Mesolithic Hunter-Gatherers in the Carpathian Basin

and the Spread of Agriculture in Europe

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Seminal research in the 1970's resulted in the recognition that events in Transdanubia (western Hungary) during the 6th millennium B.C. were pivotal to the spread of agriculture to north central Europe. Two perspectives have figured prominently in the debate: 1) agriculture was directly spread by migrating agricultural populations; and 2) agriculture spread through the adoption of agricultural practices by indigenous hunter-gatherer populations. In Hungary the spread of agriculture has primarily been approached from the perspective of the first farmers (Neolithic). Limited archaeological evidence from Mesolithic hunter-gatherers during the Early Holocene (~10,000-6,000 B.C.) in the Carpathian Basin has made it difficult to consider their role in the entire process. It is argued that the complex process of agricultural spread may be more comprehensible if research is specifically directed toward identifying long term evolutionary trends in Mesolithic hunter-gatherer society. This paper provides a summary of extant evidence from the Mesolithic and Neolithic in Hungary, with an emphasis on Transdanubia, and presents some of the preliminary results of recent research on the Mesolithic.

Introduction

The prehistoric spread of agriculture was the impetus for one of the most significant reorganizations of human society. In the middle 7th millennium B.C. the first agricultural societies (Neolithic) in Europe appeared in Greece, and by the early 4th millennium B.C. nearly the entire European continent was more or less dependent on the by-products of domestic animals and plants. The Neolithic is often associated with the first ceramics and a more sedentary life in villages. Within the past quarter century the Carpathian Basin, and Transdanubia in particular, has been identified as one of the more important regions for understanding the Neolithization of Europe. Archaeology, as a discipline, developed in Europe during the mid to late 19th century (Trigger 1989). This long research tradition has produced an unprecedented volume of data for examining the spread of agriculture in Europe.

V. Gordan Childe, an influential early discussant, characterized the spread of agriculture as a revolutionary event in which Neolithic societies demographically invigorated by a more efficient productive economy spread rapidly across the European continent from an initial foothold in Southeastern Europe (Childe 1929). He considered that most important innovations of cultural import, and especially agriculture, derived from South West Asia or the Orient and were transmitted throughout Europe along the Danube corridor. Childe, an open Marxist, presented views that were at the time quite novel and contradictory to researchers who, often with strong nationalist sentiments, advocated local origins for agriculture in Europe. Subsequent research has convincingly demonstrated that, as Childe had originally proposed, the earliest center of agricultural origins relevant to Europe was indeed located in South West Asia (Bar-Yosef and Meadow 1995; Harris 1996). The basic route of agricultural expansion in Europe was theoretically established from South West Asia, across the Anatolian Penninsula, up the Balkan Peninsula, through the Carpathian Basin, and progressing northwards unto the North European Plain.

Two basic mechanisms have been enlisted to explain the spread of agriculture: 1.) Migration – spread of agricultural societies through movement of agriculturalists; 2.) Diffusion – indigenous hunter-gatherers adopt items, ideas and practices associated with agricultural society (domestic plants and animals, pottery, etc.). Migration and Diffusion represent the ends of a variagated spectrum of mechanisms, recently summarized by Zvelebil (2000), including folk migration, demic diffusion, elite dominance, community infiltration, leapfrog colonization, exchange in frontier zones, and regional exchange. Apart from the slipperiness in defining and distinguishing between hunter-gatherers and farmers during transitional stages (e.g. see Gronenborn 2003: 86; Smith 2001), it certainly the case that agriculture spread through a variety of mechanisms with different underlying causes at different times and places. Determining which mechanism dominated in particular situations hinges upon the extent to which we can recognize continuity or discontinuity amongst different categories of archaeological evidence. In order to address the issue of continuity we must incorporate a substantial understanding of long-term trends in the cultural evolution of the different peoples involved in the process. In the case of the Transdanubia this would include both early agriculturalists, the Early Neolithic Starçevo culture and Middle Neolithic Linearbandkeramik culture (LBK), in addition to the indigenous Late Mesolithic hunter-gather population. An informed examination of the transition to agriculture in the Carpathian Basin should consider both the long-term evolutionary trajectories of Mesolithic hunter-gatherers of indigenous origin and Neolithic agriculturalists of indeterminate indigenous or exogenous origins. Unfortunately, with rare exceptions (see Kertész 1996b, 2002), there is almost no robust evidence bespeaking the existence of Mesolithic populations in Hungary.

Strong evidence garnered from genetics of modern European populations (Richards 2003; Richards, et al. 2000) and palaeobotony (Schweizer 2001; Sümegi 2004) suggest that Mesolithic hunter-gatherers were present and partook in the neolithization of the Carpathian Basin and Central Europe. However, minimal direct archaeological evidence for Mesolithic hunter-gatherers has often prevented discussion from moving beyond hypothetical statements (e.g. Chapman 1985). This paper examines the significance of Mesolithic hunter-gatherers to the spread of agriculture in the Transdanubian region of Hungary and Europe in general. The following themes are high lighted: 1) the historical context and current status of Mesolithic research in Europe and Hungary, with an emphasis on Transdanubia; 2) background to the origins and spread of Early Neolithic societies in Europe; 3) a more specific treatment of our current understanding of Early Neolithic societies in the Carpathian Basin, again emphasizing Transdanubia, and their role in the transmission of agriculture to North Central Europe; 4) possible directions for future research into Mesolithic hunter-gatherer research in Hungary; and 5.) preliminary results from research on the Hungarian Mesolithic by Róbert Kertész, Tibor Marton, Eszter Bánffy, and myself. I argue that Mesolithic participants in the neolithization of the Carpathian Basin have been underrepresented for a variety of historical reasons and insufficient research. The situation can best be rectified through research aimed at revision of poorly investigated sites of possible Mesolithic origin in conjunction with prospecting for new sites.

Mesolithic Hunter-gatherers and Their Dynamic Environment

The beginning of the Mesolithic period, or Middle Stone Age, is roughly coeval with the shift from Glacial (Pleistocene) to non-Glacial (Holocene) climate in Europe, occurring at roughly 10,000 cal. B.C., or 10,000 uncal. B.P. Changes in Climate had significant impacts on European flora and fauna (Roberts 1989), as well as the humans depending on these resources (Kozlowski and Kozlowski 1979). The climatic and vegetation changes that are associated with Pleistocene-Holocene boundary have been well documented throughout Europe and Hungary (e.g. Sümegi, Krolopp, et al. 2002); although the environmental changes associated with the Holocene began earlier in Hungary than the traditionally assigned date of 10,000 B.C. Unlike many regions in Europe, the volume of archaeological evidence for Mesolithic hunter-gatherers in southeastern Europe, and Carpathian Basin in particular, is conspicuously minimal during the Late Pleistocene and Early Holocene.

Understanding the manner in which hunter-gatherers adapted to dynamic climatic and environmental change is critical to understanding the spread of agriculture. Traditionally, the long term evolutionary tendencies of southeastern European Neolithic societies are presented in pain staking detail. In Hungary Mesolithic hunter-gatherers are generally only mentioned when the two worlds collide, and even then their behaviors and their very existance have remained primarily within the hypothetical realm.

Research exploring the question of why agriculture may or may not have struck hunter-gatherers as an attractive subsistence strategy has been explored in other parts of Europe and has significantly improved the character of discussions on the spread of agriculture (e.g. see Zvelebil and Rowley-Conwy 1984). The goal of such research has been to move beyond a flat characterization of hunter-gatherers toward a temporally and spatially textured picture of the ubiquitous Mesolithic substrate upon which agricultural practices were transposed. Thus the spread of agriculture in the Carpathian Basin can best be understood through the incorporation of evidence bearing on the long-term evolutionary trajectory of hunter-gatherer society from the Late Pleistocene into the Early Holocene. The current evidence for Mesolithic hunter-gatherers in the Carpathain Basin is minimal and patchily distributed, but some of the initial pieces of information can be put in place. In the following paragraphs I will present the climatic and environmental changes in the Carpathian Basin at the Pleistocene-Holocene boundary and summarize our current understanding of Late Paleolithic and Mesolithic hunter-gatherers in the Carpathian Basin and adjacent regions.

The shift from hunting Pleistocene large bodied herd mammals, abundantly present at predictable locations, to more dispersed Holocene faunal species found in smaller herds or as isolated individuals probably required that hunter-gatherers adopt new searching and hunting strategies. This topic has received a significant amount of attention in theoretical debates regarding the relationship between the environmental changes impacting resource distribution and the evolution of hunter-gatherer food-getting strategies; particularly with regard to mobility (Fitzhugh and Habu 2002). For example, Fisher has recently argued that search strategies in relation to the different attributes of resource distributions should be incorporated into modeling hunter-gatherer behavior during this period of climatic change (Fisher 2002). In response to changes in resource distribution Mesolithic hunter-gatherers were confronted with two basic choices: 1) extensification through increased mobility in order to exploit a greater area, or 2) intensification on particular resources within a smaller area. Low level oscillation between strategies and mixing of strategies probably prevailed during different times and conditions, and understanding the character of these oscillations is significant to understanding longer-term trends in hunter-gatherer cultural evolution. Additionally, it is likely that different components of the Late Pleistocene hunter-gatherer social and technological world were modified or differentially emphasized during the Early Holocene. The Mesolithic has been generally associated with technologies in which locally procured stone was fashioned into geometric microliths or small blades that were inserted into slotted bone or wood to form composite tools (e.g. see Bárta 1985; Bárta 1990). The bow and arrow, in usage since the Late Pleistocene, was probably one of the most important components in Mesolithic hunting strategies (Bergman 1993), and it is possible that domestic dogs were also used in the pursuit of game. An increased usage of passive hunting strategies (e.g. trapping, nets, etc.) and reliance on aquatic resources have been postulated as two of the most important ways in which European hunter-gatherers managed to reduce increasing costs of high mobility and squeeze more from a smaller territory (Binford 1990, 2001; Holliday 1998). The utilization of storable resources or processing of foods to increase their shelf life presents another manner in which hunter-gatherers may have reduced mobility (Testart 1982). The intensive debate over hunter-gatherer adaptation to novel Holocene environments is significant to investigations of the much later transition to agriculture, because it is during this period that we may begin to recognize general patterns in how, when and where Mesolithic hunter-gatherers chose to exploit different resources. The tactics that these hunter-gatherers relied upon was probably highly variegated. However, understanding the underlying general patterns of will go a long way toward conceptualizing the various types of interactions, which may have developed several thousand years later when the first domesticated animals and plants reached the Carpathian Basin.

During the period after the Late Glacial Maximum, 22-20,000 uncal. B.P. (B.P dates measured from 1950), Europe witnessed rising temperatures interrupted by several shorter, cooler periods (Würm 3, Dryas III). Between 19,000 and 17,000 uncal. B.P. the evidence for human occupation of the central Carpathian Basin is represented by permutations of the Late Paleolithic Gravettian technocomplex and the Ságvárian culture. Most Gravettian sites are located in northern Hungary, a particular dense cluster is located in the Danube bend region near the confluence of the Danube and Ipoly Rivers, but significant sites have also been investigated in Transdanubia and the Jászság region. It has often been the case that such sites were identified in buried soils within eroded loess resulting from modern disturbances. The sites that have been investigated are generally associated with hunting of reindeer, horse, bison, or other large tundra/steppe mammals (see Dobosi 1989, 2001; Dobosi and Kövecses-Varga 1991; Gábori 1956a, 1964; Vörös 1989, 1991, 1993). Evidence for structures/shelters and clear spatial patterning of activity areas has been recognized at such sites, among others, as Ságvár (Gábori and Gábori 1959) and Jászfelsőszentgyörgy-Szúnyogos (Dobosi 2001). It is important to note that relative to the totality of Late Paleolithic hunter-gatherer activity these sites probably represent only a small portion of activities aimed at the exploitation of seasonally available resources. Such sites are archaeologically more visible as a result of intensive occupation and/or repeated returns to the site. Archaeological evidence for hunter-gatherers in the central Carpathian Basin sharply decreases after this period.

Between 15,000 and 11,000 uncal. B.P. the continued retreat of the Alpine and North European glacial ice sheets opened up previously uninhabitable territories into which hunter-gatherers associated with the Magdalenian technocomplex expanded from east to west across the north central European Plain (Kozlowski and Kozlowski 1979: 46-51). There is limited evidence from the Rózsás-Hegy site near Miskolc suggesting the penetration of certain Magdalenian elements into northern Hungary during the Late Pleistocene (Lengyel 2004; Ringer 1991). A greater influence during the time was the Epigravettian (Tardigravettian) techno-complex occupying the Mediterranean coast from the Spanish Levant to the Adriatic coast, and possibly the central Balkans. The regional variants of the Epigravettian are poorly understood and probably consist of numerous as yet unrecognized cultural units (Kozlowski and Kozlowski 1979: 47). During this time period the central Carpathian Basin witnessed numerous changes in flora and fauna as a result of changing climatic conditions. Based on data from pollen cores, loess profiles, and malacology, Sümegi et al. (2002) report that beginning around 15,000 uncal. B.P. portions of Hungary formerly dominated by steppe vegetation began to yield to closed taiga vegetation (*Pinus*, *Picea*, and *Larix*). Associated with these vegetation changes were significant changes in fauna: large herd animals of the steppe began to be replaced by animals found in warmer closed forest environments such as beaver, red deer, roe, deer, wild pig, and aurochs (e.g. see Bökönyi 1972). It is likely that technological elements from the Gravettian technocomplex, including the Ságvárian culture, contributed to the development of subsequent Epigravettian in the Carpathian Basin. The overall lack of evidence has lead some researchers to suggest that hunter-gatherers migrated northwards followed the shift in large steppe herd animals (Simán 1990: 19), leaving the central Carpathian Basin largely depopulated until the Neolithic (Gábori 1981, 1984; Szathmáry 1988). The depopulation scenario is not tenable in light of past and recent research, and it is certain that some hunter-gatherer groups remained. The hunter-gatherer groups that stayed in the Carpathian Basin, like hunter-gatherers throughout Europe, undoubtedly altered their food-getting strategies in response to the changing environment. The general lack of archaeological evidence from this time period in Hungary may be partially attributable to the burial of sites by wind-blown loess, although the discovery of sites from earlier periods, equally susceptible to burial by loess suggests that the problem may be more complex. A second reason for the lack of evidence from this period is probably also the result of insufficient research directed at locating such sites.

After 12,000 uncal. B.P. increasing temperature and precipitation in Hungary accelerated the transition from closed taiga to boreal forest (Krolopp and Sümegi 1995; Sümegi 1996; Willis, et al. 1997; Willis, et al. 1995), which was accompanied by a continual increase in proportion of deciduous trees. By 10,000 uncal. B.P. (~10,000 cal. B.C.) further climatic warming had led to the expansion of deciduous forests (lime, oak, elm, hazel) throughout most of Hungary (Sümegi, Krolopp, et al. 2002). Sümegi et al. (Sümegi, Krolopp, et al. 2002: 19) and Sümegi et al. (Sümegi, Kertész, et al. 2002) have emphasized that the differential impact of climatic patterns (Atlantic in Transdanubia, Continental on the Alföld, and sub-Mediterranean in southern Transdanubia), coupled with the effects of soil and geographical conditions, produced a mosaic of vegetation regimes. Mast producing plants such as hazelnut were a readily exploitable and storable plant resource and may have had a significant role in the overall diet. Although, no plant remains have been recovered from archaeological sites in the Carpathian Basin during this period, pollen corings suggest that by the Late Mesolithic hunter-gatherers may have actively been manipulating of forests in order to encourage the growth of hazel. The dominant terrestrial faunal species during this period were the beaver, red deer, roe, deer, wild pig, and aurochs. These animals are generally more dispersed throughout the landscape and to a certain extent less predictable in their location.

If we turn our attention to the archaeological evidence from Hungary during the Pleistocene-Holocene transition, the only sites that have significantly investigated are Sződliget-Vác (Gábori 1956b, 1968), on the left bank in the Danube Bend, and Szekszárd-Palánk (Vértes 1962). Bökönyi's and Berinkey's analyses of the faunal material from Szekszárd-Palánk reveals the presence of aurochs, red deer, beaver, and fish (Vértes 1962: 197-198). The exploitation of aurochs, red deer, and aquatic resources demonstrates the hunter-gather adaptability to a changing environment. Additionally, Sződliget-Vác provided evidence for a small (2.4 x 2.2 m) rectangular stone lined structure associated with external hearths (Gábori 1968: plates 1-2). Both sites have lithic assemblages that are quite similar with end scrapers, backed blades and segments present. Likewise both sites seem to exhibit general trends toward microlithization (for general discussion see Kozlowski and Kozlowski 1979), a trend which may be indicative of the adoption of composite projectile technologies. Based on these similarities it may be possible to extend the radiocarbon date from Szekszárd-Palánk of 10,350 ± 500 B.P. to Sződliget-Vác. Gábori considered the Sződliget-Vác site to be assignable to the Late Epigravettian or Early Mesolithic (Gábori 1956a: 181), while Kertész interprets the site as Early Mesolithic. In light of the similar lithic assemblages and single radiocarbon date, it is likely that both sites are assignable to the Late Epigravettian techno-complex; probably reflecting a transitional period from the Late Epigravettian to the Early Mesolithic: if such a period is sharply distinguishable at this time. The sites of Jászberény-Nevada-Tanya near the Tarna River (Kertész personal communication, Kertész 1996b), as well as, Kunpeszér-Felsőpeszéri út-Homokbánya (Horváth 1983b, 1985b, c; Horváth and Tóth 1984a, b) and Kunadacs-Köztemető (Horváth 1983a, 1985a) may be datable to the same period (see Kertész 2002). Perhaps the most significant conclusion regarding hunter-gatherers at the Pleistocene-Holocene boundary is the simple fact that they were present in the Hungary and demonstrate a general trend toward adaptation to new environmental conditions.

Until the early 1990's the evidence for Mesolithic hunter-gatherers in Hungary was primarily limited to poorly investigated, surface collections with minimal information regarding the context from which the finds had originated (Kertész 1991: 29 and 41). Many sites claimed to be Mesolithic, for example Pamuk among many others, were based on collections comprised of gunflints or completely non-diagnostic lithic debitage (Marton 2003). In numerous cases museum collections cannot be associated with specific locations and contexts, such as the Győr collection (Gallus 1942) or the collection from Vöröstó. Two probable Mesolithic harpoons recovered as isolated finds during peat cutting from the Sárrét in Transdanubia (Makkay 1970: 14; Marosi 1935, 1936a, b; Nemeskéri 1948) have recently been dated to the Holocene based on geological stratigraphy by Sümegi (2003b: 379); although, in the future these should be subjected to direct radiocarbon dating. In other cases, such as Mencshely-Murvagödrök (Mészáros 1948), subsequent investigations have revealed that the sites are probably assignable to the Neolithic (Biró 1992). Other sites such as Kaposhomok, where convincing Mesolithic stone tools had been privately collected in the 1950`s, have only been marginally investigated by professional archaeologists (Marton 2003; Pusztai 1957). Recent reinvestigations of the Kaposhomok collection indicate that it demonstrates affinities with Western Technocomplexes (Beuronian, Sauveterrian), and that the raw materials used to produce the chipped stone tools originated from both sources in the Bakony to the north and Mecsek Mountains to the south (Marton 2003: 41-42). Like previously mentioned sites, the specific location of the Kaposhomok site and the geological and archaeological context of the finds remain dubious. Until such collections can be clearly associated with specific sites, with known geological and archaeological contexts, their Mesolithic status will remain uncertain

A second research impediment can be attributed to the fact that prior to the 1990's there were real questions as to the characteristic features of stone tools which could be associated with the Mesolithic. Vértes held that large bifacial tools were indicative of the "Rough" or "Danubian" Mesolithic in Hungary which coexisted with a little known microlithic Mesolithic (Vértes 1965): a position reinforced by other researchers (e.g. Rozsnyói 1963). Strong criticism of the "Danubian" Mesolithic paradigm were initially put forth by Kozłowski in 1973, in which he argued that the association of large bifacial tools with the Mesolithic was untenable in light of the fact that the Mesolithic was throughout Europe associated with microlithic technologies (Kozlowski 1973). Nevertheless, in a catalog of Paleolithic and Mesolithic sites in Hungary, Dobosi almost exclusively discusses the "Rough" Mesolithic (Dobosi 1975). It was not until the late 1980's that the "Danubian" Mesolithic concept was put to rest when the artifacts were solidly reassigned to Middle and Late Paleolithic industries (Kordos and Ringer 1991; Ringer 1982, 1983, 1990, 2000, 2001; Ringer and Adams 2000; Ringer, et al. 1995; Simán 1978, 1979, 1984, 1986, 1991; Simán and Csorba 1993; Svoboda and Simán 1989). Hungary effectively remained *terra incognita* in terms of the Mesolithic until surveys and excavations conducted by Róbert Kertész in the Jászság region of north central Hungary during the late 1980's and 1990's. An often underestimated effect of the pre-1990 situation was a complete lack of popularizing publications produced for the general public presenting the types of archaeological materials associatable with the Mesolithic: The serendipitous discovery of Mesolithic sites was unlikely to occur in such an environment.

Before discussing the Mesolithic sites from the Jászság region, it will be beneficial to review the broader character of evidence from the Carpathian Basin. J. K. Kozłowski's and S. K. Kozlowski's syntheses of evidence from Mesolithic sites in the Carpathian Basin and adjacent regions formed the foundation for predictive hypotheses regarding the character of stone tools, which could conceivably be associated with the Hungarian Mesolithic (Kozlowski 1982a, b, 1989; Kozlowski and Kozlowski 1979; Kozlowski 1975, 1980, 1984, 1985, 2001). The general scheme used by J. K. Kozłowski and S. K. Kozłowski for identifying and labeling lithic industries recognizes broad *technocomplexes* with shared general attributes and lower order *culture groups or industries* of more localizable distribution. There are basically two technocomplexes, most recently discussed by S. K. Kozłowski (2001), relevant to the Carpathian Basin Mesolithic: the Western Technocomplex and the Late Epigravettian (also referred to as Tardigravettian) [see Maps in Kozłowski and Kozłowski 1979]. During the Early Mesolithic, roughly 10-8,000 uncal. B.P., the Western Technocomplex is best known from sites associated with the Beuronian-Coincy industry north of the Alps and the Sauveterrian industry located south of the Alps and along the Mediterranean. Both industries are defined by general associations between lithic tool types and specific types of geometric microliths. Trapeze microliths are present in the later variants of both the Sauveterrian and Beuronian. During the Late Mesolithic Castelnovian industry, the successor to the Sauveterrian, trapezes become more widely dispersed and spread from the south to north. The Epigravettian technocomplex, as treated by S. K. Kozłowski (2001), is allegedly distributed throughout the Balkans and central Carpathian Basin, including Transdanubia and the Alföld.

The Late Epigravettian, equivalent to the Early Mesolithic, lasted from 10,000 uncal. B.P. to roughly 8,000 uncal. B.P., while the Latest Epigravettian, equivalent to the Late

Mesolithic, lasted from 8,000 uncal. B.P. to 7,000 uncal. B.P (Kozlowski 2001). The quality of the evidence with which they have used to generate the Epigravettian is highly variable, and dependent upon both the research traditions of different countries and the geomorphological conditions affecting site detection. Epigravettian is used to describe this industry in order to emphasize continuity with the precedent Gravettian industry. To a large extent the perception of technological homogeneity is rooted in S. K. Kozłowski's perception that Pleistocene-Holocene environmental change was less extreme in southeastern Europe, a point contradicted by both Sümegi et al. (2002) and Kertész (2002). S. K. Kozłowski's considers that due to lack of evidence there is probably little internal cohesion to the Epigravettian technocomplex and future research may lead to its redefinition (Kozlowski 2001: 268-269). The identification of technocomplexes and the subsidiary culture groups has progressed almost exclusively along the lines of typological classification with little emphasis on the various aspects of Mesolithic hunter-gatherer behavior and site function, which undoubtedly played a significant role in structuring the character of each lithic assemblage. It is entirely possible that some of the more poorly reported sites may represent a palimpsest of activities from different time periods, or that particular tool types may be differentially present at sites geared toward different activities.

Few sites in the Carpathian Basin have been successfully radiocarbon dated, and the assignment of late or early Mesolithic is primarily based on the previously discussed lithic typologies, which are significantly more robust in regards to the Western Technocomplexes (Beuronian, Sauveterrian, Castelnovian). The following is a list of known Mesolithic sites or site concentrations significant to understanding similar sites in Hungary [see Map Kertész 2002: 282-283].

- ➔ In the portion of Romania within the Carpathian Basin there are three known Mesolithic sites: 1) Ciumeşti II – located near the Romanian-Hungarian boarder (Paunescu 1964, 1970); 2) Cremenea – located in Transylvania (Nicolaescu-Plopsor and Pop 1959); and 3) Glîma – located in Transylvania.
- ➔ A concentration of exceptionally rich Mesolithic sites has been excavated on both the Romanian and Serbian banks of the Danube in Iron Gates region (Radovanovic 1996).
- ➔ Two Mesolithic sites are known from northern Serbia: Peres, near Hajdukovo, and Bačka Palanka, on the left bank of the Danube (Brukner 1966).
- ➔ There are no known Mesolithic sites from the Slavonian portion of Croatia or from eastern Slovenia.
- ➔ Leitner (1984) has provided a summary of eighteen Mesolithic sites from Austria, some of which have never been published, which have been assigned, primarily based on the presence of geometric microliths, with varying degrees of certainty to the Mesolithic. He notes that Austrian research into the Mesolithic has confronted similar problems as research in Hungary: sites lacking stratigraphical context, often mixed with assemblages from later cultures, and chronological relations only possible through general typological comparison with better known sites from surrounding regions (Germany, Switzerland, and Italy). Nevertheless the more eastern Mesolithic sites in Austria are worthy of mention as potential analogs for Mesolithic sites in Hungarian Transdanubia. In

South East Austria the cave sites of Tropfsteinhöhle des Schloßberges bei Griffen located along the Mur/Mura River in Kärnten and Zigeunerhöhle im Hausberg von Gratkorn near the Drau/Drava river in Steiermark. A cluster of five open air sites is located between the Danube and Czech boarder in Niederösterreich: Mühlfeld bei Horn, Horn-Galgenberg (Gulder 1953; Weiser 1980), Kamegg im Kamptal (Berg and Gulder 1956), Burgschleinitz bei Eggenburg (Gulder 1953; Leitner 1980), and an outlier site located near Vienna, Bisamberg bei Wein (Gulder 1953; Kmoch 1966). Five unpublished and undated possible open air Mesolithic sites are also known from Eastern Austria in Burgenland: Neusiedl am See, Jois, Breitenbrunn, Föllik bei Großhöflein, and Pöttelsdorf. From amongst all these sites, the Early Mesolithic sites of Kamegg and Limberg-Mühlberg, as well as, the Late Mesolithic site of Bisamberg stand out.

- ➔ A group of five Mesolithic sites is known from southeastern Czech Republic: Smolín (Valoch 1963, 1978, 1985), Přibice (Valoch 1975), Dolní Věstonice (Klíma 1953), Šakvice (Klíma 1953), and Mikulčice (Klíma 1970).
- ➔ In western Slovakia, Bárta has investigated the Early Mesolithic sites of Mostová (Bárta 1960) and Tomásikovo (Bárta 1955), as well as, the Late Mesolithic sites of Sered I (Bárta 1957) and Dolná Streda (Bárta 1965). These sites are restricted to a rather small region west of the lower Vág River. Evidence for Mesolithic occupants in eastern Slovakia is limited to the probable Early Mesolithic site of Barca I (Bárta 1980a, b; Prošek 1959) and Ružín-Medvedia Cave (Bárta 1985, 1990).
- ➔ Numerous Mesolithic sites are known from both the portion of the Ukraine lying within the Carpathian Basin and the drainages of the Prut and Dniester Rivers (Matskevoî 1987, 1991). The disproportionate number of Mesolithic sites located in the Ukraine, relative to surrounding countries, is almost certainly the direct product of more intensive research efforts.
- ➔ The site of Odmut cave (Kozlowski, et al. 1994) in Montenegro is one of the only stratified cave deposits containing a stratified Mesolithic sequence in the Balkans.

Beginning in the late 1980's and 1990's Kertész, in collaboration with local collector Gy. Kerékgyártó, began to sytematically survey the Jászság region of the northern Hungarian Alföld along the Tarna and Zagyva Rivers (Kertész 1991). In the course of this work numerous sites with characteristic Mesolithic geometric microliths were identified along abandoned channels and oxbows of the of the Early Holocene (Boreal Period) Tarna and Zagyva Rivers (Kertész 1996b: 13). In many cases these sites lacked pottery or the pottery present originated from a period in which chipped stone tools were not utilized. Further survey work and subsequent excavations lead to the further investigation and publications of the sites of Jászberény I (Kertész 1991, 1996b), Jászberény II (Kertész 1993), Jászberény IV (Kertész 1995, 1996c), and Jásztelek I (Kertész 1994, 1996b). The area of surface lithic scatters vary from 12-17 m to 40-50 m in diameter, and the rarer, larger sites may be comprised of multiple smaller concentrations (Kertész 1996b: 19; 2002: 288). Kertész goes on to report that difference in site size may reflect differences in the duration of stay, and that at the larger sites it is possible to recognize different activity areas. Significantly, a circular dwelling structure (diameter = 5 m) with a subterranean floor and centrally located hearth was excavated at the Jásztelek site: post holes indicate that the hut was constructed from large leaning poles (teepee form) to which roofing material (i.e. reeds) was probably affixed (Kertész 1996b:19-22). As suggested by the location of sites on river floodplains, faunal remains from aquatic animals are present, but in addition faunal remains from terrestrial animals attest to the exploitation of species located both in riparian corridors and interfluvial steppe environs (Kertész 2002: 289). As of yet no plant remains have been recovered from the Jászság sites, but this is probably the result of poor preservation conditions, as recent analyses of pollen cores suggest that hunter-gatherers may have been intentionally manipulating the woodlands to increase hazelnut production (Sümegi 2004). All the Jászság Mesolithic sites are dominated by lithic raw materials locally attainable from the Mátra Mountains located 20-30 km to the north; suggesting seasonal movement between highland and lowland environments.

On the basis of lithic materials recovered in the course of surface collections at Jászberény II and IV, as well as, excavations at Jásztelek I and Jászberény I, Kertész (Kertész 1996a; 1996b) divided the Jászság Mesolithic into two phases: 1) the Early Mesolithic, Boreal, Jászberény I phase based on stratigraphic observations during the course of excavations; and 2) the Late Mesolithic, Early Atlantic, Jásztelek I phase known from surface collections at the respective site. In contrast to J. K. Kozłowski and S. K. Kozłowski (Kozlowski and Kozlowski 1979), Kertész argues that the Jászság Mesolithic lithic industry, or North Hungarian Plain Mesolithic Group (NHPM), shows links with the preceding Late Pleistocene Epigravettian and significantly incorporates elements of the Western Technocomplex (Beuronian, Sauveterrian), but does not demonstrate links with the Balkan Epigravettian/Tardigravettian (Kertész 1996b: 23-25). He goes on to state that the strongest analogies for the NHPM are the Western Technocomplex influenced Mesolithic sites, including the Tisza Valley Mesolithic Group (Barca I, Ciumeşti II) (for definition see Bárta 1972, 1973, 1980a, b), the northern Carpathian Basin perimeter (Kamegg, Limberg-Mühlberg, Mostová, Tamášikovo, Smolín, Přibice, Dolní Věstonice, Mikulčice, Bisamberg bei Wien, and Sered I). The results of this work suggest that the cultural landscape of the Early Holocene Carpathian Basin was significantly more diverse than initially suspected.

Sites created by mobile hunter-gatherers are often archaeologically less visible than those created by farmers living in villages. Archaeological visibility is an invalid proxy for evaluating the contributions of the respective groups to the second phase of Neolithic expansion. Increasing evidence has accrued which convincingly indicates that hunter-gatherer populations were present in the Carpathian basin and probably interacted with the first farmers. Sustained research efforts in the Jászság region have proven that Mesolithic sites exist, but as yet undiscovered sites in western Hungary are still awaiting similar treatment. The Jászság region stands in stark contrast to Transdanubian Hungary; an important staging ground for the spread of agricultural communities to the rest of North Central Europe. Transdanubia's role, as the secondary node for the prehistoric transmission of agriculture to North Central Europe, demands that increased effort be devoted to the scrutiny of possible Mesolithic evidence.

The Spread of Agriculture: South West Asia to South East Europe

The agricultural center of origin most significant to the European Neolithic is the "Fertile Crescent" located in South West Asia; an area encompassing the Levantine corridor (Israel, Palestine, Jordan, and Syria) and southern foothills of the Taurus Mountains (Syria and Turkey) and Zagros Mountains (Iraq and Iran). This region was initially singled out as a region in which early agriculture may have developed based upon the regional distribution of the wild progenitors of early domestic animals and plants (Harris 1990; Vavilov 1926). Human actions ultimately leading to the domestication many of plant species are likely to have begun some time during the late Pleistocene (pre-10,000 cal. B.C.). The ability to track the first steps in the process of domestication is hampered by the fact that morphological change in the animals themselves, and other materially salient aspects of human-animal relations, are both preceded by a period of unknown duration. It appears that groups inhabiting different regions with in the Fertile Crescent and Taurus Mountains in Anatolia were responsible for domesticating different animal and plant species during the early Holocene between 10,000 and 7,000 cal. B.C. These species were later melded into the classic "Neolithic Package" during the later Pre-Pottery Neolithic B period (PPNB) and early Pottery Neolithic (PN) sometime during the late 8th and early 7th millennium B.C. (Bar-Yosef and Meadow 1995). This "Neolithic Package" included the following domesticated plants: emmer wheat (*Triticum dicoccum*), einkorn wheat (*Triticum monoccoccum*), bread wheat (*Triticum aestivum*), six-row barley (*Hordeum vulgare*), lentils (*Lens culinaris*), peas (*Pisum sativum*), and bitter vetch (*Vicia ervilia*). These plants were later complemented by the following domestic animal species: sheep, goat, cattle, and pig. Dogs were also present, but were domesticated much earlier, and hence were already distributed throughout both Europe and South West Asia.

Agriculture was almost certainly transmitted to Greece from the Anatolian Peninsula; although the specific route, or routes, out of western Turkey is the topic of current debates (Özdogan 1989, 2000; Schubert 1999; Thissen 2000a, b). Based on her evaluation of radiocarbon dates from Early Neolithic sites in Greece, Perlès (2001: 98-110) suggests that the Early Neolithic began on the southern Greek mainland around 6,500 cal. B.C. and lasted until about 5,900 cal. B.C. The debate over the existence of an earlier Greek Pre-Pottery Neolithic phase aside, Early Neolithic societies in Greece utilized both pottery and the major elements of the suite of domestic plants and animals (Perlès 2001). The Greek Early Neolithic subsistence economy, as described by Perlès (2001: 152-172), displays some of the general patterns that are manifest throughout the Balkan Early Neolithic societies. Emmer and einkorn wheat tend to be the most common domestic plants recovered from sites, although this type of information is heavily dependent upon the types of recovery techniques used. The bones of sheep and goat, animals adapted to more arid conditions, are almost always numerically dominant, but cattle probably provided more meat. Certain aspects of the material culture tend to be widely shared such as the basic ceramic forms, figurines and idols, as well as the chaff tempered fabric used in their production.

Between the late 7th millennium and early 6th millennium cal. B.C. an approximately 500,000km^2 portion of southeastern Europe were settled by the first agricultural societies. Radiocarbon dates from a number of Early Neolithic sites (Whittle, et al. 2002) indicate that agricultural societies spread rapidly northward through the Balkans, probably following a number of different routes, and reached the Carpathian Basin by the early 6th millennium cal. B.C. (Hertelendi, et al. 1995; Hertelendi, et al. 1998; Horváth and Hertelendi 1994; Whittle, et al. 2002). Within the Carpathian Basin the following three culture groups have been distinguished: Starčevo (Hungarian Transdanubia, eastern Croatia, Bosnia-Herzegovina, and Serbia), Körös (Hungarian Alföld and northern Serbia) Criş (Transylvania in Romania).

Early Neolithic in the Carpathian Basin: Starčevo-Körös-Criş Cultures

The Balkan Early Neolithic as manifest in the Carpathian Basin has been separated into three regional groups: Starčevo, Körös, and Criş [see Map Kalicz et al. 1998: 153]. Each is endowed with its own peculiarities but the three groups are also often referred to in hyphenated form (Starčevo-Körös-Criş), reflecting their underlying relatedness with in the broader Balkan Early Neolithic sphere. From the start it is important to emphasize that boundaries between these groups are generally not sharp, and they are best envisioned as fuzzy boundaries. The Criş culture is distributed parts of Walachia and Transylvania in Romania (Lazarovici 1969, 1979) and probably also extreme northeastern Hungary, as evidenced at the Méhtelek-Nádas site. I will not discuss the Criş culture in this paper. The Körös culture is distributed throughout the southern Alföld in Hungary, the Banat in Romania, and the extreme northern portion of Serbia (Vojvodina). The Körös culture has been and continues to be the topic of intensive research, and I will briefly summarize some its more salient, and generally agreed upon, aspects before discussing the Starčevo culture, which is often presented in juxtaposition to the Körös culture. However, Kalicz notes that the integration of the full range of archaeological evidence, not only ceramics, indicates a greater degree of variability within the Starčevo culture than between the Starčevo and Körös cultures (Kalicz 1988: 88), and it is important to keep this heterogeneity in mind. The currently accepted distribution of Starčevo culture sites includes Serbia, Western Bosnia-Herzegovina, eastern Croatia (Slavonia), and southwestern Hungary (Transdanubia).

Research in the early 20th century failed to associate the Körös culture with the Balkan Early Neolithic. It was only through the efforts of Kutzián (1944; 1947) that the Körös culture was correctly assigned to the Balkan Early Neolithic. Kutzian recognized a strong similarity in the artifacts recovered from Körös culture sites on the southern Alföld of East Hungary and Early Neolithic sites in Greece (Kutzián 1944, 1947). Since then it has been recognized that Körös sites are also distributed in the Danube-Tisza interfluvial region (Bognár-Kutzián 1977). From the outset it must be stated that many Körös sites have been excavated since the 1950's, but few of these excavations were large scale and even fewer have been fully published, rendering much of the available information impressionistic in character. Despite these deficiencies it is possible to make some general statements regarding the overall settlement patterns, internal settlement structure, subsistence economy, and ceramics.

Körös sites are found at densities far surpassing that documented for either Criş or Starčevo. In his summary of archaeological surveys (MTA IV 1-Szeghalom and MTA IV

2- Szarvas) conducted in the central area of Körös distribution Makkay (1982: 114) reported that 304 sites were recorded in a 2012km^2 area, for an astounding average density of 6.61 sites/km^2. The most characteristic Körös culture sites are linear sites, up to 1 km in length, with dense surface scatters of ceramic and burnt daub, stretched out on slightly elevated levees along active and abandoned river courses (Kalicz and Makkay 1977; Kosse 1979; Sherratt 1997a, b; Whittle 1996). This view of Körös settlements located in a relatively homogeneous environment structured primarily by the location of waterways has been recently challenged in a paper by Sümegi (2003a) in which he argues for significantly more heterogeneous soil and vegetation conditions. He argues for two types of Körös sites distinguishable on the basis of their environmental associations: 1) sites "…situated on Holocene alluvia, right at the active riverbeds.", and 2) sites "…'normally' found on the natural levees that developed toward the end of the Pleistocene and are covered with infusion and sometimes aeoleian loess constituting the morphologically highest points of the plain depression areas, and as a consequence, free of the influences of floods" (Sümegi 2003a: 53, 56). Sümegi further suggests that these different environmental associations were probably associated with fundamentally different subsistence economies; with the first, less well investigated, site type associated with the exploitation of wild terrestrial and aquatic resources and the second site type focused on production of domestic plant cultivation and animal husbandry.

The recognition of Balkan Early Neolithic Starčevo sites in western Hungary coeval with Körös culture sites occurred significantly later and the full distributional extent of the Starčevo culture only became well defined in the late 1980's and early 1990's [see Map sequence: Dimitrijević 1969: 41; Kalicz and Makkay 1972: 82; Kozłowski and Kozłowski 1979: 69; Kalicz 1990: 116; Virág and Kalicz 2001: 266]. The earliest synthesis of the Starčevo culture in monograph form was presented by Arandjelović and D. Garašanin (1954). The steps that would lead to the recognition of Starčevo sites in western Hungary were initiated in the 1960's when Yugoslavian archaeologists began to identify Starčevo sites located further to the north and west than had previously been known (Dimitrijevic 1966, 1969, 1971, 1978, 1979). These new Starčevo sites were located throughout Slavonia (northeastern and central Croatia between Drava and Sava Rivers) with the northern boundary established along the Drava River (Dimitrijevic 1969: 41). The northern boundary along the Drava did not remain reality for long. Through investigation of museum collections, survey work, and excavations in the 1970's Kalicz and Makkay were able to establish that the Starčevo culture was also present north of the Drava River in southwestern Hungary. At first they recognized Starčevo elements, which they initially termed the "Medina type", from museum collections originating from the sites of Medina and Harc-Nyanyapuszta, both located in Tolna county (Kalicz and Makkay 1972a, b, 1975a). Subsequent excavations at Lánycsók in Baranya County (Ecsedy 1978; Kalicz 1978, 1980, 1983) and Becsehely in Zala County (Kalicz 1980, 1983) provided unequivocal contextual evidence for the Starčevo culture in Trandanubia. Kalicz notes that these excavations were significant not only in the materials recovered, but also due to their spatial separation, which suggested that Starčevo sites could be found throughout southern Transdanubia.

From the 1970's onward there has been a

steady increase in the number of Starčevo sites recognized in both southwestern Hungary and Slavonia. In her 1992 monograph on the Starčevo culture of Slavonia, Minichreiter catalogs a total of nineteen investigated Starčevo sites throughout Slavonia; although more are known to exist (Minichreiter 1992). In 1988 Kalicz reports ten known Starčevo sites from western Hungary (Kalicz 1988, 1990), by 1993 fifteen certain and two questionable Starčevo sites were known (Kalicz 1993), and subsequently one additional site has been added (Virág and Kalicz 2001). The presently recognized northern extent of the Starčevo culture has been established south of a line running from Szekszárd, on the Danube, northwest along the Kapos and Koppány Rivers to the southern shore of Lake Balaton, proceeding north to encompass the Gellénháza site before turning south. Undoubtedly many new Starčevo sites are awaiting discovery in Transdanubia. For example, the sites and ceramics presented in the erroneously identified Neolithic "Tapolca Group" (Törőcsik 1991) contain many Starčevo artifacts from sites in the vicinity of the Koppány and Kapos Rivers, which have been incorrectly associated with the early Transdanubian LBK (Bánffy personal communication). There are also hints of Starčevo sites on the northern shore of Lake Balaton (Bánffy personal communication). Even with the addition of these new sites it is likely that the settlement density will remain an order of magnitude less than the Körös culture, a situation mentioned by Kalicz (1988; 1990; 1993: 87).

An examination of Hungarian Starčevo site location, settlement density, site size, and occupation intensity reveals that their settlement density appears to be lower, the sites tend to be smaller and less intensely occuppied than the more densely distributed Körös sites to the east (Kalicz 1988, 1990) and to a certain degree the Starčevo sites in Slavonia. The significant geographic differences, especially in terms of relief, between Transdanubia and the Alföld preclude a direct comparison between Körös and Starčevo site location; although, as Kalicz et al. remark, "…the living water environment was as important here [Transdanubia] as on the Alföld" (Kalicz, et al. 1998: 152). It may prove more insightful to direct our attention toward comparisons which can be drawn between the geographically similar regions in Hungary and Slavonia.

There are few apparent differences between the location of Slavonian and Hungarian Starčevo sites. Minichreiter notes that Slavonian Starčevo sites are generally located on "…elevated terraces along major rivers, - on low sunny hills which descend towards valleys with watercourses, [and] – gently elevated terrain in plains along small streams" (Minichreiter 1992: 70). The geographical location of Starčevo sites in Hungary is comparable to those in Slavonia; specifically, the Hungarian sites are associated with terraces along the Danube River, Drava River, and Lake Balaton and related wetland areas, as well as, smaller rivers and streams draining into these three larger bodies of water (Kalicz 1988). Waterways almost certainly provided both rich resource environments, as well as, easy routes for movement for people exchanging raw materials and information.

In contrast with site location is possible to recognize changes in settlement density, site size, and settlement intensity northwards from Slavonian into Hungarian Transdanubia (Kalicz 1988, 1990). There are more Starčevo sites known from Slavonia, and especially south central Slavonia (Kalicz, et al. 1998: 153 - Fig. 2). Three large Starčevo sites have been investigated in Slavonia (Pepelane, Vinkovci, and Zadubravlje), some quite near to the Drava River (Pepelane) (Minichreiter 1992: 11-36, 64-70), but most Slavonian sites are smaller than 1 *ha*. No large sites are known from Hungary and all sites are smaller than 1 *ha* (Kalicz 1988, 1990; 1993: 87). Kalicz questioned whether the apparent difference in Starčevo settlement density and size, relative to Körös culture sites, resulted from an overall smaller population or from a shorter duration of presence in the region (Kalicz 1988, 1990).

The intensity of occupation at individual sites is related to both the nature of on-site activities and the effects of settlement mobility (Whittle 2001). Whittle argues that more attention should be paid to the potential mobility of Early Neolithic (Körös) and Middle Neolithic (LBK) societies. He suggests six types of mobility within a broader settlement mobility spectrum: 1) residential or circulating mobility, 2) embedded or tethered mobility, 3) logistical or radiating mobility, 4) short-term sedentism, 5) short-term sedentism with embedded and/or logistical, and 6) embedded sedentism (Whittle 2001: 450-451). In regards to the Lánycsók site Kalicz remarks that far fewer ceramic sherds were recovered than would be expected from a similar sized Körös excavation (Kalicz 1978: 143). There is currently no evidence refuting the interpretation of Hungarian Starčevo sites as locations where a limited range of special activities were repeatedly executed for short periods or time.

The internal structure of Starčevo sites in western Hungary is poorly understood. The sites are generally characterized by a series of variously sized (1-6 m dia.), round or amorphously shaped pits, and occasionally associated with small kilns (e.g. Vörs-Máriaasszony-sziget). To date, no structure has been excavated at a Starčevo site in Hungary that could plausibly have functioned as a dwelling structure (Kalicz 1988; Kalicz, et al. 2002: 19-20). Horváth (1989: 85-86) has provided a synthesis of dwelling structures recovered from a number of Körös culture sites – Kotacpart-Vata Tanya (Banner 1943), Nosza-Gyöngypart (Brukner 1974; Garašanin 1959), Ludaš-Budžak (Szekeres 1967), Tiszajenő (Selmeczi 1969), Szajol-Felsőföld (Raczky 1982) , Szolnok-Szanda (Kalicz and Raczky 1981; Raczky 1982) and a house model from Röszke-Ludvár (Trogmayer 1966) – and he concludes that "…the characteristic Early Neolithic house type of the Tisza region was a single-room rectangular structure with gable roof and wattle and daub or reed walls." [see reconstruction in Lenneis 2000: 388] Indirect evidence for houses, perhaps similar to those observed at Körös culture sites, has been recovered in the form of burnt daube and pit arrangements from both Gellénháza-Városrét (Simon 1996) and Vörs-Máriaasszony-sziget (Kalicz, et al. 2002: 19-20). Kalicz notes that the layout of pits suggests that surface structures may have been present at Vörs.

An entirely alternative interpretation of Starčevo structures, dominant in the interpretation of Croatian sites, considers that the numerous excavated pits are the remains of subsurface houses (Minichreiter 1992: 70) [see reconstruction in Minichreiter 1992: 30]. The association of northern Starčevo sites with pit house architecture may be amenable to theories attempting to stress Mesolithic roots, but there are neither parallels for such architecture in the Mesolithic of Transdanubia (largely due to absence of evidence), nor in the Early Transdanubian LBK with the exception of an enigmatic pit dwelling identified at the Bicske I site, located west of Budapest (Makkay 1978).

The situation regarding Starčevo houses may be similar to the state of research regarding Alföld LBK (AVK) houses in eastern Hungary in the early 1990's. Up to this time, for lack of any better evidence, references were made Alföld LBK pit houses (Kurucz 1989: 20-25). The Alföld LBK pit house theory was rendered less plausible after extensive excavations by Dombóroczki (1997; 2001; 2003), at the site of Füzesabony-Gubakút, revealed Early Alföld LBK long houses similar to those known throughout the LBK North Central European distribution. At this site large pits found parallel to the long houses were reinterpreted as possible clay extraction pits incidental to house construction. In Transdanubia similar long houses, with parallel pits, are known in the Early Transdanubian LBK from the site of Balatonszárszó (Oross and Marton personal communication). With regard to the Starčevo culture, an interesting case in point may be the Croatian site of Zadubravlje, where post molds are interpreted as pilings for elevated food storage units, while larger pits, some containing kilns are interpreted as dwellings (Minichreiter 1992: 29-36, 69-70). The interpretation of the post molds as remnants of some type of surface structure would be more in line with the type of architecture seen in the Early Middle Neolithic. It is probably only a matter of time before excavations in Hungary or Croatia produce a more convincing evidence for Starčevo dwellings. Alternatively, it may come to pass that a diversity of non-standardized domestic architecture may typify the northern manifestation of the Starčevo culture. It remains impossible to speculate on the internal social organization of Starčevo site inhabitants as reflected in domestic architecture. Given complete absence of information on Mesolithic structures it is also impossible to gauge the likelihood of the survival of such traditions within the Starčevo group.

Four human burials have been excavated at Starčevo sites in Hungary. Two burials were found at Vörs-Máriaasszony-sziget (Kalicz, et al. 2002). Kalicz et al. (2002: 16) report that initial excavations by Aradi in 1990 resulted in the exposure of a burial in contracted position with no grave goods. Further details of this burial have not been published, but a radiocarbon date from the burial falls between 5,550 and 5,200 cal. B.C. (Kalicz, et al. 2002). The second burial, a young female, from Vörs was associated with clam shells, a pottery vessel, and a grinding stone. Two burials, a child and female, were excavated at the Lánycsók site (Zoffmann 1978). The Hungarian Starčevo burials appear to fall within the context of general Starčevo burial practices (Lekovic 1985, 1995), which are characterized by a diversity of non standardized customs with few to no grave goods. It is not possible to discern any clear differences in social status based on burial patterns. Analysis of skeletal materials suggests a fairly heterogeneous population probably reflecting both non-local and indigenous elements (Zoffmann 1999, 2001).

Our understanding of Starčevo subsistence practices from Hungarian sites is minimal. Systematic flotation was not enlisted, or results have not been reported, and the only evidence regarding domestic plant usage comes from cereal impressions resulting from chaff tempering of ceramics at Lánycsók (Kalicz 1990: 125), and other sites, and carbonized grains in a possible Starčevo alter fragment recovered as a stray surface find from the site of Kéthely (Füzes 1990: 161-162). The lack of information makes it impossible to make any definitive statements regarding the specific pattern of domesticated plant management or utilization. However, as Kalicz (1988: 114-115) notes, it would not be unusual to find similar early cultigens to those found on other Early Balkan Neolithic sites; domesticated plants such as:

emmer wheat (*Triticum dicoccum*), einkorn wheat (*Triticum monoccoccum*), bread wheat (*Triticum aestivum*), six-row barley (*Hordeum vulgare*), lentils (*Lens culinaris*), and peas (*Pisum sativum*).

The evidence for domestic animal husbandry is only slightly more robust than the previously presented evidence for domestic plants. Lánycsók is the only Hungarian site from which the faunal assemblage (total NISP = 1067, total MNI = 118) has been analyzed and reported (Kalicz 1988: kép 2; 1990:164). The full suite of domestic animals is present (% total NISP = 95.5, % total MNI = 86.44): cattle, sheep-goat, pig, and dog. The following wild animals are present (% total NISP = 4.5, % total MNI = 13.56): aurochs, red deer, roe deer, and wild boar. The typical pattern observed at other Balkan Early Neolithic sites is repeated at Lánycsók: 1) significantly greater proportion of bones from domestic animals relative to wild animals; 2) sheep-goat NISP (Number of Identifiable Specimens) is greater than any other domestic animal, with cattle second and pig a distant third; and 3) cattle contributes more consumable meat by weight calculated from MNI (Minimum Number of Individuals). On the other hand, Kalicz points out that the contribution of wild animal meat, and especially aurochs, to the overall diet at Lánycsók was 62.68 % by weight. Based on this extremely limited information it is possible to state that either Starčevo immigrants brought with them, or the Mesolithic hunter-gatherers were able to gain access to the entire suite of domesticated animals. Future research should aim to improve the quality and quantity of information available on Starčevo subsistence practices in Hungary: Without this information it will be extremely difficult, if not impossible, to examine the process of neolithization.

If we turn our attention briefly toward the better documented Körös culture faunal material: The numerical dominance of sheep and goat bones at Early Neolithic Körös sites in the Carpathian Basin has lead Bökönyi (1974; 1989) to point to a Greek and ultimately South West Asian origin for the entire agricultural package. He further suggests that this evidence supports the spread of agriculture through migration of agricultural populations. The antithesis of Bökönyi's position has been recently postulated by Chapman (2003). Chapman attempts to identify the Mesolithic substratum, or in his terms "habitus," in the Körös culture by comparing faunal assemblages from Körös sites with Greek Early Neolithic sites and the Jászság Mesolithic sites. Chapman considers the high percentage of wild species (12-40% total NISP; 25-62% total MNI) in three Körös site assemblages of significant size, "…to surely betoken a range of skills, ecological and ethological knowledge and dietary preferences Körös hunters and fishers derived from local specialists;…" (2003: 96). Chapman views the utilization of wild animals as some type of gauge of Mesolithic-ness. Ultimately, this is based on the assumption that Early Neolithic groups were somehow incapable of adapting to new situations without the help of Mesolithic "super hunters." It is equally insightful to consider the significance of utilization of wild species by Early Neolithic cultures in a broader temporal context, as opposed to the purely spatial context enlisted by Chapman. Kalicz et al. (1998: 152), draw attention to Bökönyi's (Bökönyi 1992: 197-201, 233-239) observations that exploitation of wild animals was greater in the Late Neolithic than the Early Neolithic, and Kalicz et al. propose that the utilization of wild animals by Körös groups was nothing more than taking advantage of a rich environment. It is difficult to come down in favor of either interpretation; however, it is fairly clear that utilization of wild resources provides no clear evidence for Mesolithic ancestry.

The analyses of the lithic raw materials and chipped stone tools at Hungarian Starčevo sites provides information about both the types of long distance relationships of the inhabitants with sources regions and the nature of on-site activities. Starčevo sites in Hungary from which the lithic assemblages have been analyzed and published are Gellénháza-Városrét (Biró 2002: 135-141; Biró and Simon 2003) and Vörs-Máriaassszony-sziget (Kalicz, et al. 1998: 164-168, 178-181). The lithic assemblage from the sites Becsehely I exists but is unpublished according to Biró (2002: 134-135). There is no information available from Lánycsók or any of the other Starčevo sites. The site of Gellénháza-Városrét had multiple chronological horizons with a total lithic assemblage of 1414 pieces, and Biró and Simon (2003) note that roughly half of the total assemblage can be securely assigned to the Starčevo culture. In their analysis of the Gellénháza-Városrét they reached the following conclusions (Biró and Simon 2003: 122-125): 1) microlithic and flake based stone industry; 2) assemblage dominated by raw materials (Szentgál radiolarite, Úrkut-Eplény radiolarite, Hárskút radiolarite, etc.) attainable from the Bakony Mountains north of Lake Balaton; 3) high ratio of flakes and chips in conjunction with numerous exhausted cores suggests that inhabitants produced chipped stone tools on-site; 4) flakes and chips dominate the overall assemblage with tools produced on both flakes and blades; and 5) retouched tools recorded also include points, borers, burins, wedges, end scrapers, trapezes and segments.

The smaller (n=126) lithic assemblage from the Vörs-Máriaasszony-sziget site (Kalicz, et al. 1998: 164-168, 178-181) presents a fairly similar picture to that of Gellénháza-Városrét site. Like the Gellénháza-Városrét assemblage, Vörs-Máriaasszony-sziget is dominated by raw materials from the Bakony Mountains with primarily flakes and chips with blades present in lower numbers. The high proportion of retouched tools and overall low number of cores, as a proportion of the overall assemblage, suggest that the inhabitants either processed the materials off-site, or acquired the materials in processed form through trade. In this sense the Vörs-Máriaasszony-sziget differs from the Gellénháza-Városrét site where a more direct connection with the same raw material sources is implicated. The tool kit is described as "fairly varied" and the following items are mentioned amongst the inventory of retouched tools: end scrapers, segments, burins, but no "classical trapezes." There is no mention of the microburin technique, recognized at Mesolithic sites in north central Hungary (Kertész 1996b, 2001, 2002), at either Gellénháza-Városrét or Vörs-Máriaasszony-sziget; although, the presence of (micro)burins may be suggestive of this technique. Inhabitants from both sites were able to gain access, either directly or through exchange, to raw materials found in the Bakony Mountains where there are no known Starčevo sites. To this I would only add that based on the illustrations in their article I am skeptical as to whether the artifacts classified as segments are technologically comparable to similarly labeled Mesolithic artifacts.

Discussions of continuity between the Transdanubian Mesolithic hunter-gatherers and the Starčevo culture have often been based on comparison of Starčevo lithic assemblages with poorly investigated or hypothetical "Mesolithic" sites. There are two implicit underlying assumptions which can be recognized in these discussions. First, Biró (in Kalicz, et al. 1998: 164) considers that lithic industries are more conservative over long periods of time, which is a tenable hypothesis, but such hypotheses reveal little about Mesolithic lithic assemblages unless continuity is accepted as predetermined. Second, the "Mesolithic Master's of Stone Hypothesis" is based the notion that if Mesolithic sites are known primarily from lithic assemblages, then it follows that those Early Neolithic sites rich in stone tools and stone tool types implicate technological continuity in lithic industries between the two industries. It is possible to recognize some aspects of the "Mesolithic Master's of Stone Hypothesis" in the following statement: "…the morphologically more varied [Early Neolithic] tool kit can be considered the legacy of hunter-gatherer societies." (Biró 2002: 129). For example, if we consider the possible effects of settlement mobility (Whittle 2001) and consider lithic tool diversity as an index of activity diversity, then such sites may have witnessed a diversity of activities possibly carried out over an extended period of time. A diverse lithic tool kit has little bearing on hunter-gatherer roots. At the very least there is a need to consider a wider range of possible underlying causes for the structure of Neolithic lithic assemblages. The presence of a lithic industry, which is probably similar to an unknown Mesolithic lithic industry, does little more than suggest continuity, but reveals little about the actual process of neolithization. This is especially pertinent both in light of the fact that little information is available on the full range of sites which may be associated with the Neolithic (Early to Late) and that it is increasingly recognized that neolithization was a more protracted process than originally figured (Gronenborn 2003). Lithic artifacts are often the most common, if not the only, type of material recovered from Mesolithic sites in the Carpathian Basin, and it is for this reason that a better understanding of the lithic assemblages from Starčevo sites will be quite important to understanding the relationship between these two groups.

The dating of Starčevo sites in Hungary and Slavonia is almost entirely based on relative ceramic chronology. In his doctoral thesis on the Early Neolithic Starčevo culture in Transdanubia Kalicz (1988; 1990) modified Dimitrijević's (1974) ceramic typology (from oldest to youngest: Monochrome, Linear A, Linear B-Girlandoid-Spiraloid A, and Spiraloid B) to assign relative chronological position to the Hungarian Starčevo sites. According to Kalicz all the known Hungarian sites fall into either the Classic Starčevo phase (elements of Dimitrijević's Linear B, Girlandoid, and Spiraloid A phases) or Late Starčevo (Dimitrijević's Spiraloid B phase) (Kalicz 1988: 103-105). The following two sites have been assigned to the Classic Starčevo phase: Lánycsók and Medina (Kalicz 1988: 103-104). The following seven sites have been assigned to the Late Starčevo phase: Becsehely I, Dombóvár-Kapos, Kaposvár-Deseda, and Harc-Nyanyapuszta all assigned by Kalicz (1988: 104); and later Gellénháza-Városrét (Simon 1996), Vörs-Máriaasszony-sziget (Kalicz, et al. 1998), and Babarc (Bánffy 2001). Kalicz hypothesized that more sites would eventually be assignable to the Late Starčevo phase as a result of increasing population after initial adoption of agriculture or settlement by agricultural immigrants. More recently investigated sites, such as Gellénháza (Simon 1996, 2001), Vörs-Máriaasszonysziget (Kalicz, et al. 1998: 160-164), and Babarc (Bánffy 2001) have tended to confirm Kalicz's original hypothesis and both sites have been assigned to the Late Starčevo (Spiraloid B phase). Significantly, the site of Babarc is located in close proximity to the ceramic typologically assigned Classic Starčevo Lánycsók site.

The dating of sites in Slavonia using Dimitrijević's chronology indicates that there are no sites from the oldest Monochrome phase. Sites assigned to the Linear A phase are found primarily in south central Slavonia near the Sava River (Zadubravlje, Bukovlje Podvinjsko, Slavonski Brod) with the exception of a single site located in northeastern Slavonia on the Danube River (Erdut). Sites assignable to Kalicz's Classic Starčevo (Dimitrijević's Linear B, Girlandoid, and Spiraloid A phases) are found throughout Slavonia. It is interesting to note that while sites assignable to Kalicz's Late Starčevo (Dimitrijević's Spiraloid B) are distributed throughout Slavonia, the furthest northwestern Starčevo site (Ždralovi) is assignable to this phase. Depending on the degree of confidence one places in Dimitrijević's chronology it is possible to suggest the following steps in the expansion of the Starčevo culture in Transdanubia and Slavonia: 1) initial spread in of the Sava and Danube River valleys; 2) infilling of central Slavonia and northern Slavonia along the lower Drava, as well as, the more eastern regions in Hungarian Transdanubia close to the Danube; and 3) expansion of to the west in Slavonia and to the northwest in southern Hungarian Transdanubia.

A detailed comparison of the Dimitrijević relative ceramic chronology with radiocarbon dates from Starčevo sites throughout their distribution range is difficult given the paucity of radiocarbon dates from Starčevo sites in its northern distribution area of Hungary and Slavonia (Kalicz 1988: 107). Two radiocarbon dates have been reported from two Starčevo sites in Hungary: Becsehely I and Vörs-Máriaasszony-sziget. Becsehely I, assigned to the Late Starčevo by ceramic chronology, has produced a radiocarbon date of 5550-5290 cal. B.C. (2 sig.) (Kalicz 1988: 106-107; 1990: 92). From Vörs-Máriaasszony-sziget a single radiocarbon date, similar to the previous date, from the human burial without grave goods, unearthed by Aradi in 1990, has been reported.

The single radiocarbon date from Becsehely I and Vörs show complete overlap with better dated early LBK site of Brunn-Wolfholz near Vienna. A compilation of the 27 radiocarbon dates from Brunn-Wolfholz indicate a date of occupation of 5700-5050 cal. B.C. (2 sig.) (Stadler 1995: 224). This information suggests, but far from confirms, that the neolithization of Transdanubia progressed northward at a rapid rate, without any major ecological barriers (contra Kertész and Sümegi 1999, 2001), or if such impediments were encountered they were rapidly overcome. On the other hand if the recognized site densities are considered indicative of actual site densities, then it is possible to posit that Early Neolithic groups encountered some type of diffuse environmental resistance, similar to the barrier described by Kertész and Sümegi, as they began to expand northwards through Slavonia and into Hungary. Many questions, pertaining to the temporal and spatial patterning of Neolithic spread, most notably in regard the Middle Neolithic LBK culture in Transdanubia, remain undiscussible in the absence of more radiocarbon dates from the Hungarian sites.

Aftermath of Starčevo: the Linearbandkeramik Culture (LBK)

The effects of the Starčevo culture were significant for not only Transdanubia, but also for the rest of north central Europe. During the middle 6th millennium B.C., roughly 5,500 B.C., the Starčevo culture was transformed throughout its entire distribution in Transdanubia and in its place the Transdanubian Linearbandkeramik (TLBK) (also referred to as Transdanubian Linear Pottery-TLP or Dunántúli Vonaldíszes Kerámia-DVK) culture developed. Within approximately 200 years LBK expanded into north central Europe occupying a 400,000 km^2 region, from the Rhine River in the West to the Bug River in the East (Bogucki 2000; Gronenborn 1999, 2003). The earliest LBK is associated with distinctive incised pottery decorations on chaff or sand tempered pottery, large long houses (Lenneis 2000), and shifts in the subsistence economy from the emphasis of sheep and goats to cattle (Bogucki 1988). However, it is important to note that there remains significant discussion regarding the actual relationship between ceramic typologies and the radiocarbon chronology (Gronenborn 2003: 80-81). The sites of Brunn-Wolfholz and Szentgyörgyvölgy-Pityerdomb, with possible transitional Starčevo-LBK ceramics, have figured prominently in these debates. The centrality of Transdanubia to this process did not become apparent until the middle 1970's, and similar to the research leading to the recognition of the Early Neolithic Starčevo culture in Hungary, the research began outside of Hungary.

The German archaeologist Quitta (1960) presented his synthesis of the earliest Linearbandkeramik (LBK) culture in Germany. Seminal efforts to date LBK in north central Europe indicated that its initial appearance was extraordinarily sudden, probably occurring in less than 200 years (Quitta and Kohl 1969). More recent radiocarbon research, often focusing on the intricacies of calibration and materials being dated, has generally tended to confirm earlier observations regarding the rate of expansion (Stäuble 1995; Whittle 1990). Early on Quitta (1964; 1971) suggested that early LBK sites would be found further to the south, but it was not until the independent and combined efforts of Kalicz and Makkay that undisputable early LBK sites were recognized and excavated. The first sites excavated were Medina (Kalicz and Makkay 1975b, 1976), Bicske I (Makkay 1975, 1978), and Becsehely II (Kalicz 1979). As a result of this research it became clear that the flash pan for early LBK expansion was localizable to the Transdanubian region in western Hungary. Subsequent research has added significantly to our understanding of both the Balkan Early Neolithic Starčevo culture and Middle Neolithic Linearbandkeramik, but by the mid 1970's the underlying framework was in place for asking more serious questions pertaining to the mechanism of agricultural spread in this region.

Since the 1970's a number of significant early LBK sites have been investigated. The sites of Barcs (Kalicz 1993: Abb. 22-23; 1995: Abb.9-11) and Szentgyörgyvölgy-Pityerdomb (Bánffy 2000a, b, c) were excavated near the Drava and Mura Rivers in southwest Hungary. The site of Szentgyörgyvölgy-Pityerdomb is particularly important, because its ceramic assemblage demonstrates the mixing of decorative motifs from Late Starčevo and Early LBK and it may represent transitional phase between Late Starčevo and Early LBK (Bánffy 2000c). Although, Gronenborn (2003) notes that the radiocarbon dates may suggest a spatially and temporally highly complex process of neolithization in Transdanubia. Portions of the recently excavated Balatonszárszó site, a massive site with many long houses on the southern shores of Lake Balaton, will most likely be assignable to the earliest LBK (Oross and Marton personal communication). On the left bank of the Danube River the site of Baja was investigated by Kalicz (Kalicz 1993: Abb. 24-26; 1994; 1995: Abb 12-14). In northern Transdanubia excavations were conducted at the sites of Budapest III-Aranyhegyi út. (Kalicz-Schreiber and Kalicz 1992) and Szigetszentmiklós (Virág 1992). Many of these sites are still in the process of analysis and it is hoped that complete reports will be reported in the near future. Kalicz and Kalicz-Schreiber (2001: 27) remark that the current number of known early LBK sites, assigned by ceramic typology, in Transdanubia is over ninety.

Among the more significant recent work suggesting a role for Mesolithic hunter-gatherers in the LBK spread is Mateiciuvová's research on raw material distribution during the Mesolithic and Early Neolithic (Mateiciucová 2001). She examined the lithic raw materials from a number of assemblages from Mesolithic sites in the Moravia (Czech Republic) with the lithic assemblages from a number of early LBK sites in the region (Mateiciuvová 2001) [see Map Mateiciuvová 2002: 184-185]. In particular she notes the low level presence (<1%) presence of Szentgál radiolarite, a distinct red radiolarite found in the Bakony Mountains north of Lake Balaton in Hungary (Biró and Dobosi 1991; Biró and Regenye 1991), at the Mesolithic sites of Smolín, Přibice, and possibly also Dolní Věstonice. In early LBK assemblages from the Austrian sites of Brunn II (see also Mateiciucová 2002) and Rosenburg I she notes an unusually high percentage (> 50%) of Szentgál radiolarite. Szentgál radiolarite is also present, but at lower levels (< 10%), at the early LBK sites of Kladniky and the cemetery of Vedrovice. Gronenborn has also noted a similar widespread distribution of Szentgál radiolarite amongst early LBK assemblages in Central Europe (Gronenborn 1994, 1999). The early Neolithic LBK societies not only maintained with but also intensified connections with the Szentgál radiolarite sources in Transdanubia. The results of Gronenborn's and Mateiciuvová's are suggestive of the intensification of Mesolithic exchange networks during the early phases of LBK expansion. Unfortunately, the robustness of connections which can be drawn on the basis of lithic raw material economy between the insufficiently investigated Mesolithic Kaposhomok site and Starčevo and LBK sites in Transdanubia is limited to the observation that Szentgál radiolarite is present in the Kaposhomok assemblage (Marton 2003: 41).

The processes which facilitated the LBK expansion undoubtedly included the Starčevo culture; there are simply too many similarities between the ceramic assemblages and other aspects of material culture to suggest otherwise. However, the extent to which the process was entirely the result of internalized Starčevo cultural development, excluding local Mesolithic hunter-gatherer populations, remains an open question. The two greatest uncertainties regarding the neolithization of Transdanubia can be encapsulated in the following questions. First, what was the relationship between Mesolithic hunter-gatherers the Starčevo culture? Second, what role did Mesolithic hunter-gatherers play in the initial development and expansion of LBK? It is puzzling, and by no means easily dismissible, that so few Mesolithic sites have been identified incidental to archaeological fieldwork in Transdanubia. On the other hand, one need only consider that Early Neolithic Starčevo sites, which presumably more detectable in surface surveys than Mesolithic sites, were only recognized during the past quarter century as a result of concerted research efforts. The final section of this paper outlines the initial steps in the development of a sustained research investigating the Mesolithic inhabitants of Transdanubia prior to and during the spread of agriculture.

Research Directions for the Mesolithic of Hungary

Over the course of my Fulbright fellowship to Hungary I have had the opportunity to directly confront the topic of the spread of agriculture in the Carpathian Basin. A significant amount of time and energy has been devoted to developing a thorough understanding of the research history, familiarity with the artifacts (stone tools, pottery, etc.), and long-term changes in Hungarian environment. In Transdanubia the Early Neolithic Starčevo culture and the Mesolithic in particular, stand out as areas in need of further development. Previous approaches to the spread of agriculture in Hungary have primarily confronted the process from the perspective of the earliest Neolithic societies. One of the principal causes for this one-sided approach is the minimal and insufficiently investigated archaeological evidence available from Holocene hunter-gatherer societies. In a general sense, current models positing a significant role for Mesolithic hunter-gatherers in the spread of agriculture, or at the very least seeking to incorporate hunter-gatherers into the process, have stimulated thought on the complex process by which agricultural societies may have spread. However, narrowly focusing on the process by which agricultural societies spread without incorporating long-term trends in hunter-gatherer social evolution obfuscates an absolutely pertinent issue: roughly 4000 years of Early Holocene prehistory in western Hungary has gone missing. Given the current information available it is difficult to conceptualize the spread of agricultural societies without first attempting to reconcile the gross imparities between agricultural and hunter-gatherer societies, reflecting more than anything the availability of evidence.

The virtual lack of Mesolithic sites in Transdanubia, in juxtaposition with the significance of the region during the spread of agriculture, presents a rather drab picture of one of the more exciting moments in prehistory. I have been fortunate to have found several of likeminded Hungarian archaeologists (Dr. Eszter Bánffy, Dr. Róbert Kertész, and Tibor Marton), and we have embarked on a collaborative mission to add a little Mesolithic color and clarity to the picture of neolithization in Transdanubia. The principal question stimulating research on the Transdanubian Mesolithic has been: How can we explain an almost complete lack of evidence from the Mesolithic in western Hungary? In addressing this question several interrelated causes may be postulated: 1) high-mobility Holocene hunter-gatherers produced ephemeral sites difficult to detect; 2) Mesolithic sites have been eroded, buried, transgressed by rising water levels (e.g. Lake Balaton), or negatively impacted by other geological or anthropogenic processes; 3) previous survey work was insufficiently sensitive to detect Mesolithic sites. Thus the issue of the missing Mesolithic revolves around the site producing behavior of the hunter-gatherers themselves, the deposition and preservation conditions, and the manner in which archaeologists detect sites (for futher discussion see Banning 2002). Some initial impressions on the possible role of all three are in order.

First, as outlined in earlier sections of this paper, hunter-gatherers had to rapidly adapt to a changing environment during the Pleistocene-Holocene transition. Changes in resource distribution undoubtedly stimulated changes in the organization of seasonal settlement patterns. The extent to which Mesolithic hunter-gatherer behavior was centered on particular locations on the landscape directly impacts the degree to which archaeologists are able to recognize such sites. To a certain extent, locations occupied for extended periods of time, by large groups, or consistently revisited are more likely to be detected, but only if the material refuse left behind has been preserved. It is thus possible that sites occupied for shorter periods, but associated with activities producing easily preserved refuse, may also be more easily detected by archaeologists. Furthermore, the diagnostic attributes of the refuse produced at each site will impact its likelihood of detection. For example, an intensively occupied site with a significant amount of lithic waste, but no diagnostic geometric microliths, will probably not be recognized as a Mesolithic site. At this point we do not know whether Mesolithic hunter-gatherers in Transdanubia produced the type of intensive sites necessary for further archaeological investigation. However, both general models for hunter-gatherer settlement, often based on ethnographic examples, as well as, the archaeological evidence from preceding periods and adjacent regions suggest that such central sites existed during the Mesolithic for a variety of social and economic reasons. For example, the importance of aquatic resources and riparian corridors is attested by the evidence from the Late Pleistocene site of Szekszárd-Palánk (Sio River), the probable Mesolithic site of Kaposhomok (Kapos River), and the Jászság Mesolithic sites (Tarna and Zagyva River). In an effort to produce positive results river valleys or other areas with the potential for rich aquatic resources are first on the list of places to explore. It is equally important to keep in mind the full spectrum of factors, other than resource distribution, which structured hunter-gatherer settlement patterns and behavior (Jochim 1976: 47-63; Wiessner 1982, 2002; Wobst 1974). Kelly states:

> We need to approach archaeology not with the goal of assigning a site or time period to a particular typological pigeonhole, but with the intention of reconstructing different cultural elements – diet, mobility, demography, land tenure, social organization- as best we can, then assemble them, like piecing together a jigsaw puzzle with no picture on the box. (Kelly 1995: 343)

The usage of both archaeological and ethnographic analogies in the description of hunter-gather behavior should always be tempered with the notion that we seek to describe a situation for which no appropriate modern analogy may exist.

Second, over the past 12,000 years geological processes resulting from natural and anthropogenic causes, or a combination of both, impact the ability to detect Mesolithic sites (e.g. see Waters 1992). Fortunately, the thick depositing of loess sediments at the end of the Pleistocene, which resulted in the burial of many Late Paleolithic sites, is less of a factor during the Early Holocene. The landscape has however remained far from stable. For example the shifting of river channels, low energy flood deposits, erosion of hillsides due to prehistoric logging, and modern farming practices all can erode, expose, or bury archaeological sites. The identification of stable surfaces through cooperation with geomorphologists will be an important component of a project aiming to find Mesolithic sites. Archaeological survey design must account for modern land use practices affecting the exposure (e.g. plowing, quarrying, etc.) or coverage (e.g. forest, pasture, etc.) of land surfaces.

Third, there has been no archaeological survey specifically directed toward the detection of Mesolithic sites in western Hungary. Archaeological surveys conducted during the last century in Hungary have focused almost exclusively on surfaces exposed by modern agricultural practices. This may work well in regions were most of the land is under the plow (e.g. Alföld), but in areas with variable exposure, such as Transdanubia, it may be more difficult to representatively sample the landscape. The results of larger surveys in Veszprém County (M.R.T.) and smaller surveys along the Kapos and Koppány rivers (Torma 1963) have turned up only sites from the Neolithic or later periods (all ceramic using). Unlike most later prehistoric periods in which the presence of ceramics greatly increases the odds of site detection, finding small Mesolithic geometric microliths is highly dependent upon the soil surface conditions. Namely, personal experience suggests that such sites are easily missed if plowed surfaces have not been deflated by precipitation or remain covered in vegetation. The window of opportunity for detecting Mesolithic sites may be narrowly assignable to short periods before planting in the spring and after harvest in the fall.

Finally, the recognition of Mesolithic sites depends upon our ability to detect diagnostically Mesolithic artifacts; almost exclusively limited to lithics. Prior to Kertész's work in the Jászság region in the 1990's there was only a limited sense of the types of stone artifacts which might be associated with the Mesolithic Hungary, much less Transdanubia. The image of an ill-defined edifice lurking amongst more visible trappings of later prehistoric remains is not prone to ease of recognition. It now seems relatively clear that Transdanubia, sandwiched between the influences of the Western Technocomplex (Beuronian, Sauveterrian) and the North Hungarian Plain Mesolithic, will be characterized to a certain extent by a similar mix of Epigravettian substrata with elements of the Western Technocomplex: a situation suggested by the Kaposhomok site (Marton 2003: 42). In the initial stages of archaeological field survey one of the central goals will be to locate isolated sites that are both free from materials associated with either Neolithic or Copper Age cultures and not sufficiently damaged by later cultural activities: not necessarily the easiest task given that narrow river valleys have witnessed intensive cultural activity during all subsequent time periods. A constant challenge will be dealing with geometric microlith types which are not temporally restricted to the Mesolithic and appear in later periods, such as trapezes and segments.

Preliminary Research Results

The research that my Hungarian colleagues and I have been engaged in over the past year has focused on the following investigative arenas: 1) the reinvestigation of sites which have been claimed to be Mesolithic, but which have only marginally been investigated; and 2) prospective survey work aimed at locating potential sites, necessarily involving the cooperation of local amateur archaeologists. Both avenues of inquiry have required the examination of museum and private collections, as well as, the organization of field projects aimed at locating/relocating and documenting sites.

First, we decided to focus on the Kapos River valley for two reasons: 1) location of the minimally investigated probable Mesolithic site of Kaposhomok (Marton

2003; Pusztai 1957); and 2) a possible Mesolithic site near Regöly brought to Kertész's attention in the early 1990's by Mr. Viktor Cziráki. In the fall of 2003 we organized a small prospective archaeological survey with a number of university student volunteers from Miskolc. The purpose of our research was to investigate the sites near Regöly and Kaposhomok, as well as, to familiarize ourselves with the geography and look for new sites along the Kapos floodplain between Regöly and Kaposhomok.

The results of the survey for new sites lead to the discovery of two new sites of interest: one south west of Belecska (Belecska-3) and a second north of Kurd (Kurd-2). Both sites were located along abandoned meanders of the Kapos River. Belecska-2 was deemed interesting on the basis of the recovery of a triangular geometric microlith; although, a scatter of ceramic sherds of uncertain age was located immediately adjacent to the lithic scatter. Kurd-2 was identified as a larger concentration of lithic artifacts with Bronze Age ceramics present on the extreme margin of the site. No diagnostic materials were recovered. Another significant result of this survey was the identification of areas of high potential that could not be immediately investigated, due to fresh plowing or vegetation coverage, but represent targets for the future.

The site near Regöly (Regöly-2) had been collected by Mr. Cziráki for approximately 15 years, and he brought the site to Kertész's attention, because the site had yielded numerous lithic artifacts with only a few ceramic sherds that could be clearly assigned to the Late Iron Age or Roman period. Survey of Regöly-2 was hampered by poor lighting conditions and weather, but Mr. Cziráki kindly provided us with his entire collection of materials from this site for further study. These materials are currently in the process of being examined, and preliminary observations on the collection suggest the following: 1) significant presence of Bakony Mountain radiolarites (e.g. Szentgál); 2) high proportion of flakes and blades which were either informally retouched or damaged during usage; 3) numerous "thumbnail" scrapers and trapezes, but no segments; and 4) presence of sickle gloss on a number of the artifacts, including a biface type associated with Copper Age assemblages. The overall character of the assemblage is one, with a few exceptions, that would fit well within what we suspect a Transdanubian Mesolithic assemblage may look like. The presence of sickle gloss on stone tools is often given as the cause for assigning an assemblage to the Neolithic or later periods; however, this practice ignores the fact that reeds and other grasses, which may also produce sickle gloss, were likely to have been intensively exploited by Mesolithic people for basketry, clothing, and shelter. The almost complete lack of ceramic material and total dominance of lithic items strongly suggests that the site was probably occupied by non-pottery using groups. As a result of these preliminary observations we returned to intensively survey the Regöly-2 site in early April of 2004. We were able to identify concentrations of lithics on the surface of the site, and it seems that the presence of ceramic from later stone tool using cultures is minimal to non-existent. We are planning small scale excavations in the fall of 2004 to determine if intact cultural layers are present below the plow zone, and also the nature of such cultural layers, if present. Immediately prior to the submission of this paper a second site was identified near Regöly that produced two diagnostically Mesolithic segments (backed retouch from alternating directions) and an interesting backed blade.

The site of Kaposhomok was first identified and collected by Mr. Antál Trombitás in the early 1950's. In the middle 1950's Mr. Trombitás brought the site to the attention of Rezső Pusztai who apparently investigated the find location, but probably did not conduct excavations or other form of intensive investigations (Pusztai 1957). The artifacts were subsequently donated to the Rippl-Rónai Museum in Kaposvár. The site has since come to be accepted in the international literature as the only legitimate Mesolithic site in Transdanubia (e.g. Kozlowski 2001), but numerous questions remain regarding the context of the finds (Marton 2003: 42). According to the maps in Pusztai's article (1957: 97), there are two sites from which the Kaposhomok collection originates. However, we encountered some difficulty in locating the site. The western most area indicated on the map was in a plowed field but we were unable locate any concentration of chipped stone artifacts. The eastern site on Pusztai's map, apparently situated on a large sand dune next to an abandoned meander of the Kapos River, was covered in pasture. With help from the good citizens of Kaposhomok, we were able to locate Mr. Trombitás, now 74 years old and living in Kaposvár. Mr. Trombitás informed us that the western site was not the site from which the collection had originated, and the eastern site was the true location from which the Kaposhomok artifacts had been collected. He further stated that while he was serving in the army, László Vertés had selected several pieces from the original collection and accessioned them into the collections of the Hungarian National Museum in Budapest. Furthermore, Mr. Trombitás related that he had retained 61 of the chipped stone artifacts from the original collection: This may account for some of the discrepancies noted by Marton (2003: 39) regarding Pusztai's mention of more than 100 artifacts, while only 49 artifacts catalogued and of which 34 were locatable in the Rippl-Rónai Museum. Mr. Trombitás has since lent us the remainder of his collection and has agreed to accompany us to the Kaposhomok site to help clarify the situation. We are planning to conduct small scale excavations at Kaposhomok during the summer of 2004 in the hopes of defining the actual site location and searching for undamaged cultural deposits.

Finally, we our research program also includes the review of materials recovered from sites in countries adjacent to Hungary. The collection from Barca I in Slovakia is currently in the process of examination and the site of Nosza-Pörös near Hajdukova in northern Serbia. Nosza-Pörös was originally reported by Brukner as the Hajdukova site, and in the original article he suggest that the site may be Mesolithic (Brukner 1966). In his article Brukner also presented illustrations of six geometric microliths (segments and trapezes). Tibor Marton later encountered a publication from the Subotica museum, in which more suspicious geometric microliths were pictured. This March we visited the Subotica Museum, and with the gracious assistance of Ágnes Szekeres, were able to relocate and fully document this collection. Among the significant discoveries were two backed points which fit within the Late Epigravettian tradition: this is quite peculiar given that the collection also includes numerous trapezes (Castelnovian influences), which seem to indicate a later period of site occupation. Like many potential Mesolithic sites in southeastern Europe, this site comes from surface collections and its context is uncertain. This summer we plan to return to Subotica and attempt to relocate the Nosza-Pörös site.

Conclusion

Currently the question of how agriculture spread in the Carpathian basin is trumped by the question of who was involved. Certainly, it is not possible to avoid discussing questions of process until the moment when we have perfectly comprehended the different participants. Such moments of total comprehension do not exist in archaeology. The different ways in which researchers construe the processes of neolithization play an important role in directing inquiry into the identification of participants. Implicitly neglecting the question of the participants will unnecessarily limit our ability to develop a richer picture of the past. It has been my goal to draw attention to the limitations of archaeological information bearing on the different participants, and especially Mesolithic participants, in the neolithization of Transdanubia and Europe. The steps my Hungarian colleagues and I have initiated are directed at establishing informational parity amongst the various participants in the process of neolithization. It is our hope that this research may substantially enrich the manner in which both researchers and the public understand this important prehistoric period.

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References

Arandjelovic, D. and D. Garašanin

1954 *Starcevacka Kultura*, Ljubljana.

Bánffy, E.

2000a The Late Starcevo and the Earliest Linear Pottery Groups in Western Transdanubia. *Documenta Praehistorica* 27:173-185.

2000b Neue Daten zur Enstehung der Bandkeramik. In *Karanovo III. Beiträge zum Neolithikum in Südosteuropa*, edited by S. Hiller and V. Nikolov, pp. 375-382, Wein.

2000c Starcevo und/oder LBK? *Varia Neolithica* 1:47-60.

2001 Neue Funde der Starcevo-Kultur in Südtransdanubien. In *Bibleotheca Historica et Archaeologica Banatica: Festschrift für Gheorghe Lazarovici: Zum 60. Geburtstag*, edited by F. Drasovean, pp. 41-58. vol. 15. Museum Banaticum Temesiense, Timisoara.

Banner, J.

1943 Az Újabbkőkori Lakóházkutatás Mai Állása Magyarországon. *Archaeologiai Értesítő (Budapest)* 4:1-28.

Banning, E. B.

2002 *Archaeological Survey*. Manuals in Archaeological Method, Theory, and Technique. Kluwer Academic/Plenum Publishers, New York.

Bárta, J.

1955 Tomášikovo, mezolitická stanica na Slovensku. *Archaeologické Royhledy (Praha)* 7:433-436.

1957 Pleistocénne piesocné duny pri Seredi a ich paleolitické a mezolitické osídlenie - Pleistozäne Sanddünen bei Sered und ihre paläolithische und mesolithiche Besiedlung. *Slovenská Archaeológia (Bratislava)* 5(1):5-72.

1960 Mezolitická industria z Mostovej pri Galante. *Archaeologické Royhledy (Praha)* 12:785-790.

1965 *Slovensko v Staršej a stredej dobe kamennej*, Bratislava.

1972 Die mittlere Steinzeit in der Slowakei. *Acta Praehistorica et Archaeologica (Berlin)* 3:57-76.

1973 Le Mésolithique en Slovaquie. In *The Mesolithic in Europe: Papers Read at the International Archaeological Symposium on the Mesolithic in Europe, Warsaw, May, 7 - 12, 1973*, edited by S. K. Kozlowski, pp. 53 - 75. Warsaw University Press, Warsaw.

1980a Das Mesolithikum im Nordwestlichen Teil des Karpatenbeckens. *Veröffentlichungen des Museums für Ur- und Frühgeschichte (Potsdam)* 14-15:295-300.

1980b Paleolit a mezolit - Paläolithikum und Mesolithikum. *Slovenská Archaeológia (Bratislava)* 28:119-136.

1985 Hunting of Brown Bears in the Mesolithic: Evidence from Medvedia Cave Near Ružín in Slovakia. In *The Mesolithic in Europe*, edited by C. Bonsall, pp. 456-460. John Donald Publishers, Edinburgh.

1990 Mezolitickí Lovci v Medvedej Jaskyni Pri Ružíne - Chasseurs Mésolithiques de la Grotte des Ours (Medvedia Jaskyna), Près de Ružín (dist. Košice). *Slovenská Archaeológia (Bratislava)* 38(1):30.

Bar-Yosef, O. and R. H. Meadow

1995 The Origins of Agriculture in the Near East. In *Last Hunters - First Farmers*, edited by A. B. Gebauer, pp. 39-94. School of American Research Press, Sante Fe.

Berg, F. and A. Gulder

1956 Vorläufiger Bericht über eine neue niederösterreichische Mesolithstation aus Kamegg im Kamptal. *Archaeologia Austriaca (Wein)* 19-20:49-62.

Bergman, C. A.

1993 The Development of the Bow in Western Europe: A Technological and Functional Perspective. In *Hunting and Animal Exploitation in the Later Palaeolithic and Mesolithic of Eurasia*, edited by P. Mellars, pp. 95-106. Archaeological Papers of the American Anthropological Association Number 4.

Binford, L. R.

1990 Mobility, Housing and Environment: A Comparative Study. *Journal of Anthropological Research* 46(2):119-152.

2001 *Constructing Frames of Reference: An Analytical Method for Archaeological Theory Building Using Hunter-Gatherer and Environmental Data Sets*. University of California Press, Berkeley.

Biró, K. T.

1992 Mencshely-Murvagödrök Kőanyaga. - Steinartefacte aus neue Grabungen von Mencshely. *Tapolcai Városi Múzeum Közleményei (Tapolca)* 2 (1991/1992):51-72.

2002 Advances in the Study of Early Neolithic Lithic Materials in Hungary. In *Prehistoric Studies in memorium Ida Bognár-Kutzián*, edited by E. Bánffy, pp. 119-168. vol. *Antaeus* (25), Budapest.

Biró, K. T. and V. T. Dobosi

1991 *Lithotheca: Comparative Raw Material Collection of the Hungarian National Museum*. Magyar Nemzeti Múzeum, Budapest.

Biró, K. T. and J. Regenye

1991 Prehistoric Workshop and Exploitation site at Szentgál-Tüzköveshegy. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 43:337-375.

Biró, K. T. and K. H. Simon

2003 Lithic Material of the Starcevo Culture at Gellénháza-Városrét. In *Morgenrot der Kulturen: Frühe Etappen der Menschheitsgeschichte in Mittel- und Südosteuropa - Festschrift für Nándor Kalicz zum 75. Geburtstag*, edited by E. Jerem and P. Raczky, pp. 115-126. Archaeolingua, Budapest.

Bognár-Kutzián, I.

1977 Ausgrabung in Szakmár-Kisülés im Jahre 1975. *Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften (Budapest)* 7:13-16 and 165-167.

Bogucki, P.

1988 *Forest Farmers and Stockherders: Early Agriculture and its Consequences in North-Central Europe*. Cambridge University Press, Cambridge.

2000 How Agriculture Came to North-central Europe. In *Europe's First Farmers*, edited by T. D. Price, pp. 197-218. Cambridge University Press, Cambridge.

Bökönyi, S.

1972 Auroch (Bos Primigenius Boj.) Remains from the Õrjeg Peat-Bogs Between the Danube and Tisza Rivers. *Cumania (Kecskemét)* 1:17-56.

1974 *History of Domestic Mammals in Central and Eastern Europe*, Budapest.

1989 Animal Husbandry of the Körös-Starcevo Complex: Its Origin and Development. In *Neolithic of Southeastern Europe and Its Near Eastern Connections: International Conference 1987 Szolnok-Szeged*, edited by S. Bökönyi, pp. 13-16. Varia Archaeologica Hungarica II. Publicationes Instituti Archaeologici Academiae Scientiarum Hungaricae Budapestini, Budapest.

1992 The Early Neolithic Vertebrate Fuana of Endrod 119. In *Cultural and Landscape Changes in South-East Hungary I: Reports on the Gyomaendrod Project*, edited by S. Bökönyi, pp. 195-300. vol. 1. 2 vols. Archaeolingua, Budapest.

Brukner, B.

1966 Die tardenoisienischen Funde von "Peres" bei Hajdukovó und aus Backa Palanka und das Problem der Beziehungen zwischen dem Mesolithikum und präkeramischen Neolithikum im Donaugebiet. *Archaeologia Iugoslavica (Beograd)* 7:1-12.

1974 The Early Neolithic Period. In *Praihistorija Vojvodine - Vojvodina in Prehistory*, edited by B. Brukner, B. Jovanovic and N. Tasic, pp. 29-68; 429-433. Monumenta Archaeologica 1, Novi Sad.

Chapman, J. C.

1985 Demographic Trends in Neothermal South-East Europe. In *The Mesolithic in Europe*, edited by C. Bonsall. John Donald Publishers, Edinburgh.

2003 From Franchthi to the Tiszazug: Two Early Neolithic Worlds. In *Morgenrot der Kulturen: Frühe Etappen der Menschheitsgeschichte in Mittel- und Südosteuropa - Festschrift für Nándor Kalicz zum 75. Geburtstag*, edited by E. Jerem and P. Raczky, pp. 89-108. Archaeolingua, Budapest.

Childe, V. G.

1929 *The Danube in Prehistory*. Clarendon Press, Oxford.

Dimitrijevic, S.

1966 Arheološka iskopavanja na Podrucju vinkovackog Muzja. In *Ergebnisse archäologischer Ausgrabunge auf dem Gebit des Museums von Vinkovci von 1957 bis 1963*, Vinkovci.

1969 Das Neolithikum in Syrmien, Slawonien und Nordwestkroatien - Einführung in den Stand der Forschung. *Archaeologia Iugoslavica (Beograd)* 10:39-76.

1971 Zu einigen Fragen des Spätneolithikums und Frühneolithikums in Nordjugoslawien. In *Actes du VIII Congres International des Sciences Prehistoriques et Protohistoriques Beograd 9-15 septembre 1971*, edited by G. Novak, pp. 141-172. vol. Tom. I, Beograd.

1974 Das Problem der Gliederung der Starcevo-Kultur mit besonderer Rücksicht auf den Beitrag der südpannonischen Fundstellen zur Lösung dieses Problems. *Materijali* 10:93-115.

1978 Das Neolithikum in Nordwestkoatien - Arheološka istraživanja u Sjeverozapadnoj Hrvatskoj, pp. 71-128, Zagreb.

1979 Sjeverna Zona. In *Praistorija jugoslavenskih zemalj*, edited by A. Benac, pp. 229-360. vol. Band II: Neolitsko doba, Sarajevo.

Dobosi, V. T.

1975 Magyarország Õs- és Középsőkőkori Lelőhely Katasztere. *Archaeologiai Értesítő (Budapest)* 102:64-76.

1989 Madaras-Téglevető Felsőpaleolit Telep, Régészeti Feldolgozás. *Cumania* 11:45-58.

2001 Antecedents: Upper Paleolithic in the Jászság Region. In *From the Mesolithic to the Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996*, edited by R. Kertész and J. Makkay, pp. 177-192. Archaeolingua, Budapest.

Dobosi, V. T. and E. Kövecses-Varga

1991 Upper Palaeolithic Site at Esztergom-Gyurgyalag. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 43:233-255.

Domboróczki, L.

1997 Füzesabony-Gubakút. Újkökori Falu a Kr. e. VI Évezredböl. - Neolithic Village From the 6th Millenium B. C. In *Utak a Múltba. - Path into the Past*, edited by P. Raczky, pp. 19-27, Budapest.

2001 The Excavation at Füzesabony-Gubakút: Preliminary Report. In *From the Mesolithic to the Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996*, edited by R. Kertész and J. Makkay, pp. 193-214. Archaeolingua, Budapest.

2003 Radiocarbon Data from Neolithic Archaeological Sites in Heves County (North-Eastern Hungary). *Agria (Eger)* 39:5-71.

Ecsedy, I.

1978 Excavations at Lánycsók in 1976 (Preliminary Report). *Janus Pannonius Múzeum Évkönyve (Pécs)* 22 (1977):119-135.

Fisher, L. E.

2002 Mobility, Search Modes, and Food-Getting Technology: From Magdalenian to Early Mesolithic in the UPpper Danube Basin. In *Beyond Foraging and Collecting: Evolutionary Change in Hunter-Gatherer Settlement Systems*, edited by J. Habu, pp. 157-180. Fundamental Issues in Archaeology, T. D. Price, general editor. Kluwer Academic / Plenum Publishers, New York.

Fitzhugh, B. and J. Habu (editors)

2002 *Beyond Foraging and Collecting: Evolutionary Change in Hunter-Gatherer Settlement Systems*. Kluwer Academic / Plenum Publishers, New York.

Füzes, M.

1990 Földmívelés Kezdeti Szakaszának (Neolitikum és Rézkor) Növényleletei Magyaroszágon (Archeobotanikai Vázlat) - Die Pflanzenfunde in Ungarn der anfänglichen Entwicklungsfase des Ackerbaues (Neolithicum und Kupferzeit)Archaeobotanische Skizze. *Tapolcai Városi Múzeum Közleményei (Tapolca)* 1:139-238.

Gábori, M.

1956a Az Epipaleolitikum Lelőhelye Honton. *Archaeologiai Értesítő (Budapest)* 83:125-138.

1956b Mezolitikus leletek Sződligetről - Mesolithische Funde von Sződliget. *Archaeologiai Értesítő (Budapest)* 83:177-182.

1964 *A Későí Paleolitikum Magyarországon*. Akadémiai Kiadó, Budapest.

1968 Mesolithischer Zeltgrundriß in Sződliget. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 20:33-36.

1981 Az Õsember Korának Kutatása Magyarországon. *A Magzar Tudományos Akadémia Társadalmi-Töténeti Osztályának Közleményei* 30(1):91-109.

1984 A Régibb Kőkor Magyarországon. In *Magyarország Története I.: Elözmények és Magyar Történet 1242-ig I-II*, edited by G. Székely, pp. 69-116, Budapest.

Gábori, M. and V. Gábori

1959 Der erste Paläolithische Hausgrundriß in Ungarn. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 9:19-34.

Gallus, M.

1942 Győr Története a Kőkortól a Bronzkorig. In *Győr Története a Vaskorszakig*, edited by M. Gallus and S. Mithay, pp. 14-31 and plates, Győr.

Garašanin, D.

1959 Nosa, Biserna Obala. *AP* 1.

Gronenborn, D.

1994 Überlegungen zur Ausbreitung der bäuerlichen Wirtschaft in Mitteleuropa - Versuch einer kulturhistorischen Interpretation atestbandkeramischer Silexinventare. *Praehistorische Zeitschrift (Berlin-New York)* 69(2):135-151.

1999 A Variation on a Basic Theme: The Transition to Farming in Southern Central Europe. *Journal of World Prehistory* 13(2):123-210.

2003 Migration, acculturation and Culture Change in Western Temperate Eurasia, 6500-5000 cal BC. *Documenta Praehistorica* 15:79-91.

Gulder, A.
1953 Beiträge zur Kenntnis des Niederösterreichischen Mesolithikums. *Archaeologia Austriaca (Wein)* 12:5-32.

Harris, D. R.
1990 Vavilov's Concept of Centres of Origin of Cultivated Plants: Its Genesis and Its Influence on the Study of Agricultural Origins. *Biological Journal of the Linnean Society* 39:7-16.

1996 *The Origins and Spread of Agriculture and Pastoralism in Eurasia*. University College London Press, London.

Hertelendi, E., N. Kalicz, P. Raczky, F. Horváth, M. Veres, É. Svingor, I. Futó and L. Bartosiewicz
1995 Re-evaluation of the Neolithic in Eastern Hungary Base on Calibrated Radiocarbon Dates. *Radiocarbon* 37(2):239-244.

Hertelendi, E., É. Svingor, P. Raczky, F. Horváth, I. Futó, L. Bartosiewicz and M. Molnár
1998 Radiocarbon Chronology of the Neolithic and Time Span of Tell Settlements in Eastern Hungary Based on Calibrated Radiocarbon Dates. In *Archaeometrical Research in Hungary II.*, edited by L. Költö and L. Bartosiewicz, pp. 61-69. Hungarian National Museum, Budapest.

Holliday, T. W.
1998 The Ecological Context of Trapping among Recent Hunter-Gatherers: Implications for Subsistence in Terminal Pleistocene Europe. *Current Anthropology* 39(5):711-720.

Horváth, A.
1983a Kunadacs-Községi Temető. *Régészeti Füzetek (Budapest)* 36:19.

1983b Kunpeszér-Felsőpeszéri út. *Régészeti Füzetek (Budapest)* 36:56-57.

1985a Kunadacs-Köztemető. *Régészeti Füzetek (Budapest)* 38:17.

1985b Kunpeszér-Felsőpeszéri út, Homokbánya. *Régészeti Füzetek (Budapest)* 38:65.

1985c Kunpeszérü-Felsőpeszéri Str., Sandgrube. *Archaeologiai Értesítő (Budapest)* 112:281-282.

Horváth, A. and E. H. Tóth
1984a Kunpeszér-Felsőpeszéri út-homokbánya. *Régészeti Füzetek (Budapest)* 37:62.

1984b Kunpeszérü-Felsőpeszéri Str.-Sandgrube. *Archaeologiai Értesítő (Budapest)* 111:269-270.

Horváth, F.
1989 A Survey on the Development of Neolithic Settlement Pattern and House Types in the Tisza Region. In *Neolithic of Southeastern Europe and Its Near Eastern Connections: International Conference 1987 Szolnok-Szeged*, edited by S. Bökönyi, pp. 85-102. Varia Archaeologica Hungarica II. Publicationes Instituti Archaeologici Academiae Scientiarum Hungaricae Budapestini, Budapest.

Horváth, F. and E. Hertelendi
1994 Contribution to the 14C Based Absolute Chronology of the Early and Middle Neolithic Tisza Region. *Jósa András Múzeum Évkönyve (Nyíregyháza)* 36:111-133.

Jochim, M. A.
1976 *Hunter-Gatherer Subsistence and Settlement: A Predictive Model*. Studies in Archaeology. Academic Press, New York.

Kalicz, N.
1978 Früh- und spätneolithische Funde in der Gemarkung des Ortes Lánycsók (Vorbericht). *Janus Pannonius Múzeum Évkönyve (Pécs)* 22 (1977):137-158.

1979 Ausgrabungen: Becsehely. *Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften (Budapest)* 8/9:119-120.

1980 Neuer Forschungen über die Entstehung des Neolithikums in Ungarn. In *Problèmes de la néolithisation dans certaines régions de l'Europe*, edited by J. K. Kozlowski and J. Machnik, pp. 97-122, Wroclaw-Warszawa-Kraków-Gdansk.

1983 Die Körös-Starcevo-Kulturen und ihre Beziehungen zur Linearbandkeramik. *Nachrichten aus Niedersachsen Urgeschichte* 52:91-130.

1988 *A Termelőgazdálkodás Kezdetei a Dunántúlon - Neolitikum.* Doktori Értekezés - unpublished Doctoral Dissertation.

1990 *Frühneolithische Siedlungsfunde aus Südwestungarn*. Inventaria Praehistorica Hungariae 4. Magyar Nemzeti Múzeum - Hungarian National Museum, Budapest.

1993 The Early Phases of the Neolithic in Western Hungary (Transdanubia). *Porocilo Raziskovanju Paleolita, Neolita in Eneolita v Sloveniji (Ljubljana)* 21:85-135.

1994 A Dunántúli (Közép-Európai) Vonaldíszes Kerámia Legidősebb Leletei és a Korai Vinca Kultúra. In *A Kőkortól a Középkorig*, edited by G. Lörinczy, pp. 67-84, Szeged.

1995 Die älteste transdanubiche (mitteleuropäische) Lienenbandkeramik: Aspekte zu Ursprung, Chronologie un Beziehungen. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 47:23-59.

Kalicz, N., K. T. Biró and Z. M. Virág

2002 Vörs, Máriaasszony-sziget. In *Régészeti Kutatások Magyarországon 1999 -Archaeological Investigation in Hungary 1999*, pp. 15-26. Kulturális Örökségvédelmi Hivatal és Magyar Nemzeti Múzeum, Budapest.

Kalicz, N. and R. Kalicz-Schreiber

2001 Die Verbreitungsgrenze der frühneolithischen Kulturen in Transdanubien (Westungarn). *Preistoria Alpina (Trento)* 37:25-44.

Kalicz, N. and J. Makkay

1972a Probleme des frühen Neolithikums der Nördlichen Tiefebene. *Alba Regia (Székesfehérvár)* 12:77-92.

1972b Südliche Einflüsse im frühen und mittleren Neolithikum Transdanubiens. *Alba Regia (Székesfehérvár)* 12:93-105.

1975a A Dél-dunántuli Neolithikum Kutatásának Fontosabb Kérdései. *Somogy Megyei Múzeumi Közlemények (Kaposvár)* 2:253-258.

1975b Medina. *Régészeti Füzetek (Budapest)* 28 (Az 1974 év régésteti kutataásai):15-16.

1976 Medina-Margitsziget Ausgrabungen. *Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften (Budapest)* 6:148.

1977 *Die Linienbandkeramik in der Großen Ungarischen Tiefebene*. Studia Archaeologica, Budapest.

Kalicz, N. and P. Raczky

1981 Siedlung der Körös-Kultur in Szolnok-Szanda. *Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften (Budapest)* 10/11 (1980-1981):14-24 and 329-341.

Kalicz, N., Z. M. Virág and K. T. Biró

1998 The Northern Periphery of the Early Neolithic Starcevo Culture in South-Western Hunngary: A Case Study of an Excavation at Lake Balaton. *Documenta Praehistorica* 25:151-187.

Kalicz-Schreiber, R. and N. Kalicz

1992 Die erste frühneolithische Fundstelle in Budapest. *Balcanica* 23:47-76.

Kelly, R. L.

1995 *The Foraging Spectrum: Diversity in Hunter-Gatherer Lifeways*. Smithsonian Institution Press, Washington D. C.

Kertész, R.

1991 Preliminary Report on the Research of Early Holocene Period in the NW Part of Great Hungarian Plain. *FHNMM* 16:29-44.

1993 Data to the Mesolithic of the Great Hungarian Plain. - Adatok a Nagyalföld Mezolititkumához. *Tisicum* 8:81-104.

1994 Late Mesolithic Chipped Stone Industry from the Site Jásztelek I (Hungary). - Késő Mezolit Pattintott Kőipar Jásztelek I lelőhelyröl. In *A Kőkortól a Középkorig*, edited by G. Lörinczy, pp. 23-44, Szeged.

1995 Előzetes Jelentés Jászberény IV Mezolit Lelőhely Kőiparáról. In *Tanulmányok és Közlemények*, edited by Z. Ujváry, pp. 15-25, Debrecen and Szolnok.

1996a Megjegyezések a Észak-Alföldi Mezolit Ipar Elterjedéséhez és Kronológiájához. *Múzeumi Levelek (Szolnok)* 75(1):11-32.

1996b The Mesolithic in the Great Hungarian Plain: A Survey of the Evidence. In *At the Fringes of Three Worlds: Hunter-Gatherers and Farmers in the Middle Tisza Valley*, edited by L. Tálas, pp. 5-34. Damjanich Museum Press, Szolnok.

1996c A New Site of the Northern Hungarian Plain Mesolithic Industry in the Jászság Area (Jászberény IV). *Tisicum (Szolnok)* 9:27-44.

2001 Kökori Vadászok. - Mesolithic Hunters. *Jász Múzeum Évkönyv* 1975-2000:37-64.

2002 Mesolithic Hunter-Gatherers in the Northwestern Part of the Great Hungarian Plain. *Praehistoria* 3:281-304.

Kertész, R. and P. Sümegi

1999 Teóriák, Kritika És Egy Modell: Miért Állt Meg A Körös-Starcevo Kultúra Terjedése A Kárpát-Medence Centrumában? *Tisicum: A Jász-Nagykun-Szolnok Megyei Múzeumok Évkönyve (Szolnok)* XI:9-23.

2001 Theories, Critiques and a Model: Why Did the Expansion of the Körös-Starcevo Culture Stop in the Centre of the Carpathian Basin? In *From the Mesolithic to the Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996*, edited by R. Kertész and J. Makkay, pp. 225-246. Archaeolingua, Budapest.

Klíma, B.

1953 Nové Mesolitické Nálezy na jižní Morave. *Archaeologické Rozhledy (Praha)* 5:297-302.

1970 Stiípaná Kamenná Industie z Mikulcic. *Památky Archeologické* 61(1):216-224.

Kmoch, L.

1966 Eine Mesolithstation auf dem Bisamberg bei Wien. *Archaeologia Austriaca (Wein)* 40:13-24.

Kordos, L. and Á. Ringer

1991 A Magyarországi Felső-Pleisztocén Arvicolidae-Sztratigáfiájának Klimato- és Archeosztratigráfiai Korrelációja. *A Magyar Állami Földtani Intézet Jelentései* 1989:523-534.

Kosse, K.

1979 *Settlement Ecology of the Early and Middle Neolithic Körös and Linear Pottery Cultures in Hungary* 64. BAR International Series, Oxford.

Kozlowski, J. K.

1973 The Problem of the So-Called Danubian Mesolithic. In *The Mesolithic in Europe: Papers Read at the International Archaeological Symposium on the Mesolithic in Europe, Warsaw, May, 7 - 12, 1973*, edited by S. K. Kozlowski, pp. 315 - 330. Warsaw University Press, Warsaw.

1982a La Neolithisation de la zone Balkano-Danubienne du point de vue des industries lithiques. In *Origin of the Chipped Stone Industries of the Early Farming Cultures in Balkans*, edited by J. K. Kozlowski, pp. 132-170. vol. 33. Prace Archeologiczne, Kraków/Warsaw.

1982b *Origin of the Chipped Stone Industries of the Early Farming Cultures in Balkans*. Nak➔ . Uniwersytetu Jagiello*nskiego, Warszawa.

1989 The Neolithization of South-East European - An Alternative Approach. In *Neolithic of Southeastern Europe and Its Near Eastern Connections: International Conference 1987 Szolnok-Szeged*, edited by S. Bökönyi, pp. 131-148. Varia Archaeologica Hungarica II. Publicationes Instituti Archaeologici Academiae Scientiarum Hungaricae Budapestini, Budapest.

Kozlowski, J. K. and S. K. Kozlowski

1979 *Upper Palaeolithic and Mesolithic in Europe: Taxonomy and Palaeohistory*. Polish Academy of Science, Krakow Branch, Works of the Archaeological Commission Nr. 18. Polish Academy of Science, Wroclaw.

Kozlowski, J. K., S. K. Kozlowski and I. Radovanovic

1994 *Meso- and Neolithic Sequence from the Odmut Cave (Montenegro)*. Wydawnictwa Uniwersytetu Warszawskiego, Warszawa.

Kozlowski, S. K.

1975 *Cultural Differentiation of Europe from 10th to 5th Millennium B.C.* Warsaw University Press, Warsaw.

1980 Bemerkungen zum Mesolithikum in der Tschechoslowakei und in Österreich. *Veröffentlichungen des Museums für Ur- und Frühgeschichte (Potsdam)* 14-15:301-308.

1984 Carte de la Culture de Beuron-Coincy (Beuronien). *Archaeologia Interregionalis (Warsaw)*:193-206.

1985 A Survey of Early Holocene Cultures of the Western Part of the Russian Plain. In *The Mesolithic in Europe: Papers Presented at the Third International Symposium, Edinburgh 1985*, edited by C. J. Bonsall, pp. 424 - 441. John Donald Publishers, Edinburgh.

2001 Eco-Cultural/Stylistic Zonation of the Mesolithic/Epipaleolithic in Central Europe. In *From the Mesolithic to the Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996*, edited by R. Kertész and J. Makkay, pp. 261-282. Archaeolingua, Budapest.

Krolopp, E. and P. Sümegi

1995 Palaeoecological Reconstruction of the Late Pleistocene, Based on Loess Malacofauna in Hungary. *GeoJournal* 26:213-222.

Kurucz, K.

1989 *A Nyíri Mezőség Neolitikuma* 28. Jósa András Múzeum Kiadványai, Nyíregyháza.

Kutzián, I.

1944 A Körös Kultúra. In *Dissertationes Pannonicae. Ser. II, No. 23*, Budapest.

1947 The Körös Culture. In *Dissertationes Pannonicae. Ser. II, No. 23*, Budapest.

Lazarovici, G.

1969 Cultura Starcevo-Cri - Die Starcevo-Cri-Kultur in Banat. *Acta Musei Napocensis (Cluj)* 6:3-26.

1979 *Neoliticul Banatului*. BMN IV. ????, Cluj-Napoca.

Leitner, W.

1980 Die Mesolithstation von Burgschleinitz (NÖ). In *Festschrift zur 50-jahrfeier des Höbarth-Museums*, pp.??-?? 83 pages total, Horn.

1984 Zum Stand der Mesolithforschung in Österreich. *Preistoria Alpina (Trento)* 19:75-82.

Lekovic, V.

1985 The Starcevo Mortuary Practices - New Perspectives. *Godišnjak Sarajevo* 23(21):157-172.

1995 Neolithic Settlements. In *Archaeological Investigations along the Highway Route in Srem*, edited by Z. Vaja, pp. 25-44, Novi Sad.

Lengyel, G.

2004 Késő-Paleolit Telep Miskolc Határában. *Momus (Debrecen)* II Õskoros Kutatók II Összejövetelének Konferenciakötete - Debrecen, 2000. November 6-8:11-20.

Lenneis, E.

2000 Hausformen der Mitteleuropäiscen Linearbandkeramik und des balkanischen Früneolithikums im Vergleich. In *Karanovo III. Beiträge zum Neolithikum in Südosteuropa*, edited by S. Hiller and V. Nikolov, pp. 383-388, Wein.

Makkay, J.

1970 A Kőkor és Rézkor Fejér Megyében. In *Fejér Megye Története az Õskortól a Honfoglalásig*, edited by J. Fitz, pp. 9-52. vol. Fejér Megye Története I, Székesfehérvár.

1975 *A Bicskei Neolithikus Telepe és Temető - Die neolithische Siedlung und das Gräberfeld in Bicske*. Az István Király Múzeum Közleményei D sorozat No. 104.

1978 Excavations at Bicske: I. The Early Neolithic - The Earliest Linear Band Ceramic. *Alba Regia (Székesfehérvár)* 16:9-60.

1982 *A Magyarországi Neolitikum Kutatásának Új Eredményei*, Budapest.

Marosi, A.

1935 Õskőkori Szigony Merítőpusztáról. *Székesfehervári Szemle* 5:75-76.

1936a Kormeghatározó Adatok a Csór-Merítőpusztai Õskori Csontszigonyhoz. *Székesfehervári Szemle* 6:40-42.

1936b A Székesfehérvári Múzeum Õskori Csontszigonya. *Archaeologiai Értesítő (Budapest)* 54:83-85.

Marton, T.

2003 Mezolitikum A Dél-Dunántúlon - A Somogyi Leletek Újraértékelése. *Móra Ferenc Múzeum Évkönyve (Szeged)* 9:39-48.

Mateiciucová, I.

2001 Silexartefakte und Gerölle im Gräberfeld der linearbandkeramischen Kultur in Vedrovice in Mähren. *Preistoria Alpina* 37:81-107.

2002 Silexartefakte der ältesten und älteren LBK aus Brunn am Gebirge, Niederösterreich. (Vorbericht). *Antaeus (Budapest)* 25:169-187.

Mateiciuvová, I.

2001 Silexindustrie in der ältesten Linearbandkeramik-Kultur in Mähren und Niederösterreich auf der Basis der Silexindustrie des Lokalmesolithikums. In *From the Mesolithic to the Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996*, edited by R. Kertész and J. Makkay, pp. 283-300. Archaeolingua, Budapest.

Matskevoî, L. G.

1987 Mezolit Predkarpatya, zapadnogo Podlolya i Zakarpatya (Cyrilic Russian). In *Arkheologiya Prikaratya, Volyni i Zakapatya (Kamennyî Vek)*, pp. 75-89, Kiev.

1991 *Mezolit Zapada Ukrainy (Cyrilic Russian)*, Kiev.

Mészáros, G.

1948 *A Vázsonyi-Medence Mezolit És Neolitkori Települései.* Doktori Értekezés, Debreceni Tudomány Egyetem. Vida András Könyvnyomdája: Veszprém.

Minichreiter, K.

1992 *Starcevacka Kultura u Sjevernoj Hrvatkoj - The Starcevo Culture in Northern Croatia*. Dizertacije I Monografije 1. 1 vols, Zagreb.

Nemeskéri, J.

1948 A Mezolithikus Kultúra Új Nyomai Magyarországon. *Természettudomány* 3:221-222.

Nicolaescu-Plopsor, C. S. and I. Pop

1959 Cercetarile si sapaturile paleolitice de la Cremenea si împrejurimi. *Materiale si Cercetari Arheologice* 6:51-56.

Özdogan, M.

1989 Neolithic Cultures of Northwestern Turkey: A General Appraisal of the Evidence and Some Considerations. In *Neolithic of Southeastern Europe and Its Near Eastern Connections: International Conference 1987 Szolnok-Szeged*, edited by S. Bökönyi, pp. 201-216. Varia Archaeologica Hungarica II. Publicationes Instituti Archaeologici Academiae Scientiarum Hungaricae Budapestini, Budapest.

2000 The Appearance of Early Neolithic Cultures in Northwestern Turkey: Some Problems. In *Karanovo III. Beiträge zum Neolithikum in Südosteuropa*, edited by S. Hiller and V. Nikolov, pp. 165-170, Wein.

Paunescu, A.

1964 Cu privire la perioda de sfîrsit a epipaleoliticului în nord-vestul si nord-estul Romîniei si unele persistente ale lui în neoliticul. *Studii si Cercetari de Istorie Veche (Bucuresti)* 15:321-336.

1970 *Evolutia Uneltelor si Armelor de Piatra Cioplita Descoperite pe Teritoriul Romaniei*, Bucuresti.

Perlès, C.

2001 *The Early Neolithic in Greece*. Cambridge World Archaeology. Cambridge University Press, Cambridge.

Prošek, F.

1959 Mesolitická Obsidiánova Industrie ze Stanice Barca I. *Archaeologické Royhledy (Praha)* 11:145-148.

Pusztai, R.

1957 Mezolitikus Leletek Somogyból. *Janus Pannonius Múzeum Évkönyve (Pécs)*:96-105.

Quitta, H.

1960 Zur Frage der ältesten Bandkeramik in Mitteleuropa. *Praehistorische Zeitschrift (Berlin-New York)* 38:1-38 and 153-188.

1964 Zur Herkunft des frühen Neolithikums in Mitteleuropa. *Varia Archaeologica* 16:14-24.

1971 Der Balkan als Mittler zwischen Vorderem Orient und Europa. In *Evolution und Revolution im Alten Orient und Europa - Das Neolithikum als historische Erscheinung*, edited by F. Schlette, pp. 36-63, Berlin.

Quitta, H. and G. Kohl

1969 Neue Radiocarbondaten zum Neolithikum und zur frühen Bronzezeit Südosteuropas und der Sowjetunion. *Zeitschrift für Archäologie (Berlin)* 3:223-225.

Raczky, P.

1982 Újkőkor. In *Szolnok Megye a Népek Országútján*, edited by P. Raczky, pp. 8-23, 92-99, Szolnok.

Radovanovic, I.

1996 *The Iron Gates Mesolithic*. Archaeological Series 11. International Monographs in Prehistory, Ann Arbor.

Richards, M.

2003 The Neolithic Transition in Europe: Archaeological Models and Genetic Evidence. *Documenta Praehistorica* 15:159-167.

Richards, M., V. Macaulay, E. Hickey, E. Vega, B. Sykes, V. Guida, C. Rengo, D. Sellitto, F. Cruciani, T. Kivisild, R. Villems, M. Thomas, S. Rychkov, O. Rychkov, Y. Rychkov, M. Golge, D. Dimitrov, E. Hill, D. Bradley, V. Romano, F. Cali, G. Vona, A. Demaine, S. Papiha, C. Triantaphyllidis, G. Stefanescu, J. Hatina, M. Belledi, A. Di Rienznzo, A. Novelletto, A. Oppenhiem, S. Nørby, N. Al-Zaheri, S. Santachiara-Benerecetti, R. Scozzari, A. Torroni and H.-J. Bandelt

2000 Tracing European Founder Lineages in the Near-Eastern Mitochondrial Gene Pool. *The American Journal of Human Genetics* 67:1251-1276.

Ringer, Á.

1982 *Egy Levéleszközös Formakör Szórvány Leletei a Bükk Hegység Területén*. Doktori Értekezés.

1983 *Bábonyien, eine mittelpaläolithische Blattwerkzeugindustrie in Nordost-Ungarn*. Dissertationes Archaeologicae Series II. No. 11, Budapest.

1990 Le Szélétien dans le Bükk en Hongrie. Chronologie, Origine et Transition vers le Paléolithiqe Spérieur. In *Paléolithique Moyen Récent et Paléolithique Supérieur Ancien en Europe. Actes du Colloque International de Nemours, 9-11 Mai 1988. Mémoires du Musée de Préhistoire d'Ile-de-France 3*, edited by C. Farizy, pp. 107-109.

1991 Miskolc Rózsás-Hegy. *Régészeti Füzetek (Budapest)* ser. 1 No. 42:19.

2000 Le Complexe Techno-typologique du Bábonyien-Szélétien de la Hongrie de Nord-Est et le Yabroudien du Levant. In *Toward Modern Humans: Yabrudian and Micoquian, 400-500 kyears ago*, edited by A. Ronen and M. Weinstein-Evron, pp. 181-187. British Archaeological Reports International Series 850, Oxford.

2001 A Bükk és Cserehát a Felső-Paleolitikumban. In *Emberelődök Nyomában. Az Õskor Emlékei Északkelet-Magyarországon*, edited by G. Gyenis, A. Hevesi, L. Kordos, Z. Mester, Á. Ringer and V. T. Dobosi, pp. 93-101, Miskolc.

Ringer, Á. and B. Adams

2000 Sajóbábony-Méhésztető, Eponymous Site of the Middle Palaeolithic Bábonyian Industry: Microwear Studies Made on Tools Found at the Site during the 1997 Excavation. *Praehistoria* 1:117-128.

Ringer, Á., L. Kordos and E. Krolopp

1995 Le Complexe Bábonyien-Szélétien en Hongrie du Nord-Est dans son Cadre Chronologique et Environnemental. In *Actes dur Colloque de Miskolc, 10-15 Septembre 1991. Paléo Supplément No. 1*, pp. 27-30.

Roberts, N.

1989 *The Holocene. An Environmental History*. Blackwell Press, Oxford.

Rozsnyói, M.

1963 Mezolit-gyanús Szórványleletek a Bükk Hegység Északnyugati Részén. *Heves Megyei Múzeumok Közleményei (Eger)* 1963(1):69-80.

Schubert, H.

1999 *Die bemalte Keramik des Frühneolithikums in Südosteuropa*, *Italien und Westanatolien*, Rahden/Westf.

Schweizer, A.

2001 *Archäopalynologische Untersuchungen zur Neolithisierung der nördlichen Wetterau/Hessen*. Dissertationes Botanicae 350. Cramer, Berlin/Stuttgart.

Selmeczi, L.

1969 Das Wohnhaus der Körös-gruppe von Tiszajenő. Neuere Haustypen des Frühneolithikums. *Móra Ferenc Múzeum Évkönyve (Szeged)* 2:17-22.

Sherratt, A.

1997a The Development of Neolithic and Copper Age Settlement in the Great Hungarian Plain: I: The Regional Setting (revised from 1983 version). In *Economy and Society in Prehistoric Europe: Changing Perspectives*, edited by A. Sherratt, pp. 270-292. Princeton University Press, Princeton.

1997b The Development of Neolithic and Copper Age Settlement in the Great Hungarian Plain: II: Site Survey and Settlement Dynamics (revised from 1984 version). In *Economy and Society in Prehistoric Europe: Changing Perspectives*, edited by A. Sherratt, pp. 293-319. Princeton University Press, Princeton.

Simán, K.

1978 Északkelet Magyarország Bizonytalan Korú Paleolit Leletei (Miskolc, Avas). In *manuscript*, Budapest.

1979 Kovabánya az Avason. *Herman Ottó Múzeum Évkönyve (Miskolc)* 1979:87-102.

1984 *Új Eredmények Északkelet Magyarország Paleolitkutatásában*. Doctoral Thesis.

1986 Mittelpaläolithisches Atelier am Avasberg bei Miskolc. In *Urzeitliche und frühhistorische Besiedlung der Ostslowakei in Bezug zu den Nachbargebieten*, pp. 49-55, Nitra.

1990 Population Fluctuations in the Carpathian Basin from 50 to 15 Thousand Years BP. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 42:13-19.

1991 Procurement and Distribution of Raw Materials in the Palaeolithic of North-East Hungary. *Études et Recherches Archéologiques de l'Université de Liége* 43:28-44.

Simán, K. and P. Csorba

1993 Korlát-Ravaszlyuk-tető Régészeti Lelőhely Geomorfológiai és Talajtani Vizsgálata. *Mérnökgeológiai Szemle* 41:91-111.

Simon, K. H.

1996 Ein neuer Fundort der Starcevo-Kultur bei Gellénháza (Kom Zala, Ungarn) und seine südlichen Beziehungen. In *The Vinca Culture*, *Its Role and Cultural Connections: International Symposium on the Vinca Culture Its Role and Cultural Connections - Timisoara*, *Romania*, *October 1995*, edited by F. Drasovean, pp. 59-92. Museum Banaticum Temesiense: Bibliotheca Historica et Archaeoloca Banatica, Timisoara.

2001 Die neolithischen Funde des Objektes 103/96 von Gellénháza-Városrét (Komitat Zala). *Zalai Múzeum (Zalaegerszeg)* 10:19-43.

Smith, B. D.

2001 Low-Level Food Production. *Journal of Archaeological Research* 9(1):1-43.

Stadler, P.

1995 Ein Beitrag zur Absolutchronologie des Neolithikums aufgrund der 14-C Daten in Österreich. In *Jungsteinzeit im Osten Österreichs*, edited by E. Lenneis, C. Neugebauer-Maresch and E. Ruttkay, pp. 210-224. vol. 102/103/104/105. Verlag Niederösterreichisches Pressehaus, St. Pölten-Wein.

Stäuble, H.

1995 Radiocarbon Date of the Earliest Neoltihc in Central Europe. *Radiocarbon* 37(2):227-237.

Sümegi, P.

1996 *Comparative Paleoecological Reconstruction and Stratigraphical Valuation of NE Hungarian Loess Region (in Hungarian).* unpublished Ph. D. Thesis.

2003a Early Neolithic Man and Riparian Environment in the Carpathian Basin. In *Morgenrot der Kulturen: Frühe Etappen der Menschheitsgeschichte in Mittel- und Südosteuropa - Festschrift für Nándor Kalicz zum 75. Geburtstag*, edited by E. Jerem and P. Raczky, pp. 53-60. Archaeolingua, Budapest.

2003b New Chronological and Malacological Data from the Quaternary of the Sárrét Area, Transdanubia, Hungary. *Acta Geologica Hungarica (Budapest)* 46(4):371-390.

2004 Preneolitizáció - Egy Kárpát-Medencei Késő Mezolitikum Során Bekövetkezett Életmódbeli Változás Környezettörténeti Rekonstrukciója. *Momus (Debrecen)* II Õskoros Kutatók II Összejövetelének Konferenciakötete - Debrecen, 2000. November 6-8:21-32.

Sümegi, P., R. Kertész and E. Hertelendi

2002 Environmental Change and Human Adaptation in the Carpathian Basin at the Late Glacial/Postglacial Transition. In *Archaeometry 98: Proceeding of the 31st Symposium Budapest, April 26-May 3 1998*, edited by E. Jerem and K. T. Biró, pp. 171-177. vol. 1. British Archaeological Reports International Series, Oxford.

Sümegi, P., E. Krolopp and E. Rudner

2002 Negyedidőszak Végi Õskörnyezeti Változások a Kárpát-medencében Térben és Időben - Late Quaternary Environmental Changes in the Carpathian Basin in Space and Time. *Földtani Közlöny (Budapest)* 132:5-22.

Svoboda, J. and K. Simán

1989 the Middle-Upper Paleolithic Transition in Southeastern Central Europe (Czechoslovakia and Hungary. *Journal of World Prehistory* 3(283-322).

Szathmáry, L.

1988 The Boreal (Mesolithic) Peopling in the Carpathian Basin: The Role of the Peripheries. *Folia Historico Naturalia Musei Matraensis (Gyöngyös)* 13:47-60.

Szekeres, L.

1967 Ludaš-Budžak, Ranoneolitsko Nasele. *AP* 9:9-12.

Testart, A.

1982 The Significance of Food Storage among Hunter-Gatherers: Residence Patterns, Population Densities, and Social Inequalities. *Current Anthropology* 23:523-537.

Thissen, L.

2000a A Chronological Framework for the Neolithisation of the Southern Balkans. In *Karanovo III. Beiträge zum Neolithikum in Südosteuropa*, edited by V. Nikolov, pp. 193-212, Wein.

2000b *Early Village Communities in Anatolia and the Balkans, 6500-5500 cal BC: Studies in Chronology and Culture Contact.* Unpublished Ph. D. thesis.

Torma, I.

1963 *A Kapos- és Koppány-völgy Ôskori Települései.* Egyetem Szakdolgozat.

Törőcsik, Z.

1991 *A Dunántúli Vonaldíszes Kerámia Kultúrája "Tapolcai Csoportjának" Balaton Környéki Lelőhelyei* 1. Bibliotheca Musei Tapolcensis, Tapolca.

Trigger, B. G.

1989 *A History of Archaeological Thought*. Cambridge University Press, Cambridge.

Trogmayer, O.

1966 Ein Neolithisches Hausmodellfragment von Röszke. *Acta Antiqua et Archaeologica (Szeged)* 10:11-26.

Valoch, K.

1963 Ein mittelsteinzeitlicher Vohnplatz bei Smolín in Südmähren. *Quartär* 14:105-114.

1975 Eine endpaläolithische Industrie von Pribice (Bez. Breclav) in Südmähren. *CMM* 60:45-78.

1978 *Die endpaläolithische Siedlung in Smolín*. Studie Archeologického Ústavu Ceskoslovenské Akademie Ved v Brne 6/3, Praha.

1985 The Mesolithic site of Smolín, South Moravia. In *The Mesolithic in Europe*, edited by C. Bonsall, pp. 461-470. John Donald Publishers, Edinburgh.

Vavilov, N. I.
1926 *Studies on the Origin of Cultivated Plants*. Institut Botanique Applique et d'Amelioration des Plantes, Leningrad.

Vértes, L.
1962 Ausgrabungen in Szekszárd Palánk und die archäologischen Funde. *Swiatowit* 24:159-202.

1965 *Az Õskőkor és az Átmeneti Kőkor Emlékei Magyarországon*, Budapest.

Virág, Z. M.
1992 Újkőkori és Középső Rézkori Telepnyomok az M0 Autópalya Szigetszentmiklósi Szakaszánál. In *Régészeti Kutatások az M0 Autoópalya nyomvonalán*, edited by P. Havasi and L. Selmeczi, pp. 15-60, Budapest.

Virág, Z. M. and N. Kalicz
2001 Neuere Sidlungsfunde der Frühneolithischen Starcevo-kultur aus Südwestungarn. In *Problems of the Stone Age in the Old World - Jubilee Book Dedicated to Professor Janusz Kozlowski*, pp. 265-279. 2001, Kraków.

Vörös, I.
1989 Madaras-Téglavető Felsőpleisztocén Emlős Maradványai. *Cumania* 11:29-43.

1991 Large Mammal Remains from the Upper Palaeolithic Site at Esztergom-Gyurgyalag. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 43:261-264.

1993 Animal Remains Campsite from the Upper Paleolithic Hunters at Jászfelsőszentgyörgy-Szunyogos. *Tisicum (Szolnok)* 8:77-79.

Waters, M. R.
1992 *Principles of Geoarchaeology: A North American Perspective*. University of Arizona Press, Tucson.

Weiser, W.
1980 Das frühe Mesolithikum von Horn-Galgenberg. In *Festschrift zur 50-jahrfeier de Höbarth-Museums*, pp.??-?? 73 pages, Horn.

Whittle, A.
1990 Radiocarbon Dating of the Linear Pottery Culture: The Contribution of Cereal and Bone Samples. *Antiquity* 64:297-302.

1996 *Europe in the Neolithic - The Creation of New Worlds*. Cambridge World Archaeology. Cambridge University Press, Cambridge.

2001 From Mobility to Sedentism: Change by Degrees. In *From the Mesolithic to the Neolithic: Proceedings of the International Archaeological Conference held in the Damjanich Museum of Szolnok, September 22-27, 1996*, edited by R. Kertész and J. Makkay, pp. 447-461. Archaeolingua, Budapest.

Whittle, A., L. Bartosiewicz, D. Boric, P. Pettitt and M. Richards
2002 In the Beginning: New Radiocarbon Dates for the Early Neolithic in Northern Serbia and South-east Hungary. *Antaeus (Budapest)* 25:63-118.

Wiessner, P.
1982 Beyond Willow Smoke and Dog's Tails: A Comment on Binford's Analysis of Hunter-Gatherer Settlement Systems. *American Antiquity* 47(1):171-178.

2002 The Vines of Complexity: Egalitarian Structures and the Institutionalization of Inequality among the Enga. *Current Anthropology* 43:233-269.

Willis, K. J., M. Braun, P. Sümegi and A. Tóth
1997 Does Soil Change Cause Vegetation Change or Vice-Versa? A Temporal Perspective from Hungary. *Ecology* 78(740-750).

Willis, K. J., P. Sümegi, M. Braun and A. Tóth
1995 The Late Quaternary Environmental History of

Bátorliget, N.E. Hungary. *Palaeoclimatology, Palaeoecology, Palaeogeography* 118(25-47).

Wobst, H. M.

1974 Boundary Conditions for Paleolithic Social Systems: A Simulation Approach. *American Antiquity* 39:147-178.

Zoffmann, Z. K.

1978 Anthropological Finds in Lánycsók, Hungary, from the Early Neolithic Starcevo Culture. *Janus Pannonius Múzeum Évkönyve (Pécs)* 22:157-162.

1999 Anthropological Data of the Transdanubian Prehistoric Populations Living in the Neolithic, Copper, Bronze and the Iron Ages. *Savaria: a Vas Megyei Múzeum Értesítöje (Szombathely)* 24(3):33-49.

2001 Anthropological Structure of the Prehistoric Populations Living in the Carpathian Basin in the Neolithic, Copper, Bronze, and Iron Age. *Acta Archaeologica Academiae Scientiarum Hungaricae (Budapest)* 52(1-3):49-62.

Zvelebil, M.

2000 The Social Context of Agricultural Transition in Europe. In *Archaeogenetics: DNA and the Population Prehistory of Europe*, edited by C. Renfrew and K. Boyle, pp. 57-79. McDonald Institute for Archaeological Research, Cambridge.

Zvelebil, M. and P. A. Rowley-Conwy

1984 The Transition to Farming in Northern Europe: A Hunter-Gatherer Perspective. *Norwegian Archaeological Review* 17(2):104 - 128.