology and raw material use that characterize the Epigravettian of Central Europe. As environmental pressures reduced the number of animal species who dwelled in the area, Epigravettian hunters were forced to specialize toward the exploitation of reindeer and horse. Faunal analysis demonstrated that a shift to a focal hunting strategy and the implicit changes this adaptation may have required in settlement patterns are the most important factors that distinguish the Epigravettian of Grubgraben from the Gravettian populations of Willendorf.

At the same time, study of the lithic industries has shown that the development of microlithic armatures, the appearance of proto-geometric forms and unguiform scrapers are indices of technological change. It is tempting to interpret the appearance of new techniques related to the production and increased use of microlithic forms as a response to changes in hunting strategies. However the possibility remains that new tools and new techniques were acquired through contact with other groups. The marked preference for varieties of patined "northern" flint and white -grey flint over radiolarites was already in evidence at Willendorf. These patterns of raw material selection remained during most of the Upper Paleolithic, a notable trait of the region of Lower Austria where flint sources are scarce. However, the parsimonious use of raw material is a trait characteristic of, and largely limited to, the Grubgraben industries.

In summary, the Epigravettian of the Middle Danube Basin is clearly differentiated from the Gravettian by changes in hunting strategies, settlement patterns and territory and by technological innovations which evolved in response to the increasingly dry climate and the more limited animal resources still present in the region after 20,000 BP.

The focus of the first stage of the Grubgraben excavations has been on establishing the stratigraphic sequence, on environmental reconstruction and on establishing the conditions under which Paleolithic people could survive. The second phase will concentrate on the intrasite variability, on detailed spatial analysis of artifactual and faunal remains and their relations to the stone pavements. That aspect of the research will complete the reassessment of Epigravettian culture by providing data concerning the internal organization and structure of long term (seasonal) base camps.