Settlement, Communication and Exchange around the Western Carpathians

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Edited by

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Preface

Tobias L. Kienlin – Paweł Valde-Nowak – Marta Korczyńska – Klaus Cappenberg – Jakob Ociepka

Since 2006 the Department of Archaeology of the Jagiellonian University of Kraków, previously the Department of Archaeological Sciences of the University of Bochum, and now the Institute of Prehistoric Archaeology of the University of Cologne, have been running a joint archaeological project on Neolithic and Bronze Age settlement patterns in the middle part of the Dunajec river valley in Little Poland. Based on data from the archaeological survey of Poland (Archeologiczne Zdjęcie Polski / AZP), a long-term perspective is taken on the development and change of human settlement in this micro-region. Intensive survey work is carried out, including geomagnetics and intensive fieldwalking, to verify and improve the often very broad dating of sites known since AZP.

The Early Neolithic occupation of the Wiśnicz foothills – situated in the western part of the research area – is an extension of the Upper Vistula settlement concentration. The next settlement agglomeration in southern Poland can be found in the area around Rzeszów. Due to the direct neighbourhood of the mountains, Transcarpathian contacts and adapted forms of economy could be expected. Instead, the excavations of Łoniowa and Żerków proved the existence of 'orthodox' KCWR/LBK houses of multiple stylistic phases in the Carpathian foothills. The discovery of a concentration of *Linearbandkeramik* hamlets in the highest topographic settings of the Wiśnicz Foothill is difficult to compare with any other situation of settlement of that culture in its whole European range. This is the first of peculiarities identified during the project. The second one is the excavation of an LBK longhouse with quite unique characteristics, namely its size and with two graves which must have been constructed during the erection of the building.

On the Bronze Age side, large-scale excavations were carried out on the extensive hilltop-settlement of Janowice. They aimed to provide an improved pottery chronology that is supported by absolute dates from scientific dating methods and give us an impression of the internal dynamics of this unusual settlement type. Trial excavations on a number of surrounding sites aim to clarify the chronological and functional relationship of these smaller settlement units to the 'central' place of Janowice. GIS applications are used to integrate the spatial data obtained and to model long-term change in settlement patterns in the micro-region examined. One question, for example, is for which reasons there was a marked change in settlement activity from the hilltops during the Neolithic towards the slopes of the Dunajec valley in the Bronze Age. Against the background of older debates that posited fortified Lusatian hilltop sites along the Dunajec valley, presumably accomodating some kind of Bronze Age elites, it is asked in what other sense the hilltop-settlement of Janowice with its long history of occupation from broadly the Middle Bronze Age to the Early Iron Age could have been 'central' for the development of this micro-region. Was it perhaps a focus of local identities that developed over centuries, and the Dunajec valley saw a combination of long-lived sites representing the stable element of human presence in this marginal landscape opposite shorter-lived places?

The micro-region under study is situated in the foothills of the Western Carpathians. It is marginal compared to the fertile Loess soils in the lowlands along the Vistuala river. However, it is an area of great interest in current research for its role as a mediator of contact and exchange with communities further south in the Carpathian Basin. Such contacts are evident already in the Neolithic when there is exchange in stone and flint raw materials. Even more so in the Bronze Age when further east there is more or less clear evidence for the presence of a 'foreign' population with the Otomani communities of the Jasło group. The situation in the Dunajec valley is different, however, since the foreign element is much less marked, for example in our pottery assemblages. Hence the Dunajec region may help to come to a more differentiated modelling of trans-Carpathian contacts in prehistory.

The papers in this volume go back to a workshop that took place in October 2012 at the Department of Archaeology in Kraków. Some results of our on-going project were presented then, and colleagues from different countries around the western Carpathians and beyond, who are working on related subjects, were invited to discuss our findings and place them in a wider European context.

Topics proposed included the archaeological and topographic setting of the western Carpathians and the Dunajec valley, Neolithic settlement, communication and exchange around the Western Carpathians, Bronze Age settlement, communication and exchange as well as the modelling of spatial patterning in settlement systems and communication including GIS applications.

We are thankful to all colleagues who shared their knowledge during our meeting at Kraków and subsequently prepared their papers for publication in this volume. We

are indebted to the Alexander von Humboldt-Foundation which generously funded our project in the Dunajec valley as well as our Kraków conference. Our thanks go to all those who kindly supported us in organising the meeting, in particular Żenia Demczuk, Joanna Jędrysik and Magdalena Płoszaj (Kraków) as well as Alexandra Czech, Laura Nazim and Tim Wolters (Bochum), and during the editorial process, particularly Eric Tebby (Edmonton, Alberta), Maria Heitkamp and Johanna Ness (Cologne).

For many years now, our project has received generous support from Konserwator Andrzej Cetera (Tarnów). Furthermore, we want to extend our warmest thanks to Director Bożena Barwiołek and the staff of the boarding school at Złota for their hospitality, to Barbara Zych and Stanisław Ziółkowski also for their hospitality, and to all the local farmers in Brzozowa, Faściszowa, Janowice, Lusławice, Łoniowa, Tworkowa, Wróblowice, Zakliczyn and Żerków, who allowed access to their fields – and still keep wondering on our continued interest everytime our team returns ... And last but certainly not least, our greatest thanks to all the students from Kraków, Tübingen, Leipzig, Bochum and Cologne who excavated with us over the years. Without them our work would not have been possible.

The Western Carpathian Highlands During the Neolithic

Peter Bogucki

Abstract: The purpose of this paper is to situate prehistoric societies in and around the western Carpathian highlands during the sixth through third millennia BC in the grand narrative of European prehistory. Mountainous regions are typically viewed as barriers that were avoided, even feared, by Neolithic people, but discoveries such as the Iceman in the Alps indicate that they were familiar with high uplands, even if they chose to reside at lower elevations. Thus highlands like the western Carpathians should not be not blank spots on the archaeological map but rather regions in which prehistoric human activity was quick, ephemeral, specialized, and purposive. Moreover, we see that the more luminous regions of Neolithic settlement to the north and the south have much in common, so the mountains and uplands must have been permeable for human interaction, even during the Neolithic. Understanding the prehistoric developments on either side of the Carpathian highlands thus requires examination of the interplay between local innovation and long-distance encounters.

Keywords: Neolithic, highlands, settlement patterns, cold-air drainage, borderlands, long-distance interaction

The American bank robber Willie Sutton (1901–1980) is said to have told a reporter (although he actually did not, but it's too good a line to ignore) who asked him why he robbed banks, 'That's where the money is.' Archaeologists have generally taken a similar approach to the Neolithic of central Europe, including the greater Western Carpathian zone. Areas in which there are many large and productive sites are intensively studied, because that is where the data are, while areas in which the density of Neolithic settlement was low are treated as marginal and uninteresting.

The 'grand narrative' of Neolithic central Europe between 6000 and 2000 BC is based on some of the richest archaeological data anywhere in the world, collected over the past two centuries. Yet when we look closely at the map of these finds, we notice large blank areas from which there is little or no information. The inference is that these areas did not play a role in the lives of the earliest farmers of central Europe. In many cases, these are mountainous or hilly zones with soils of relatively low fertility. One such area includes the Western Carpathian foothills and mountains along with the valleys and passes among them.

The Western Carpathian region encompasses many geographical units (Figure 1). In this paper, they are grouped into three general categories. The smallest, in terms of its spatial extent, are the mountain peaks and crags of the High Tatras and their lower neighbors like the Pieniny chain. These form the core of the Western Carpathians. Around the periphery of the Western Carpathian region lie the loess-filled basins, often characterized as 'plateaus'. These areas are still highland in character compared with much of the rest of central Europe, but within the Western Carpathian system they are the lowest parts. Between the basins and the peaks are the foothills and uplands like the various Beskid ranges. These surround the mountain core, and thus I will refer to them as 'perimontane hill country' to reflect its character: 'perimontane' because it surrounds the high mountains and 'hill country' to indicate its elevations and to give a sense that it forms a landscape in which human activity took place in the past.

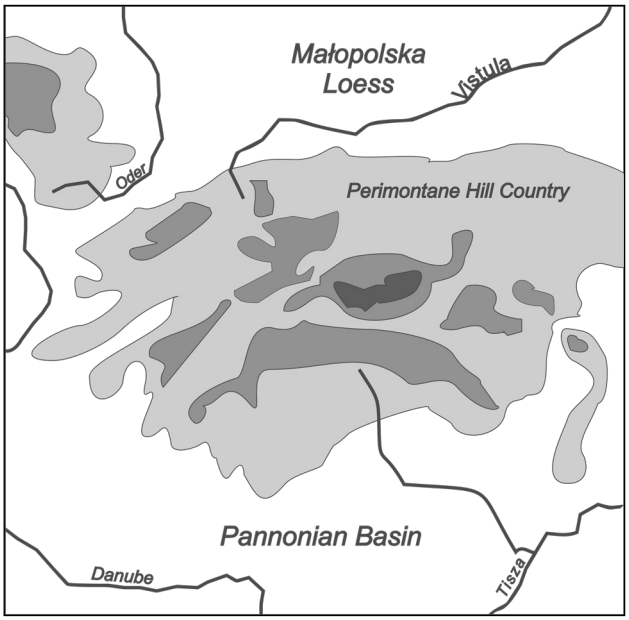

Figure 1: Map of the Western Carpathians showing key topographical zones and sites mentioned in the text.

The 'grand narrative' of Neolithic central Europe

The traditional grand narrative of the Neolithic between *c.* 5500 and 2200 BC in the greater Western Carpathian area can be summarized in several paragraphs. It begins with Linear Pottery communities spreading northward from the middle Danube region eventually arriving at the Moravian Gate and spilling over the northern side of the Carpathians through Małopolska and eventually around the eastern slopes into Ukraine. Circular debates over whether 'neolithization', a spurious term which conflates

thousands of individual choices and decisions over many generations into one process, was motivated by farming colonists or adaptive foragers continue to tie scholars in knots. By the end of the sixth millennium BC, settled farming communities inhabited the basins filled with Pleistocene loess. In the eastern part of the Carpathian Basin, Danubian variants such as the Eastern Linear Pottery and Bükk complicate the pattern of cultural groups.

During the two millennia that followed, these implanted farming societies matured and refined the exploitation of their environments. Different sources of raw materials, such as the Jurassic flint from the Kraków Jura, Świeciechów flint from the veins east of the Holy Cross Mountains, and Tokaj obsidian circulated widely. During the fifth millennium BC, Lengyel-Polgár communities continued earlier Danubian traditions and added features of their own, including the building of circular ditched enclosures known as rondels on the southern Carpathian slopes. Subsequently, Funnel Beaker communities replaced Lengyel ones north of the Carpathians around 4000 BC with a concurrent shift in settlement patterns in the loess basins from lower valley slopes to higher plateau margins. Variations in site sizes suggest regional settlement hierarchies. Consistent evidence for animal traction documents the use of wheeled vehicles and ploughing, although these innovations probably were introduced during the previous millennium.

The final centuries of the fourth millennium BC saw the emergence of what might be called the 'classic' Neolithic of the Western Carpathians, known very broadly as the Baden Complex. Despite the fact that there is an obvious lineage from Funnel Beaker predecessors north of the Carpathians and a strong imprint of Boleráz-style pottery to the south, clear unifying characteristics integrate the material culture of the Western Carpathian farming societies during the late fourth millennium BC. The Baden Complex played a central role in Andrew Sherratt's model of a Secondary Products Revolution during the fourth millennium BC, despite the fact that now many of its elements seem less than revolutionary and more the result of long-term developments. Long-distance interactions beyond the Western Carpathians situate Baden within the larger Neolithic world of central Europe.

A dramatic change took place during the first half of the third millennium BC with the transformation of the archaeological record from one dominated by settlements to one comprised largely of mortuary monuments, particularly the small Corded Ware barrows. Clearly people had to live somewhere in order to die, but the frequency of settlement finds does not correspond to that found earlier. Traditionally, this has been interpreted as a shift from a settled agricultural economy to one based on pastoralism that left ephemeral traces of settlement. On the other hand, traces of cultivation indicate that at least some sedentism was required**.**

The grand narrative of the Neolithic in the Western Carpathians excludes substantial portions of the region, however. High mountains and the perimontane hill country do not figure prominently until very late in the Neolithic, despite the overwhelming evidence for the presence of settled farming communities to the north and south of them. This is especially true during the sixth through fourth millennia BC, when almost all human interaction in the region is inferred to have passed through a few choke points like the Moravian Gate. We simply have no models for human activity in the blank spots on the map of the Neolithic in the Western Carpathians, and thus they are usually written out of the grand narrative completely. The perimontane hill country of the Western Carpathians is notably absent from the grand narrative of Neolithic Europe.

Luminous areas of Neolithic settlement

Neolithic research has been concentrated on what might be called the 'luminous areas' in the Carpathian region. Some examples of Neolithic 'luminous areas', a term first applied to parts of the British Isles such as Wessex and Orkney (Barclay 2009: 3), might be the Pannonian Basin on the southern side of the Carpathian slopes and various sub-divisions of that large area, while on the north side, the area along the Upper Vistula around Kraków and the Nida Basin has been another such focus of archaeological research for well over a century.

The attention paid by archaeologists to the 'luminous areas' is understandable. These are generally areas of fertile soils and favorable hydrology for year-round agricultural settlement. Sites are large, easily recognized, and numerous. Modern soil disturbance such as road building and industrial and residential development uncovers sites. Every year there are new discoveries, and much more still remains to be found beneath the soil. A young archaeologist who wants to make a career is advised to concentrate on the luminous areas, while a senior archaeologist finds them convenient and easy on the legs.

As archaeologists keep returning to the luminous areas of high-density settlement, just as Willie Sutton allegedly kept returning to banks, an increasing-returns phenomenon sets in that magnifies the significance of these areas even more over the impoverished record of the hill country. We see this phenomenon often in archaeology, but rarely in an area surrounded by such intensive settlement. For example, in the northeastern United States, David M. Lacy (1999: 115) notes that: 'Mountainous terrain was the last major environmental zone in Vermont to have its significance in prehistoric land-use systems acknowledged. The myth that indigenous people avoided the mountains through time led to the conclusion that there would be little or no archaeological evidence to detect, effectively marginalizing the mountains' importance to the archaeology of New England.'

In much the same way, the highlands of the Western Carpathians have been marginalized in the grand narrative of Neolithic central Europe. The intellectual effect of seeing the Neolithic of central Europe through the luminous areas of high-density settlement is to define an 'authentic Neolithic' in the eyes of archaeologists. Low-density settlement in the Western Carpathian hill country does not feel quite so 'authentic' and thus can be easily overlooked.

Perceptions of the Western Carpathians

Thus the Carpathian Highlands appear in the literature on Neolithic Europe largely by their absence. Looking in the indices of classic works on Neolithic Europe, we find two sorts of mentions: the first, as the Carpathian Basin in southern Slovakia, Hungary, and Austria, defined by the arc of highlands to the north and east but not including the highlands themselves; and the second as a source of raw materials, especially copper, in their southeastern part. Major concentrations of Neolithic settlement, such as around Kraków, are often characterized without specific mention of any nearby highlands, as islands within a sea of hills, despite the fact that their own character is determined by upland topography. In general, mountains are portrayed as impenetrable barriers to human interaction, as major cultural divides. Their foothills and lower slopes are regarded as a liminal zone between the luminous basins and the forbidding peaks, generally neglected for systematic archaeological investigation except by some hardy enthusiasts or vacationers from their main area of research interest.

It is true that conditions for Neolithic agrarian settlement are much more favorable in the basins than in the hill country and mountains, and that during the winter the mountains in particular would have been largely uninhabitable. On the other hand, being uninhabitable during some parts of the year does not necessarily mean being impermeable during others. We know that foraging societies of the Late Palaeolithic and Mesolithic were very active in the highlands, and on the southern slope of the Tatras, we find late Mesolithic campsites in the shadow of the high peaks (Valde-Nowak/Soják 2010). Over the millennia, major lines of communication would have become well-known and the trails would have been clear. As foraging bands became entrained into the Neolithic diaspora during the sixth and fifth millennia BC, such knowledge would have been perpetuated among the farming communities.

Elsewhere in Europe, Neolithic communities were certainly active in highland and mountain zones, and this notion is non-controversial perhaps, let me suggest, because they are more clearly descendent from indigenous foraging populations. In the highlands of Scotland and western Ireland, we find many early Neolithic settlements and monuments, while in the Alps, Ötzi the Iceman is incontrovertible evidence that Neolithic peoples penetrated not just foothills but the highest elevations.

As I have already noted, the idea of Neolithic activity in highland and mountain areas in the Western Carpathians does not seem to figure prominently in the narrative of early farming societies, especially during the sixth, fifth, and fourth millennia BC. Hints of Neolithic presence are noted in the literature but only in passing. For example, Tunia (1977) reported a very Danubian-looking core of Kraków Jurassic flint found at the very foot of the high Tatra peaks just south of Zakopane. How did it get there? Is anyone curious about that and whether there might be more calling cards of Neolithic visitors before 4000 BC? In the hill country south of the upper Vistula basin, the recent discovery of a shaped wooden artifact interpreted as a fragment of a yew bow in a peat bog on Mt. Kamiennik in the Flysch Carpathians dated to the fourth millennium BC provides further tangible evidence of Neolithic activity outside the traditional basin areas (Margielewski *et al.* 2010).

Rather than simply concentrating on the luminous basins, whose artifacts fill museums and storerooms from Kraków to Vienna, we need to view the Carpathian Highlands as an integrated system of many different landscapes, all of which were surely known to Neolithic people in one way or another. Human activity in these landscapes falls on a continuum of population density and settlement duration, ranging from high density and long duration in the loess basins to very low-density and short term human habitation among the high mountains. Although most Neolithic people apparently chose to live in the loess basins, they could not avoid the hill country or the high peaks, which would have been clearly visible from settlements in the loess basins, especially on clear days.

In the basins, defined by the surrounding hills, which caused fertile loess to be trapped in them during the Quaternary, we will always find large permanent year-round settlements, and wherever many people lived, you will also find cemeteries and burials. Many additional early Neolithic mortuary sites remain to be found on the upper Vistula now that the ice has been broken by recent discoveries (Czekaj-Zastawny/Przybyła 2012). People lived and died in great numbers in the basins, but such luminous areas would not exist but in contrast with their surroundings.

At the other end of the spectrum of habitability, high mountainous areas like the Tatras would have been the scene of quick human penetrations during only part of the year. These visits were purposive and deliberate, and always seasonal. A few possible reasons to find Neolithic people in the high mountains include expeditions to obtain special kinds of woods (remember that wood from many different species had been used in the equipment carried by Ötzi, as documented in Oeggl 2009); to hunt animals that had sought refuge from human encroachment on their traditional territories (remember that Ötzi had clothing made from at least six animal species, including brown bear and chamois); to gather medicinal plants as well as

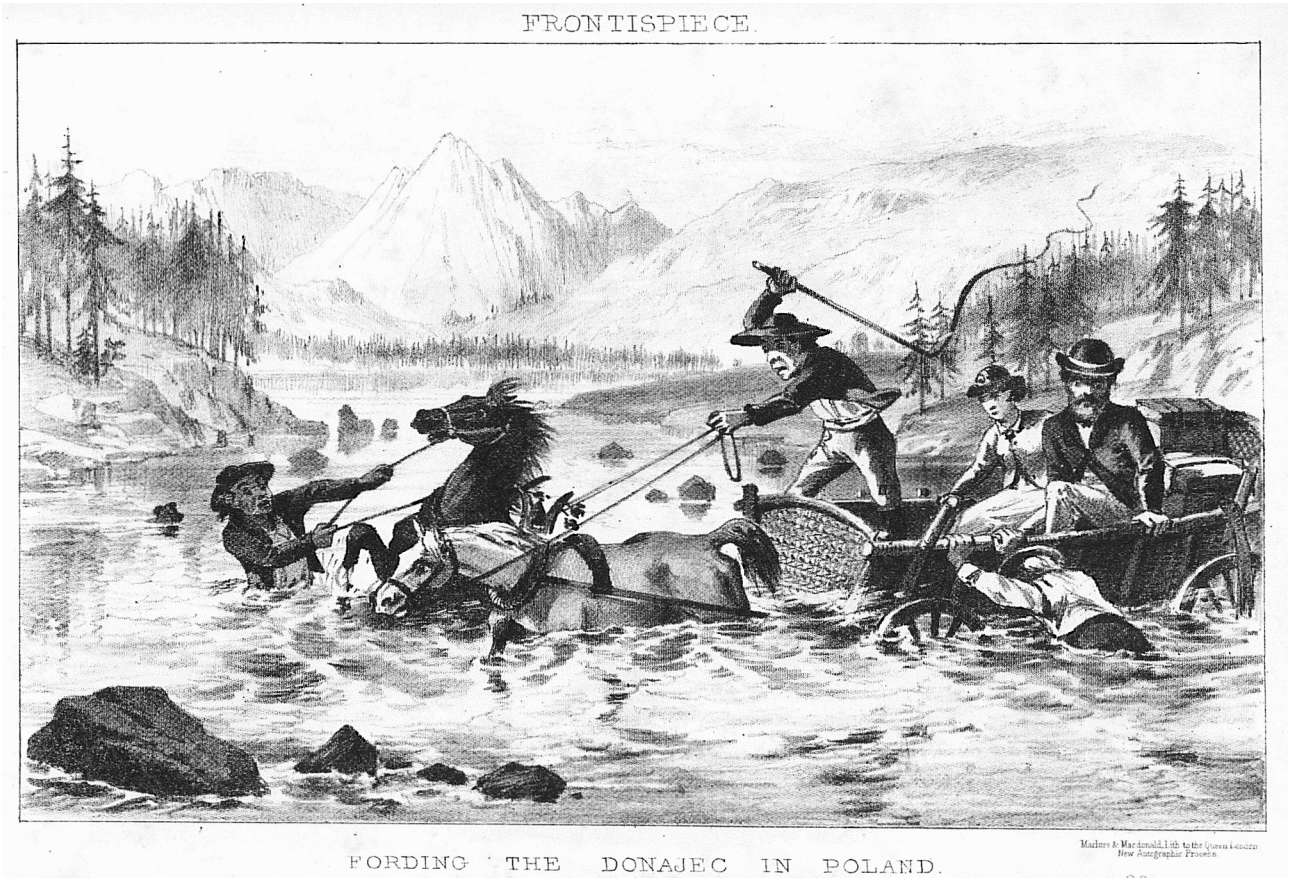

FIGURE 2: HUTCHINSON AND COMPANIONS FORDING THE DUNAJEC RIVER ON THE WAY TO ZAKOPANE IN 1871 (AFTER HUTCHINSON 1872).

mushrooms, fruits, nuts, and berries; and for escape from enemies and social complications.

On the other hand, the mountains themselves are hardly impermeable barriers. While browsing in the Princeton library, I came across a charming little book published in 1872 by a British army captain named Hutchinson. It is entitled *Try Cracow and the Carpathians*, a journal of a trip that he took with his wife and some other companions right after the Franco-Prussian War. Hutchinson travels from London to Kraków by boat and train, then after a few days recording his impressions, he sets off on a difficult trip to Zakopane (Figure 2), fording rivers and using primitive roads, the railroad line not yet having been built. Finally, he simply rides around the high peaks of the Tatras to a resort at Stary Smokovec, or Alt Schmecks, in what is now Slovakia. Although Hutchinson complains all the way about the difficult traveling conditions, the relative ease with which he moves around the foot of the mountains and then hikes up into them suggests that Neolithic way-finding through the mountains would not have been an insurmountable challenge either. My point is that the highest parts of the Western Carpathians are not just permeable through big gaps like the Moravian Gate but rather through many smaller passes, especially during the warmer months.

Moreover, Hutchinson's hotel in Stary Smokovec looked out on a landscape of Danubian Neolithic settlement within 20 kilometers as the crow flies (very high) from Zakopane. The Spiš basin drained by the southernly-flowing Hornád river, while its northern extension is drained by the northward-flowing Poprad, and it contains a concentration of open-air and cave sites of the Linear Pottery culture along with its Bükk and Želiezovce variants at the very foot of the Tatras (Soják 2000). Linear Pottery settlements at Poprad-Matejovce and Stráne pod Tatrami are among the highest-situated Early Neolithic habitation sites in central Europe (Valde-Nowak 2013: 267). The Neolithic inhabitants of these settlements could not help but confront the high peaks in whose shadow they lived on a daily basis.

The hill country Neolithic

The question then becomes, what happened in the hill country, between the basins and the mountains, during the sixth through third millennia BC? While there is definite evidence of Neolithic activity in these areas, it is not the large, multi-household and multi-generational settlements and repeatedly-used burial locations that we expect from the basin archaeology. Smaller-scale, short-term, dispersed agrarian settlement as well as specialized

activities such as hunting, herding, gathering, and fishing would have enabled Neolithic peoples to live in the highlands for extended periods, but such patterns confound the archaeologist through their relative invisibility under normal prospection techniques.

Neolithic use of the hill country is often characterized as 'pastoral', which advances the traditional narrative of the emergence of nomadic pastoralism as a prevalent economic strategy emerging during the second half of the Neolithic. I am skeptical that true pastoralism was necessarily the dominant economic strategy during the early part of the Neolithic. If anything, I think it more likely that Linear Pottery and Lengyel-Polgár communities practiced open-range cattle management in which animals were allowed to roam freely in search of grazing. Cattle mobility in the hill country would have been somewhat constrained by steep slopes. Instead, I believe that during the earlier Neolithic in the hill country we are dealing with systems of agrarian land use that simply do not match the dominant model of long-term settlement seen in the luminous basins.

I am also wary of simply characterizing Neolithic use of the hill country as 'transhumance', a term that has become popular in central European prehistory. Transhumance is a seasonal pattern of animal management observed ethnographically in some European upland zones, especially in southeastern Europe. It may well be conditioned by animal economies and their supply chains that emerged in fairly recent times, and it requires additional human effort not usually mentioned, such as the maintenance of pastures at high altitudes and the provision of salt to sheep and cattle (Nandris 1990: 13). The hill country of the Western Carpathians could be inhabited all year, and there are certainly enough arable areas for Neolithic cultivation to make transhumance a specific economic choice rather than the default strategy.

The integrated system of basins, hills, and mountains that comprise the Western Carpathians can be illustrated in an early LANDSAT image (Figure 3). It was made in 1979, as indicated not only by the date on the image but also by the fact that the scar on the landscape from the recently-completed wide-gauge railway line between Huta Katowice and the Soviet Union is still quite visible. In this false-color composite, bright red indicates vegetation vigor, which in turn is due to moisture. Thus it tells us a bit more than the photographic realism of Google Earth. We can see the upper Vistula basin with its *relative* dryness save for the valleys of the streams, which were the foci of Early Neolithic settlement. High Tatra peaks, on the other hand, are brownish-red, reflecting their relative lack of vegetation and residual snow cover in early May.

In between the basins and the peaks, what I am calling the hill country, is the area about which much remains to be learned. This area is characterized by bright red in the false-color composite image, reflecting the lushness of its vegetation. While this may be a reflection of the modern use of this area for cultivation and pasture, it also reflects the moistness of the habitat that supports such vegetation, and that it highly relevant for understanding of prehistoric settlement. Smaller-scale, shorter-term, dispersed agrarian settlement as well as specialized activities such as hunting, herding, gathering, and fishing would have enabled Neolithic peoples to live in the hill country for extended periods, but such settlement patterns confound the archaeologist through their relative invisibility under normal prospection techniques. It might be simply necessary to re-define what constitutes a site and where to find sites.

Cold-air drainage as a factor in Neolithic settlement

With regard to Neolithic settlement in the highland zone, I believe that a key element in understanding it will come from the micrometeorology of local landscapes, specifically the matter of cold-air drainage. In specific configurations of upland terrain, cold air drains from higher ground down into the valleys on cold clear nights and accumulates in the valley bottoms (Figure 4). Peattie (1931: 426–427) remarks, 'the mountain wind of evening is merely the expression of the downslope drainage of cold air.' This may result in significant temperature differences between the warmer watersheds and the cooler valleys, but more importantly, cold-air drainage during the late spring and early fall may produce marked differences in the length of the growing season on the watersheds over that of the valley bottoms, sometimes on the order of one or two weeks, especially by delaying the first freeze in the fall. The spatial distribution of cold-air drainage may produce 'thermal belts' with higher minimum temperatures along ridgelines and slopes that have more frostless days than adjacent lower terrain (Geiger 1965: 431).

This phenomenon of cold-air drainage has been studied from an archaeological perspective in the Appalachian Highlands of eastern North America as well as on the Colorado Plateau. In the Hopi Mesas region of the Colorado Plateau, Adams (1979) suggested a correlation between cold-air drainage and the length of the maize growing season, pointing out that it could result in a difference of 10-30 days between various localities. Hasenstab and Johnson (2001) examined late prehistoric settlement patterns in the Monongehela river drainage in southwestern Pennsylvania near Pittsburgh. In this terrain, not dissimilar to the Carpathian foothills, there was a shift in settlement of the maize-growing Monongehela Culture around AD 1200/1250 from bottom lands to upland plateau edges and drainage divides. Hasenstab and Johnson explained this shift as an adaptation to the contraction in the growing season caused by increased cold-air drainage, which led the more fertile valley soils to be abandoned in favor of the warmer conditions in certain parts of the uplands.

Although far distant in time and space from the Western Carpathian highlands, and using different cultigens, I believe that such an explanation of why horticultural communities, counter-intuitively, preferred some hilltop

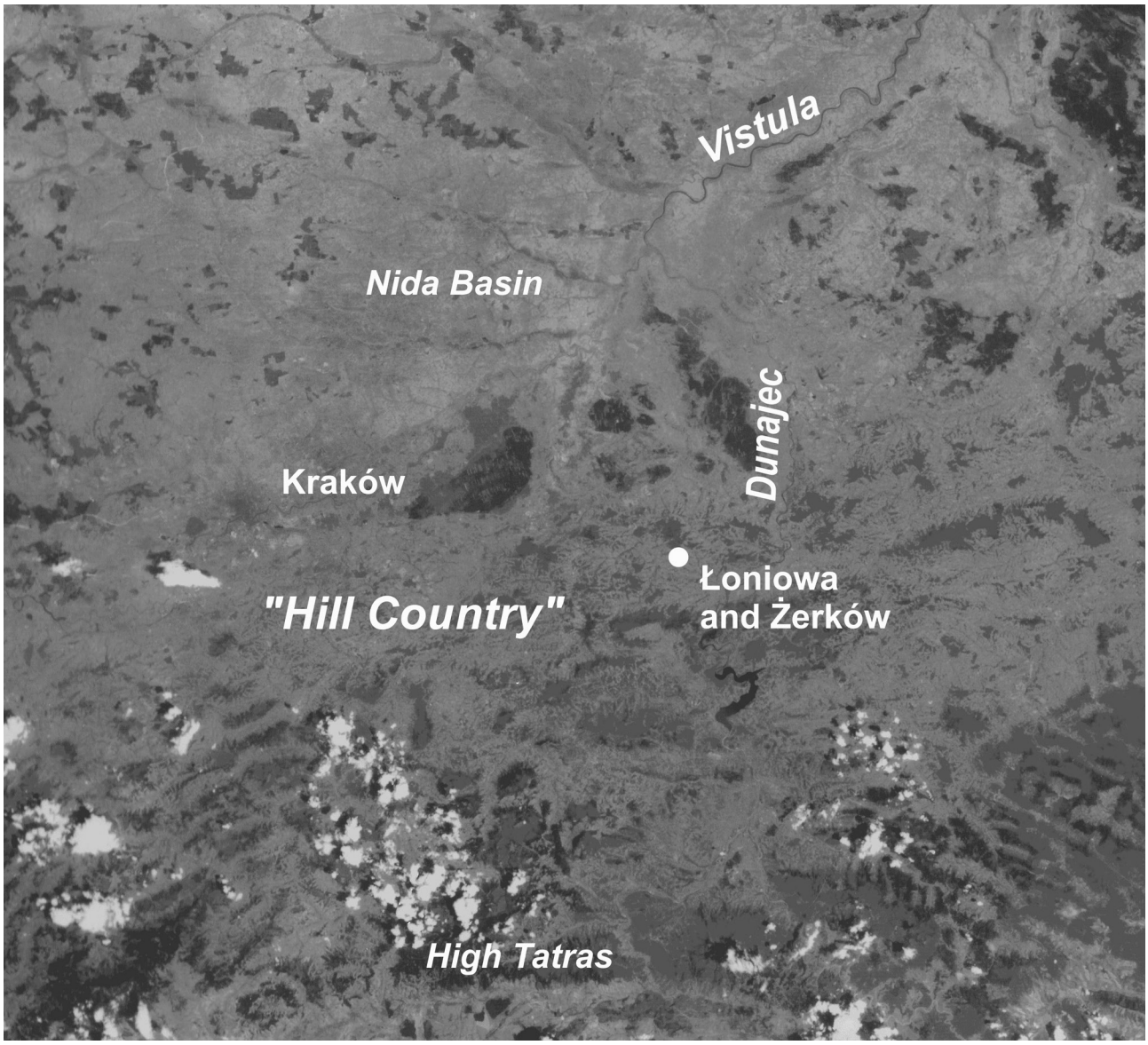

Figure 3: LANDSAT image of upper Vistula and northern Carpathian slopes with the location of Łoniowa and Żerków. Image taken May 27, 1979 (source: U.S. Geological Survey).

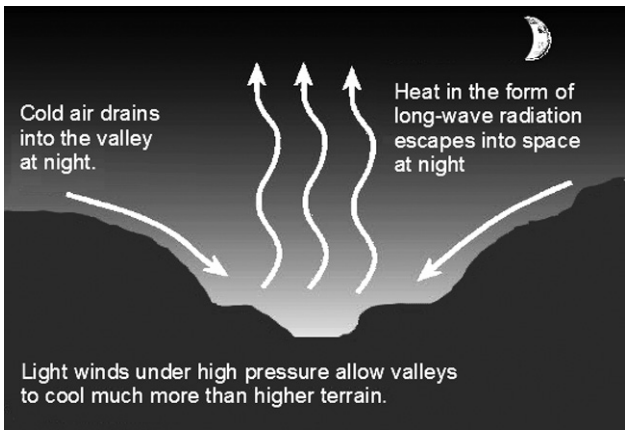

Figure 4: Schematic of nocturnal cold air drainage in upland valleys (after image on http://www.crh.noaa.gov/mkx/?n=terrainandtemperature, accessed May 1, 2013).

locations as opposed to the more fertile valleys may have relevance here. My first thought upon reading about cold-air drainage was about the shift observed by Janusz Kruk (1973) in the Upper Vistula Basin from Early Neolithic settlement on the lower parts of slopes by the Danubian societies before 4000 BC to settlement on higher terrain and watersheds by Funnel Beaker and Baden communities after 4000 BC. While there are many possible explanations for this shift in settlement, could cold-air drainage as climate cooled at the end of the Postglacial Climatic Optimum be a contributing factor? Wheat and barley may not be as dependent on the length of the growing season as maize, but it may simply have been a human decision to vacate the colder valleys in favor of warmer plateaus as just a more comfortable place to live.

This was before I became aware of Łoniowa and Żerków, with their locations overlooking the Dunajec valley, not

conforming to the rule that Danubian settlements had to be found at lower elevations in the landscape (Valde-Nowak 2009). Let us return to our LANDSAT image, however, and note that Łoniowa and Żerków lie outside the luminous part of the Upper Vistula basin, in a different hill-country terrain zone where cold-air drainage may already have been an issue for agricultural settlement during the late sixth millennium BC. We might be seeing an example of the adaptability of Linear Pottery farmers to adjust to local conditions and take advantage of opportunities, another case of Modderman's 'diversity in uniformity' (Modderman 1988).

What we learn from Łoniowa and Żerków is that we cannot base our expectations on what Neolithic sites will look like and where to find them in the Carpathian Highlands necessarily on what we see in the luminous basins. Acting on the hypothesis that cold-air drainage might have been a significant factor in settlement location, collaboration between archaeologists and meteorologists working at the landscape scale may be able to predict locations where hill-country sites could be sought. We can also act on the hypothesis that corridors for communication, not just north-south but also east-west across the Carpathian Front, would have shaped patterns of movement and settlement. For example, it would be illuminating to explore the reach of Linear Pottery settlement up the Dunajec Valley, that is, toward the south and the mountains, in order to articulate it with Neolithic settlement on the southern Carpathian slopes in the Poprad and Hornád basins.

The hill country as a borderland

Another way to look at the Western Carpathian highlands, rather than as a penumbra around the luminous basins, is as a borderland separating major concentrations of Neolithic settlement. The use of the term 'borderland' is deliberate. In contrast to frontiers and boundaries, borderlands are meant to be crossed during interactions between local polities. This characteristic of the hill country between the basins and the Tatras was of particular importance during the second half of the Neolithic, when true material wealth began to emerge in central Europe.

Here, I am especially thinking about the Baden Complex, the classic Neolithic society of the Western Carpathians at the end of the fourth and beginning of the third millennia BC. The geographical extent of Baden during the late fourth/early third millennia BC fully encompassed the Western Carpathians, from its heartland in the Pannonian Basin to its northern edges in Małopolska (Zastawny 2008). Rather than get bogged down in the debates over what constitutes Baden and its relationships with northern cultures like late Funnel Beakers and Globular Amphora, the important point is that this period is characterized by interregional connections that reach north-south across the Western Carpathians. These connections would have followed routes that were established millennia earlier, but now they would have been well-traveled tracks.

The Baden Complex defies characterization as an archaeological culture in the traditional sense of V. Gordon Childe. Instead, it more closely aligns with the concept of a supra-regional network of local communities. Braun (1986) applied Renfrew's (1986) concept of 'peer polities' to the Hopewell interaction sphere in the Midwestern United States, and such a consideration is also appropriate with reference to Baden and the later Neolithic of central Europe, which shares many similarities with Hopewell. One key observation is that in Hopewell, geographical barriers and distance did not stand in the way of long-distance contacts. Obsidian from western Wyoming appears in Ohio, and copper from the upper Great Lakes is found in Illinois. Writing about supra-regional networks in the Neolithic of southwest Asia, Watkins notes that people articulated multi-layered identities: 'as family or household, as lineages, as communities, as members of local clusters of villages, as participants in regional and supra-regional networks' (Watkins 2008: 165). We can imagine the Baden world as encompassing a similar range of nested networks.

Elsewhere (Bogucki 2011), I have identified several important factors that converged during the fourth and third millennia BC to result in the concentrations of wealth that characterize subsequent prehistory in central Europe: the innovation of durable goods, specifically mass-produced metal artifacts, that after they break or wear out can be recycled into new objects; transportation infrastructure, particularly a well-defined network of roads, fords, and portages; and capital investment in cattle for traction.

The Western Carpathian highlands would have been very important in the transportation infrastructure of central Europe during the Late Neolithic, as an area to be traversed purposively rather than avoided. It is in this context that we can consider the Baden grave at Swinna Poręba in the valley of the Skawa river south of Kraków (Valde-Nowak 2008). This area would have been a key thoroughfare along the northern edge of the Beskid range, between the Moravian Gate and the upper Vistula. More such sites will surely be found as archaeologists study the Neolithic of this area.

Later in the third millennium BC, attention shifts to the use of the hill country by Corded Ware communities, often considered to be transhumance due to the distribution of stray finds across the landscape. Yet, as Jarosz, Włodarczak and Włodarczak (2010) note, 'in the valleys of the Vistula, Raba, Dunajec and their tributaries, evidence of Final Neolithic communities is regularly being discovered' at low-lying locations inside river valleys. Again, these may reflect the role of these transportation corridors in the Neolithic world of the third millennium BC.

The hill country would have held dangers, however. The movement of durable goods and other commodities along narrow tracks would have created opportunities for Neolithic brigands and highwaymen to operate. Ambushes and attacks were probably common. These dangers could

have been mitigated through alliances and treaties of safe-conduct (for a price), middlemen and fixers, and armed expeditions. The creation and transmission of wealth in the Late Neolithic and Copper Age led to complexities of human interaction that would have been incomprehensible to the farming pioneers of the early Neolithic.

Conclusion

The luminous areas of the upper Vistula and Pannonian Basin will always be interesting and the focus of most archaeological research, but they cannot really be separated from the highlands that define and surround them. Whereas the luminous areas can provide abundant data to support models of prehistoric life at high population densities, the perimontane hill country of the Western Carpathians, as is the case with hill country everywhere, can excite the archaeological imagination about low-density settlement and movement. People lived and died in the hill country during the Neolithic, even if their remains are not exceptionally visible at the moment. Until we can document their presence more abundantly, and this conference will point toward ways in which that is happening, we can think creatively and imaginatively about how they might have inhabited the highlands as a way of generating hypotheses to guide future research.

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