

CHAPTER 7

Landscape Archaeology and 'Community Areas' in the Archaeology of Central Europe

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Landscape is why people climb up to a viewing tower.
— Jiří Sádlo, quoted by Storch 2002: 9

The terminology of 20th-century European archaeologists included the terms 'space', 'environment', 'settlement' and 'landscape'. These terms are closely interrelated: they can be treated as synonyms, their meanings can overlap or they can be defined as quite separate concepts. Their meanings change according to the traditions of use in various regional and period-based communities of archaeologists, as well as under the influence of shifting disciplinary paradigms. Our focus in this chapter is on how approaches to 'landscape' have changed in the archaeology of central Europe, drawing upon archaeological material from the Czech Republic, Poland and Germany. We explore the changing approaches to 'settlement' in central European archaeology, introducing the concepts of *Landesaufnahme* and *Siedlungskammer*, and Neustupný and Kuna's notion of 'community areas'. We shall then discuss how the idea of 'community areas' can be used to trace the relationships between identity and landscape in central European prehistory through two case studies, examining an Iron Age industrial zone and Bronze Age burial mounds in landscape perspective. By doing so, we hope to demonstrate the distinctive way in which the archaeology of landscapes has been approached in the study of the later prehistory of central Europe.

SPACE, SETTLEMENT AND LANDSCAPE IN CENTRAL EUROPEAN ARCHAEOLOGY

The archaeological landscapes of central Europe range from Upper Palaeolithic sites at the foot of the South Moravian hills in the eastern Czech Republic to the changing landscapes of the Neolithic and Chalcolithic (Sherratt 1981); Corded Ware and Bell Beaker sites; Celtic

hill forts, medieval field boundaries and deserted villages; 19th-century industrial landscapes; and the remains of 20th-century collectivisation and industrialisation programmes, opencast coal mining, factories and motorways. A variety of spatial approaches, with a diversity of methods and aims, have been employed in the region.

The earliest attempts to study archaeological material in relation to geographical space in central Europe developed in the culture historical approaches of the early 20th century. The German prehistorian Gustav Kossina (1858–1931) was one of its foremost proponents, with his *Siedlungsarchäologie* (settlement archaeology), which focused on the ethnic dimension of spatial distribution of archaeological sites (Kossina 1911). The culture historical approach developed ever more detailed typologies and chronologies of archaeological cultures. Geography and landscape were used to identify individual social and political groups in the archaeological record, and to highlight migrations from 'homelands' that were analogous to conventional historical accounts of geopolitical events. Similar approaches were common in other European countries at that time and even later, such as the school developed by Kossina's student Józef Kostrzewski at Poznań University in Poland (Kostrzewski 1949), and many archaeologists in Czechoslovakia, e.g. Jaroslav Böhm (1937, 1941) and Jan Filip (1956). Occasionally, culture historical approaches led to nationalistic excesses and political manipulations: most notoriously in the appropriation of Kossina's attempts to define the primacy of German culture in Europe by the Nazis (e.g. Mähling 1944). But such perspectives were not necessarily an integral part of culture history. The culture historical paradigm has survived across central European archaeology in a moderated form until today, and the influence of culture historical interpretive frameworks continues to be significant.

The gradual dissolution of Kossina's concept of settlement archaeology began in central Europe during the 1940s and 1950s, with the work of German scholars such as Ernst Wahle (1941) and Hans J. Eggers (1950). These scholars argued that ethnic reasons alone did not explain the spatial organisation of archaeological cultures and that a range of other explanations (socio-economic, political, ritual) were required. Later, Herbert Jankuhn (1955, 1977) revised Kossina's approaches, and his work produced a school of thought with a new theoretical framework. Jankuhn retained the term *Siedlungsarchäologie*, but sought to examine the relationships of past settlements with the natural environment, demography and socio-economic relationships, rather than just engaging in 'ethnic' interpretations. Spatial relationships between archaeological sites, the natural environment and remnants of settlement activities were emphasised in studies that made use of a range of methodologies: the analysis of geological and soil

maps, palynological and climatic data, and the density of settlement units in space.

Slightly later, between the 1950s and 1960s, similar approaches to settlement and archaeology emerged in the United States. A significant asset of the American school was contained within the concept of 'settlement pattern' – the layout of past settlements, containing evidence of their socio-economic systems (Willey 1953; Chang 1968). The term 'settlement pattern', whether adopted directly from Willey and Chang, or from those influenced by their work, percolated into European archaeology after the 1960s in innumerable partial meanings and contexts. The extent of intellectual exchanges between central European and American schools of settlement archaeology during the 1950s is unclear. However, references to central European approaches are not to be found in the classic statements of either American (e.g. Chang 1968) or German versions of settlement archaeology (e.g. Jankuhn 1977) during the 1960s and 1970s. The processes through which ideas of settlement archaeology developed therefore remains an interesting target for future research into the history of thought in world archaeology.

Central European approaches to landscape were, however, significantly influenced by the spatial archaeology formulated in Britain by David Clarke. Clarke drew upon the New Geography to develop both methods and theoretical frameworks for the archaeological study of spatial relationships (Clarke 1977). The spatial organization of archaeological data was studied at various levels – from a single assemblage to an archaeological culture. Spatial archaeology enriched the discipline with several valuable methods and models, such as site-catchment analysis, flow-off curves, etc., but as a general theoretical model it nevertheless gradually became unfashionable during the 1980s. This occurred mainly under the pressure and influence exerted by another approach, also originating in Britain, which did not bow to the exact methodology and economic interpretations of spatial archaeology, but preferred a hermeneutic approach to archaeological material – symbolic archaeology, later to be known as post-processual archaeology.

However, as British scholars were moving away from the term, in Czech archaeology spatial archaeology was revitalised in the 1990s with the work of Evžen Neustupný (1991, 1998a). As with earlier British approaches to spatial archaeology, Neustupný argued that space forms an important aspect of the archaeological evidence, which should be analysed next to the aspects of its (artefactual) form. In a sense, Neustupný's spatial archaeology is a conceptual antinomy and supplement of the typology of artefacts – that is, archaeology that studies the formal characteristics of the data. General spatial characteristics and spatial units of archaeological sources have been formulated in Neustupný's theory of community areas.

In central Europe, landscape archaeology was also developed by avocational archaeologists – for example, in the development of research on deserted medieval villages and medieval field systems by Czech physician Ervín Černý (1973, 1979). Such approaches developed a concept of landscape as revealing an object of study outside the 'site' (which in central European prehistory were often simply rich concentrations of artefacts). It was clear that the areas between the distinct sites (settlements and burial grounds) also held archaeological potential, although often of a different nature from those found on more visible 'sites'. As in Britain, so in central Europe this was particularly significant for the recognition of landscape features such as field boundaries, enclosures of various functions, remnants of quarrying and processing raw materials, etc. These artefacts and ecofacts were often difficult to date, resulting in their long-lasting neglect by previous archaeological schools in central Europe, which presumed chronology to be the main aim of archaeological knowledge. Within the new conceptual framework, however, the concept of landscape (in the sense mentioned above) brought a new insight to archaeology. Firstly, it showed that the geographical space was used continually and not just at the selected loci, and that this continuity of use is reflected in the spatial continuity of archaeological data (components). Secondly, it showed that spatial continuity could be interpreted as the continuity of complementary functions – most settlements, for example, must have been associated with arable fields, paths, burial grounds and pastures. Consequently, the understanding of past communities has become more complex than had so far been realised. Thirdly, archaeology's capability of studying large objects of anthropogenic origin altered the concept of the surrounding material world as a whole: it has become clear that man was not only influenced by his environment, but often also impacted upon it and re-created it. Rather than thinking of humans adapting to the environment, the emphasis shifted to human interaction with the environment (Zvelebil et al. 1993; Zvelebil 1994), and its adaptation to human uses (Neustupný in prep.). Finally, the fact that archaeological features are still part of the landscape illustrates a further characteristic of the landscape: continuity in time. Individual people and their settlements can relatively easily appear and disappear, while the landscape, although transformed by man and nature, cannot. All processes in the landscape relate to the state of the previous period and previous generations of its inhabitants – in this sense landscape has a memory. Erasure of that memory can be achieved only by drastic means, such as the surface mining of brown coal in northwestern Bohemia during the communist period, or the building of the Three Gorges Dam in China today.

In contemporary archaeology, landscape is often understood not only as a concept complementary to 'sites', but also as an overarching

approach to multiple scales of analysis – from site to region. This is also how the term landscape has been used in the German landscape archaeology (*Landschaftsarchäologie*) since the mid-1990s (Lüning 1997; Gramsch 2003). According to Andreas Zimmerman (2003; Zimmermann et al. 2004), landscape archaeology represents the research of the spatial organisation of human activity above the level of individual sites or communities, while emphasising the structure and function of landscape components (understood generally as settlement components). In his two seminal studies on the prehistoric settlement (mainly Neolithic, excavated in the opencast mining areas) in the Rhineland, Zimmermann and his colleagues provide evidence for aspects of landscape archaeology in two spheres: settlement history reconstructing the development of the area under study to the scale of individual villages and generations of their inhabitants, and the study of settlement structure on various scales. As exemplary questions of landscape archaeology, in this sense the author considers settlement density, demographic trends, circulation of raw materials, hierarchy of settlement units and similar.

We suggest here that the term 'landscape' can incorporate one crucial element which is not considered by the contemporary German model of *Landschaftsarchäologie*, and which is often missed in settlement and environmental archaeologies in general: unlike the 'natural environment', 'landscape' is indivisible from human beings and their cognitive activities. Human beings not only interact with the environment through materials, but they also perceive and interpret it, and the part of the environment which can be perceived and given meaning by people is incorporated within the idea of 'landscape'. The idea of landscape, then, can be used to capture how the physical environment is manipulated by people in a symbolic as well as a practical way. We naturally assume that this manipulation existed in the past, too, and should have left traces in the archaeological record. Therefore, we see the aim of landscape archaeology as being a process of reconstruction of landscape elements or larger parts of landscape in the past that works upon the identifiable and interpretable imprint of human activity in both its practical and symbolic aspects.

SETTLEMENT AND LANDSCAPE ARCHAEOLOGY IN CENTRAL EUROPE

In this section, we examine how archaeologies of settlement and landscape have developed in central Europe, introducing several influential concepts (*Landesaufnahme*, microregions, community area theory) and methods (analytical survey, predictive modelling). However, before introducing these concepts, it is important to underline some of the

particular influences upon the development of central European settlement and landscape archaeologies in this region – since the character of the central European archaeological record has shaped how archaeologists in the region have developed and used ideas of landscape.

Today, landscape archaeology in central Europe presents a number of challenges, not only because of the influence of culture history or Jankuhn's settlement archaeology on research in the region, but also due to the ongoing destruction of the archaeological landscape through intensive arable agriculture, which continues a process that began with medieval and post-medieval clearance and leaves just small areas of pasture and woodland in which elements of past landscapes survive above ground. Apart from hill forts or medieval field systems, above-ground earthwork features – whether from the prehistoric or medieval periods – are rare in the central European landscape. Another specific problem is the low frequency of artefacts made of durable materials such as flint. Whereas surface collection in southern England can recover thousands of flint tools and *débitage* during a short field survey project, but very few sherds of prehistoric ceramics (Shennan 1985), the situation in central Bohemia is quite the opposite. For example, during the British-Czech Ancient Landscape Reconstruction (ALRB) project in Bohemia approximately 30,000 fragments of prehistoric pottery were found during the five collection campaigns, contrasting with only approximately 600 items of flint, including Palaeolithic material and post-medieval strike-a-lights, and even fewer other durable items (fragments of stone axes, prehistoric glass or metals) (Kuna 1994, 1998, 2000).

Comparison of settlement densities in various prehistoric periods is not without its pitfalls, too. As already mentioned, the probability of finding a prehistoric settlement depends directly on defining sub-surface archaeological features. For example, the period of Corded Ware (Late Eneolithic in the Czech terminology, 2900–2500 cal. BC) is not characterised by the presence of sub-surface features such as houses or storage pits, and therefore not a single settlement site is known in the Czech Republic from this period – whereas very many Corded Ware cemeteries survive. This poses particular challenges for landscape archaeology. One answer is to maximize the exploitation of the evidence available. For example, a detailed analysis of residual pottery fragments, which previously had not received analytical attention, has recently been undertaken. The results of this research surprisingly revealed that there were more periods represented, often almost their complete spectrum, on most prehistoric settlement sites than had been recorded by standard excavation methodology (Kuna 2002). This example is a warning against premature conclusions concerning the density of prehistoric settlements on the basis of standard field data.

The central European archaeological resource also presents particular advantages, however. For example, in some periods ceramics from prehistoric settlements and cemeteries are so abundant and typologically distinctive that assemblages can be sorted into very fine-grained phases. As reflected in the analysis of Neolithic settlements in both Germany and Bohemia, by using this data the development of individual settlements and microregions can be detailed down to almost individual generations of their inhabitants. Such clarity in prehistory can only be surpassed by some of the dendrochronologically dated sites of the Alpine region.

Landesaufnahme

The first concept that we want to introduce, that of *archäologische Landesaufnahme* ('archaeological area scan'), has played an important role in the development of central European landscape archaeology since the 1960s. *Landesaufnahme* involves the systematic collection of all archaeological data within the maximum possible chronological span from the region under study. All the possible resources are used: museum collections, sites and monument records and published archaeological literature are combined with new data generated through systematic field surveys. The cartographic visualization of these data creates an integrated overview of the landscape which serves as a source for theoretical research and effective heritage management.

The term *archäologische Landesaufnahme* was first used by Karl Heinz Jakob in 1908, and was further developed between the wars by other German archaeologists (Alfred Tode, Albert Kiekebusch, Karl Kersten). It was Herbert Jankuhn (1973), however, who defined it as a principal method of settlement archaeology. In 1978, it was adopted in Poland by an ambitious project, *Archeologiczne Zdjęcie Polski* (Archaeological Record of Poland), for mapping the whole state territory (Mazurowski 1980) that continues to this day. Combining fieldwalking and documentary research on the standing monuments, it has now covered approximately 75% of the country and has registered some 290,000 archaeological sites (Barford et al. 2000: 73; Barford 2001: 27).

Unlike the focus of previous culture historical approaches, the *Landesaufnahme* allowed a regional (rather than a supra-regional) and diachronic (rather than chronologically selective) approach to the archaeological resource. In regions where archaeological evidence was sufficient, settlement archaeology, using the methodology of *Landesaufnahme*, achieved very complex reconstructions of the past landscape (cf. Jankuhn 1977; Kuna et al. 2004: 454). However, *Landesaufnahme* and its applications were characterised by an excessive empiricism and over-confidence in the surviving data patterns. The collection of 'all' the

data from any area is obviously impossible. *Landesaufnahme* as a method does not sufficiently consider the character of research as a never-ending and iterative process, in which sources themselves (their kind, quantity and availability) are inseparable from research questions and simultaneously change with them. Therefore, no research sources can ever be assembled either in completeness, or in advance for future research. For this reason, current archaeology has replaced the methodology of 'archaeological scan' with methods of archaeological sampling. It is no longer believed that archaeology can obtain a 'complete' data set once forever and for any future research question – it is rather believed that the method of data collection and the data itself always reflect the research question posed at the beginning. Different questions, therefore, deserve different field methods, which bring data sets of different characteristics (Kuna et al. 2004).

Siedlungskammer

While regional approaches developed in many traditions of archaeology during the 1970s, inspired especially by the New Geography (Coones 1985), in central Europe studies of *Siedlungskammer* (microregions) became a popular form of settlement archaeology, especially as an alternative to previous culture historical studies. It formed part of a general shift in the region away from typological and chronological questions towards a focus on the social and economic dimensions of settlement. The term 'microregion' appears to have first been used in the late 1960s in Poland by Witold Hensel (Barford 2001: 22). A similar approach had already been applied in the Czech Republic during the excavations of Neolithic settlements in Bylany area near Kutná Hora. Within this framework Bohumil Soudský (1966) formulated, for example, the model of cyclic (shifting) agriculture. This was a perfect example of an effective exploitation of microregional data, and although it is no longer generally accepted as a useful method, its stimulating effect cannot be doubted.

The term 'microregion' gained in importance in the Czech Republic, Poland and both German states mainly during the 1980s, since it was during that decade that extensive rescue excavations were undertaken in areas of brown coal surface mining in these countries – especially in Bohemia in the Czech Republic (Velímský 1987), in the Cottbus area in Niederlausitz, East Germany (Wetzel 1987), and in the Aldenhovener Platte in Rhineland, West Germany (Schwellnuß 1987). With square kilometres of cultural landscape disappearing almost instantaneously it was clear that archaeological excavation could not document the whole region with equal quality. The methodological answer therefore was to change to the systematic research of landscape

samples, or microregions. The available capacities of research institutions concentrated on microregions, usually defined as basins of small streams with fewer than a dozen settlement areas (prehistoric community areas). This in turn promoted studies concerning the mobility of settlement areas and settlement 'rotation' (Smrž 1981, 1987, 1994; Smejtek 1994), size of the settlement areas and settlement concentration (Kuna 1991) or the dynamics of settlement processes in the early medieval period (Meduna and Černá 1991).

The methodology used in the coal mining areas was consequently applied to other excavations and field survey projects, later on including the use of geographical information systems (GIS) and statistical analysis. Questions of settlement area dynamics, size and the density of prehistoric communities began to be investigated (Kuna 1991, 1997), as well as the location of activity areas in relation to local geomorphology and other landscape features (Kuna and Adelsbergerová 1995). In the mid-1990s an economic model of a prehistoric microregion was developed (Dreslerová 1995, 1996, 2002), and a method of prediction of prehistoric settlement sites was tested (Dreslerová 1998).

Similarly in Germany, the 1970s archaeological excavations in the brown coal district of Aldenhovener Platte led to a new focus on settlement archaeology (Lüning 1997; Zimmermann 2002). Extensive excavations were also undertaken in the southeastern Swabian Alb (Knipper et al. 2005) and in Hessen, in the central part of western Germany (Ebersbach and Schade 2005). These projects focused on settlement patterns from the level of individual houses to complete regions, demographic estimations, quantification of the settlement economy (mainly the size of arable fields and pastures) and mapping communication networks as demonstrated by the distribution of lithics.

Community Area Theory

Like the field research of *Siedlungskammer*, Evzen Neustupný's 'community area theory' (1986, 1991, 1998a) sought to give a deeper theoretical background to this research by presenting a general model of the settlement and social structure of prehistoric agricultural societies (Table 7.1). Neustupný suggested that the regularities observed in the organization of archaeological evidence, including regular distances between sites and continuity in occupation, often resulted from 'settlement areas' in the past. In this model, the remains of settlement activities of individual prehistoric communities accumulated within the original 'community areas'. Community areas were composed of activity areas with various functions. Neustupný's suggestion that components of various functions and dates with different archaeological visibility resulted from archaeological formation processes was

Table 7.1 The basic concepts of the community area theory. *After E. Neustupný 1986, 1998a, 1998b, 2001*

<i>Living culture</i>	<i>Dead (Archaeological) culture</i>
activity area (e.g. residential, funerary, production area)	component (residential, funerary, production component)
community area	settlement area
supra-community area (ritual, production area)	extra-settlement area (hill forts, rondels, mines)
sphere (world) of otherness	landscape

closely related to his wider 'theory of archaeological transformations' (Neustupný 1998a; Kuna 2001). Community area theory highlighted how some aspects of the past use of the landscape – such as fields, pastures, areas of wood resources or boundaries – are less archaeologically visible. Settlement space was understood as a continuum, rather than as a set of isolated points.

Community area theory is important mainly for the general perception of past settlement activities and the corresponding archaeological evidence. It is an approach that makes it possible to work with results of modern non-destructive methods in a way that conventional site-based archaeologies cannot. Neustupný has recently extended community area theory to explore the landscape dimensions of interaction between communities through the idea of *sféra jinosti* ('sphere of otherness'), which focuses especially upon the exchange of material culture and kin relations between different communities in the past (Neustupný 1998a, 1998b, 2001). The idea of the *sféra jinosti* highlights how activity areas may relate not just to a single community, but to relationships between communities. It has been applied to sites such as hill forts or industrial zones, for example in the Loděnice area discussed below (Neustupný and Venclová 1996; Venclová 2001); recently the idea of analogical 'ritual zones' has been considered (Waldhauser 2001).

Community area theory introduced a distinctive approach to landscape, which was seen as a 'spatially unconfined, but richly structured area, where the relations of otherness were in motion' (Neustupný 2001: 17). Landscape in this sense is not a geographical unit, but the relic of a past social world. Landscape, that is to say, is a part of the dead (archaeological) culture and comprises settlement areas and supra-settlement areas.

Analytical Survey

The large excavations of the 1980s inspired further projects in central Europe. Programmes of intensive field survey were developed in

Rhineland (Schwellnuß 1987), Bohemia (Meduna and Černá 1991) and outside the area of brown coal mining (Kuna 1994), and came to include not only surface artefact collection but also intensive aerial photography, which had been forbidden during the Communist period. In the 1990s similar surveys were also developed in other former Communist central European countries such as the Czech Republic, eastern Germany, Poland and Hungary, and were characterised by a new focus on landscape, rather than on sites in isolation. Analytical field survey used arbitrary spatial units which were covered with standard intensity; the results were quantified and analysed by various statistical methods.

Such analytical surveys approached the continual occurrence of archaeological data in the landscape as deriving from past activity areas that shifted location over time, although their movements were usually constrained by the boundaries of a community area, creating an extensive palimpsest of variously dated overlapping remains. Hence, concentrations of finds ('sites') might be seen not as the exclusive loci of past activities but as 'epicentres' of activity areas, where accumulations of remains mostly relate to more archaeological phases or cultures (Kuna 1998, 2000). Archaeological 'sites' are not identical with 'original' functional units, but are a result of secondary processes, of archaeological transformations. Analytical methods of field survey enable a quantitative analysis of the data collected and the application of sophisticated mathematical procedures. In particular, multivariate analysis of data (factor analysis, etc.) and its combination with geographical information systems (GIS) have proven to be very effective (Neustupný 1996).

Predictive Modelling

The increasing use of GIS since the 1990s has revived interest in location analysis and archaeological predictive modelling in central Europe, topics that can contribute to archaeological research as well as being applied to archaeological heritage management. By facilitating predictive modelling, GIS allowed archaeologists to assess the potential archaeological 'risk' of large industrial landscape interventions. In countries such as Holland and Denmark, predictive modelling has become part of the common heritage protection strategy, creating 'indicative maps of archaeological value' (Deeben and Hallewas 2003: 109). As a method, archaeological prediction is based upon an assumption of regular relationships between the use of the land and the characteristics of its geography. This assumption does not necessarily mean geographical or ecological determinism, because the relationships under attention need not be only those with practical functions (such as the distance from a water source), but could also be those with

social or symbolic value: their relation to the landscape may more easily change in time and between various cultures.

TWO CASE STUDIES

A number of shifts in central European landscape archaeologies have occurred in recent years. Previous approaches to archaeological sites as corresponding to past activity foci have been replaced by an awareness of how they are the products of formation processes. Site-focused approaches have been replaced by an understanding that the areas between sites can be significant – that a lot of significant data lies beyond sites. Where previously it was believed that a concise list of sites could represent the full complexity of past activities (this is where the concept of *Landesaufnahme* comes from), a shift towards a more appropriate theory and a more flexible field methodology is represented by the community area theory and the methodology of analytical field survey, as well as predictive modelling.

Two case studies drawn from the archaeology of the Czech Republic will serve to demonstrate the potential of contemporary landscape approaches: the study of an Iron Age zone of industrial production and the use of predictive modelling in the study of the construction of burial mounds during the Middle Bronze Age to Hallstatt periods (c. 1600–400 cal. BC) in South Bohemia (Figure 7.1).

The Landscape of an Iron Age Industrial Zone

The potential of the combination of community area theory and analytical field survey is clearly illustrated by the Loděnice project, which was carried out in the early 1990s (Neustupný and Venclová 1996; Venclová 2001). Field survey during this project concentrated on the microregion along the Loděnice and Bakov streams in the western part of central Bohemia, where nucleated Iron Age (La Tène) settlement and the remains of iron smelting and production of decorative arm rings made from sapropelite (a shiny, black shale related to cannel coal) have been identified. This area is also well known in Europe for the excavation of a *Viereckschanze* (rectangular enclosure) dating from the 2nd-1st centuries BC at Mšecké Žehrovice, which produced a famous Celtic carved ragstone head. Two relatively innovative elements were used in this project: an analytical fieldwalking survey of surface ecofact scatters, and the combination of multivariate mathematical analysis with GIS.

The ecofacts collected on the surface from an area of c. 11 square kilometres included concretions of pelosiderite, a potential raw material for a production of iron; both smelting and smithing slag; sapropelite both

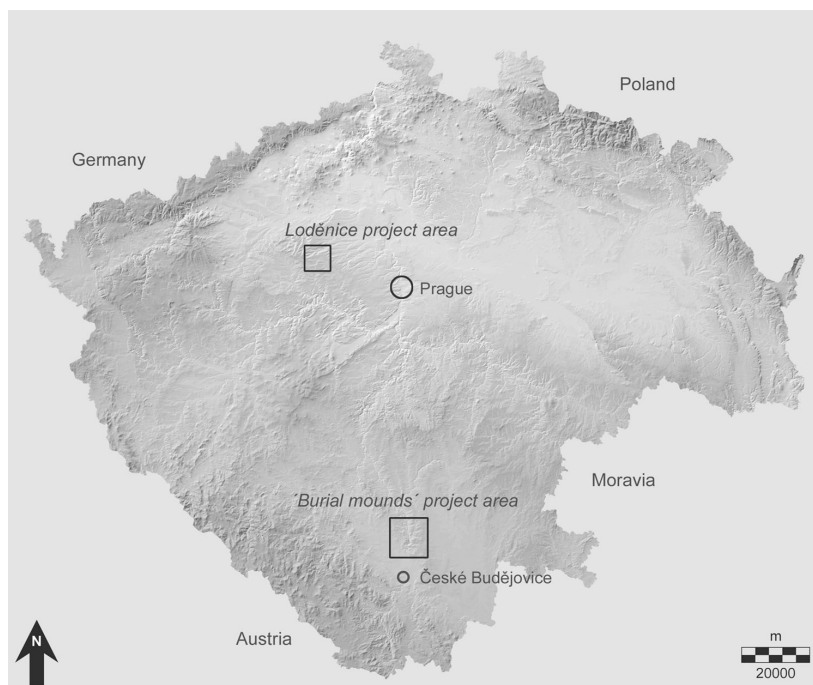


Figure 7.1 Map of Bohemia in the western part of the Czech Republic. The locations of the two projects discussed as case studies are marked by rectangles: Lodénice (north) and Hluboká n.V. (south). The circles mark the Czech capital Prague (north) and the regional center of České Budějovice (south).

as raw material and as waste from the production of saponite arm rings (Figure 7.2); as well as prehistoric and medieval pottery and fragments of arm rings. The surface patterning of the La Tène period ecofacts provided a completely new understanding of the prehistoric industrial activities. Traditional field methods such as excavations and survey aimed at identifying sites could not have detected prehistoric industrial waste on such a scale. Since the remains of these activities occur only in the plough soil and often spread over very large areas, their patterning cannot be recognised other than by analytical field-walking survey covering large parts of the landscape.

On the basis of the surface ecofact scatters, the term 'absolute quantities' was used to describe items that usually do not decay and disappear in the course of archaeological transformations and, therefore, their number in the archaeological record can correspond to the original number of the once-deposited items. This applies, of course, only to durable materials, in this case to iron slag pieces and items of saponite, with which we can judge the original quantity/intensity

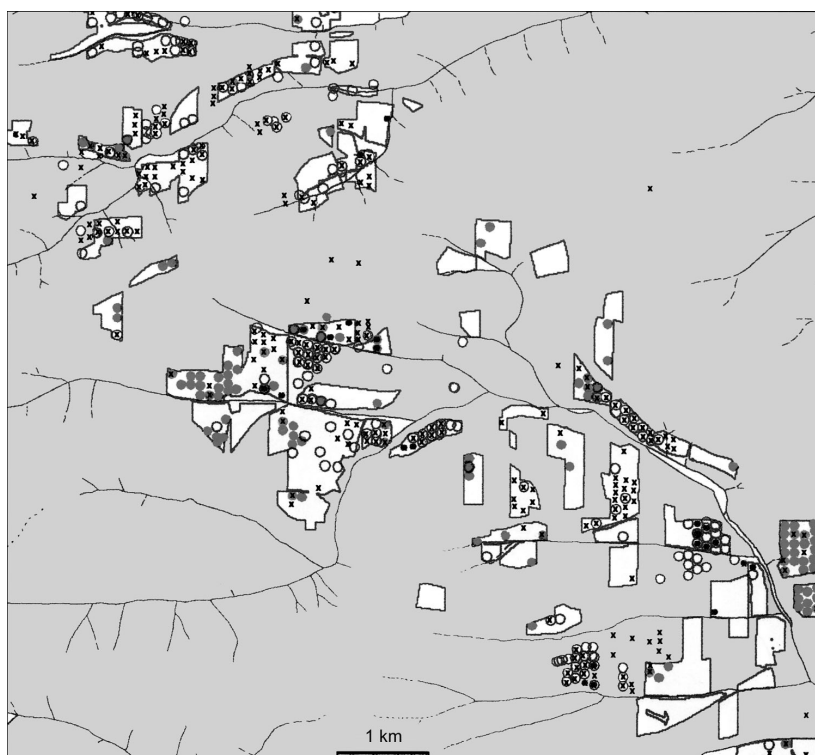


Figure 7.2 The Lodinice project area – an Iron Age industrial zone (distr. Rakovník and Kladno). Open circles: La Tène pottery. Gray circles: pieces of pelosiderite (concretions used as raw material in iron smelting). Black crosses: pieces of iron slag. White polygons: area surveyed.

of the past production. In contrast, the surviving quantities of items of other materials, such as prehistoric pottery, have been considerably reduced over time.

Multivariate analysis (principal component analysis) was used to study combinations of artefacts and ecofacts and the significance (factor scores) of individual fieldwalking sectors to identify factors of variability. From the observed patterning of these factors, the organisation of activity areas (components) was determined and their mutual relationships were interpreted.

Iron production could have been actively undertaken within the residential areas, but it was more commonly located on their periphery and in areas with less agricultural value. This model evolved through time as production areas moved further away from residential ones as the supply of fuel (wood) dwindled. The generally quite high density of

settlement components in this microregion indicates the intensity of the past production activities. However, not all of the activity areas could have been contemporary since the industrial activity was carried out during the La Tène period for a span of approximately 110 to 130 years.

In the northern part of the area under study (the Bakov stream valley), there are outcrops of sapropelite, which may have attracted people during the La Tène period. However, a comparison of their location with the spread of the sapropelite *débitage* accumulations shows that workshops were probably not directly dependent on the raw material sources. Sapropelite was quarried and partly worked on here, but the products were finished within the residential areas further away. There is only sporadic evidence for metalworking being found in the Bakov stream valley. In contrast, in the Loděnice stream valley (the next to the south) iron production appears to have been the main industrial activity (but not in all of the identified settlement areas), along with the finishing of sapropelite arm rings, usually from prepared pieces. There were also areas devoted only to iron production. This diverse and richly complex nature of the La Tène communities' industrial activities is still difficult to explain (Neustupný and Venclová 1996).

From the interpretation of the surface data it has been also possible to propose a hypothesis concerning the extent of prehistoric woodland cover in the landscape. Polygons with no surface occurrence of the pelosiderite were interpreted as an anciently deforested landscape (with all of the pelosiderite concretions collected as the raw material for the production of iron). Judging from this data, the landscape had to have been already widely deforested in the Iron Age.

According to E. Neustupný (2003) the example of the Bakov stream, which is characteristic of land with poor agriculture value, shows convincingly that the practical properties of landscapes did not impose any fatal limitations on prehistoric communities. People did overcome poorer environmental conditions if they found any practical function or meaning in the landscape (which supposedly happened in the case of sapropelite arm ring production). Seen from this angle, the human behaviour is far from being determined by nature environment – it is, therefore, better to speak of an adaptation of nature by man than of an adaptation of man to nature (Neustupný in prep.).

Burial Mounds in the Landscape

There are several reasons why the location analysis of funerary sites may appear to be (and in many aspects really is) more complicated than a similar analysis of settlement sites. Firstly, funerary components on the level of regions are usually less complete and/or less easily

detectable by the available field methods than are settlement sites. Secondly, the relationships of funerary areas to the attributes of the natural environment are more variable and less comprehensible to a modern observer. While the location of settlement sites must have paid some attention to the practical aspects of the natural environment, the location of funerary areas was probably even less confined by these factors, and instead responded predominantly to individual, culture-specific norms.

There are, however, several areas in Bohemia where the evidence of prehistoric funerary activities is extremely rich. Such cases may be connected to regions with convenient taphonomy, namely those that have not been deforested since the Middle Ages. One such region lies in South Bohemia (Czech Republic), north of the regional centre České Budějovice. This hilly region was once part of the Schwarzenberg estates, and forest has survived here because of the conversion from the 16th century of the entire landscape into several deer parks that still exist today. Most of the prehistoric tumulus cemeteries in this area were excavated between the 1880s and the First World War; their results provide an indication of the dates of the cemeteries (mostly from the Middle Bronze Age and Hallstatt periods, with the Early and Late to Final Bronze Age periods also being represented; altogether ca 2000–400 cal. BC), although the quality of the documentation is usually too poor to meet modern research needs (for the method of modern survey and the catalogue of sites see Šimana 1999; Beneš, Michálek and Zavřel 1999). The study area of 320 square kilometres consists for the most part of hilly relief, and about 45% of it is covered by forest. It is here that the deer parks were situated, preserving evidence of 96 prehistoric tumulus cemeteries with over 1,000 prehistoric burial mounds in total.

The study had two principal aims (Kuna 2006): to learn whether there were some general principles of locating mound cemeteries in the landscape, and to interpret the rules of burial location in terms of a more general settlement pattern. We considered whether there were settlement sites corresponding to each of the mound cemeteries, or whether there were large 'burial zones' being shared by more than one community living at a greater distance from the funerary areas. The latter solution seemed more probable at the beginning (there are clusters of cemeteries without any known settlement sites), but the crucial role of the different visibility of tumuli vs. settlement sites in forest is obvious. Our approach to the problem started at the location analysis of mound cemeteries by GIS, and stemmed from the idea that specialised 'burial zones' should have had different environmental characteristics from the cemeteries situated close to the residential areas.

The GIS analysis concerned several simple characteristics of the landscape, like the distance to the nearest water source, slope gradient

and slope aspect, but it also included some more complicated procedures which we programmed ourselves. The latter set of procedures included an identification of hilltops, ridges, edges and upper and lower parts of the slopes and valley floors. For each of these geomorphological elements their area was calculated as well as the number of cemeteries occurring within their extent. Using simple statistical tests it was then easy to see if some of the relief elements (features) were preferred or avoided.

Surprisingly, even these simple analyses produced quite patterned results. For example, the distance from water source showed the increasing significance of higher distance categories for the cemetery location, the clear peak of the values being in the 300–400 metre class. From what we know about settlement sites (from other regions, of course: there are almost no settlement sites known in the area under study), most of them could be expected to occur less than 300 metres from the streams. Hence, cemeteries seem to have been in slightly more distant locations than the settlement sites, but they still seem to be connected to the settlement zone along the water streams. Another interesting point appeared from the analysis of slope aspect. The pattern observed in our data (Table 7.2) shows a clear preference for southern slopes. For the location of a cemetery such a preference would not make much sense if the immediate vicinity of a settlement site could not be assumed.

Table 7.2 Burial mounds in the landscape, the Schwarzenberg deer parks area at Hlubokaa nad Vltavou, in the district Ceske Budejovice. Distribution of prehistoric tumulus cemeteries according to the slope aspect. Significant values marked bold

<i>Slope aspect</i>	<i>Spatial extent of the category in the landscape</i>		<i>Number of cemeteries</i>		<i>Index observed/expected</i>
	<i>km²</i>	<i>%</i>	<i>observed</i>	<i>expected</i>	
flat	2.6	0.8	0	0.8	0.0
N	37.2	11.6	5	11.2	0.4
NE	41.7	13.0	8	12.5	0.6
E	35.3	11.0	7	10.6	0.6
SE	37.6	11.8	15	11.3	1.3
S	50.7	15.8	20	15.2	1.3
SW	47.2	14.7	21	14.2	1.4
W	35.9	11.2	13	10.8	1.2
NW	31.9	10.0	7	9.6	0.7
total	320.1	100.0	96	96.0	1.0

Table 7.3 Burial mounds in the landscape, the Schwarzenberg deer parks area at Hluboka nad Vltavou, in the relief features. Hilltops are defined as the highest points within the radii of 100, 250, 500 and 1000 metres; hence, for categories of hills could be distinguished. Significant values marked bold

<i>Relief features</i>	<i>Spatial extent of the category in the landscape</i>		<i>Number of cemeteries</i>		<i>Index observed/expected</i>
	<i>km²</i>	<i>%</i>	<i>observed</i>	<i>expected</i>	
hilltops100	28.3	8.8	11	8.5	1.3
hilltops250	17.8	5.6	12	5.3	2.2
hilltops500	6.6	2.0	2	2.0	1.0
hilltops1000	4.0	1.3	5	1.2	4.1
buffers 25 m	18.6	5.8	7	5.6	1.3
ridges	60.4	18.9	31	18.1	1.7
upper edges	1.3	0.4	0	0.4	0.0
above (upper) edges	3.8	1.2	2	1.1	1.8
lower edges	2.7	0.8	0	0.8	0.0
flood plain	7.1	2.2	0	2.1	0.0
lower plain	4.8	1.5	0	1.4	0.0
upper plain (plateau)	1.3	0.4	0	0.4	0.0
lower slope (<10°)	82.6	25.8	16	24.8	0.6
upper slope (<10°)	57.1	17.8	9	17.1	0.5
steep slope (>10°)	23.7	7.4	1	7.1	0.1
total	320.1	100.0	96	96.0	1.0

Non-random preferences for the location of tumulus cemeteries are also illustrated by the analysis of relief landscape features. Table 7.3 shows the obtained values of significance for several relief elements, given by the ratio between the observed and expected numbers of cases. These values show that hilltops and ridges were clearly the most popular types of relief for the location of tumuli. Burial mounds often occur at dominant locations from which large parts of the landscape may be visually 'controlled' (Figures 7.3 and 7.4) (cf. Kuna et al, 2004: 253). This might argue for the special meaning of burial mounds, seeing them as territorial markers, monumental symbols of the community, etc.

During a more careful analysis of the data, two additional aspects were observed. The tumulus cemeteries obviously tend to appear in dominant places but not necessarily in the highest or the most prominent (i.e. least accessible) of all those available. If a prominent area is too far from the stream (i.e. from a potential settlement location) it is usually not used; a location on a slope (above a potential settlement site) seems, then, to have been sufficient. Similar results were obtained from a model of the 'suitable' (not steeper than 10 degrees, within the

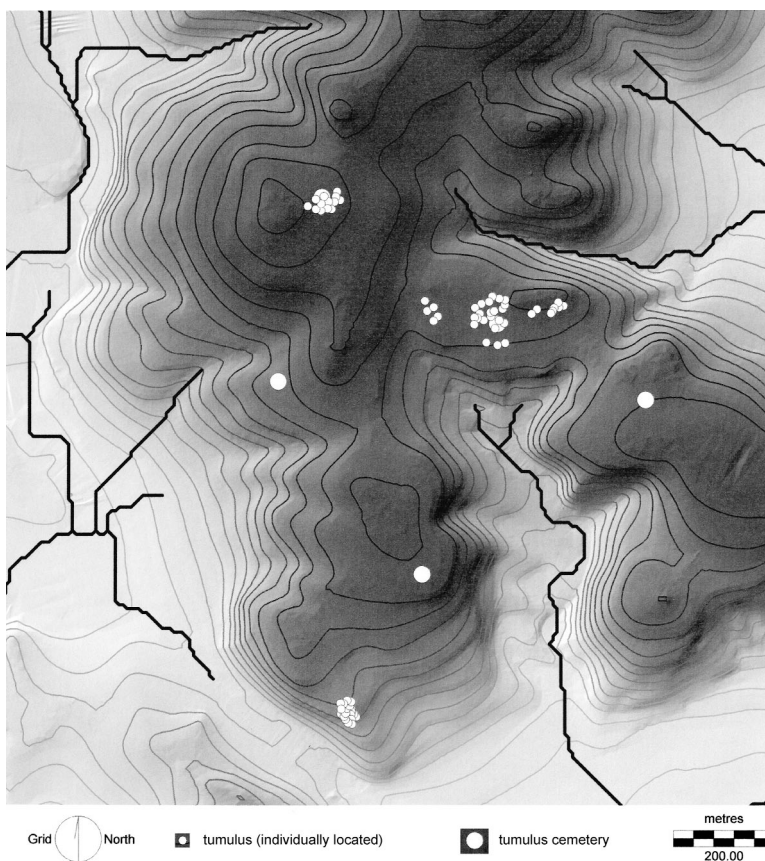


Figure 7.3 Burial mounds in the landscape, the Schwarzenberg deer parks area at Hluboká nad Vltavou, distr. Ěeské Budějovice. The position close to the edges of elevated plateaux, hilltops and the upper parts of slopes is typical. Small circles: burial mounds individually measured. Large circles: groups of burial mounds, not measured individually.

300-metre distance from the nearest water stream) and ‘unsuitable’ land. As seen in Figure 7.5, the tumulus cemeteries are not always situated on the ‘suitable’ land (i.e. within the area of the supposed settlement sites), but they are usually quite close to its peripheries and appear to avoid larger islands of the ‘unsuitable’ landscape.

All these observations have a common denominator: a close relation between the cemetery and a settlement site. Dominant places may have been preferred for the location of cemeteries, but not always; we must pay attention to other (and probably the decisive) aspects of the landscape, which in this case may have been the location of the settlement

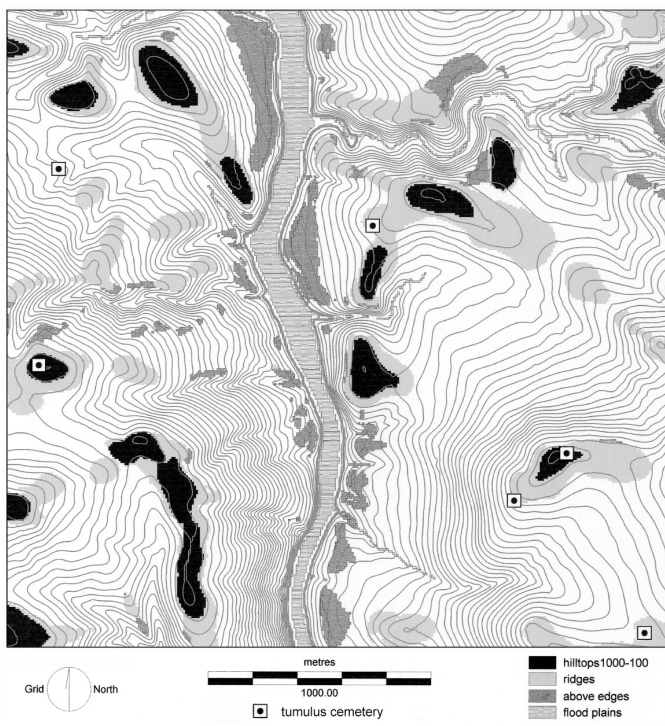


Figure 7.4 A GIS model of the landscape distinguishing the main relief elements (hilltops, ridges, edges and areas above them, floodplains) and the position of prehistoric tumulus cemeteries in the area of the Schwarzenberg deer parks (detail). The four categories of hilltops (see Table 2) have not been differentiated in this figure.

site. This, however, changes our opinion expressed at the beginning: the model which now seems more probable works with small settlement sites, each of which is closely accompanied by a cemetery. Such a model corresponds to what has been recently published on the Bronze Age settlement pattern in Germany and Denmark (Willroth 2001).

There are more hints to support this model. Firstly, in several sites in different areas of Bohemia some residual pottery fragments appear in the bodies of burial mounds. These have been interpreted as artefacts from settlement layers in the immediate vicinity of the cemetery brought during the mound construction (Čtrnáct 1954). From these cases we can also learn that if a sequence of a settlement and a cemetery is found, the cemetery is always later. This may mean that funerary areas were respected for a long time after they were created. In principle, the model of a close relationship between a settlement site and a tumulus cemetery could be verified by further survey, although any survey

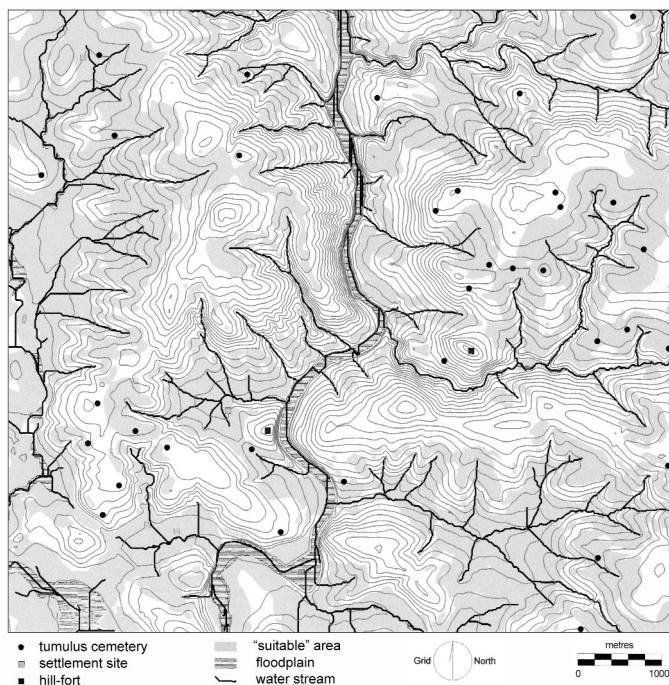


Figure 7.5 A predictive model of 'suitable' versus 'unsuitable' land for pre-historic settlement sites within the Schwarzenberg deer parks area (detail). 'Suitable' land (marked grey) is within 300 metres of water sources and on slopes below 10 degrees. The position of the tumulus cemeteries, two prehistoric hill forts and a few (generally not quite clear) settlement sites is marked.

looking for subsurface features (settlement sites) in a forested landscape is very difficult and demands special field methods.

This study of burial mounds shows that GIS as a methodological tool includes much more than simple procedures for measuring distances and slope gradients – it is a tool which can, if used creatively, help us to understand how people in the past perceived their landscapes and employed them in their social strategies. Studying the relation between residential and funerary areas may contribute to our knowledge of the past social structure, particularly if more field research is done in the future.

CONCLUSION

The development of landscape archaeology in central Europe has, as anywhere else in the world, been strongly influenced by the character of the region's archaeological resources. Compared with Atlantic Europe

and Scandinavia, in central Europe there is a certain lack of what is normally understood to be the archaeological landscape – visible landscape features such as field boundaries or monuments. Rather, the central European archaeological record yields a lot of 'on-site' evidence of a high quality, mostly in the form of rich residential and funerary sites. These components can usually be structured with a high accuracy, providing the base for detailed chronologies, settlement histories and settlement patterns. No wonder that under such circumstances 'landscape archaeology' as a specific approach was mostly either neglected or – as in the case of contemporary German archaeology (*Landschaftsarchäologie*) – used to mean something else than in the English-speaking countries (a sophisticated version of modern settlement archaeology in the given example). The Czech theory of the community areas, too, derives from settlement archaeology; the term 'landscape' is used here in a marginal context and with a meaning that is incompatible with that of other archaeological schools. The different understanding of the term 'landscape' is, anyway, deeply rooted in the history of the discipline and certainly will not change in the near future.

Within the conceptual framework of archaeology in central Europe it is particularly difficult to identify a difference between the concept of 'landscape' on the one hand, and the concepts of 'environment' and 'settlement pattern' on the other. 'Landscape' is often used as a synonym for one of the other terms. To make our point of view clear, we would argue that 'landscape' as a concept should be related to human perception. Unlike 'environment' or 'settlement pattern', 'landscape' is a set of natural or man-made features on the Earth's surface, which are (or can be) perceived by people and given meaning by them. Such a definition, however, would hardly be agreed upon by most archaeologists in central Europe, mainly because of the very fact that human perception is understood as a sphere inaccessible to archaeology and, thus, inappropriate for the debate.

Since the 1960s, landscape archaeology has played an important role in broader shifts in central European archaeology, away from typologies and chronologies toward questions of the economy, demography, social structure and symbolic systems of the past cultures. As our two case studies show, while they may be different from the landscape archaeologies common in other parts of Europe or elsewhere in the world, archaeologists in central Europe are continuing to develop sophisticated approaches to landscape in archaeology.

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