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HUMAN CONDITION, LIFE, AND DEATH AT AN EARLY NEOLITHIC SETTLEMENT: BIOARCHAEOLOGICAL ANALYSES OF THE VEDROVICE CEMETERY AND THEIR BIOSOCIAL IMPLICATIONS FOR THE SPREAD OF AGRICULTURE IN CENTRAL EUROPE

ABSTRACT: *In this final chapter, we discuss the major issues that have informed our research about Vedrovice, place them into the broader context of the LBK origins, and address research questions relating to the emergence of the LBK tradition in terms of both, the population dynamics and population movement on the one hand, and culture change and cultural transmission on the other. We go on to summarize and discuss the results of our collective research relating to the ancestry of the Vedrovice community, the health condition, palaeodemography and nutrition of its inhabitants, their social status and social differentiation, and the transmission of cultural traditions inter-generationally and through contact as the major vehicle of culture change that brought about the development of the LBK culture. We go on to reconstruct life biographies of selected individuals from Vedrovice community in order to illustrate the personal diversity and variability of those who made up the Vedrovice community, and to emphasize that we can, through a combination of biological and cultural analyses, within the bioarchaeological approach and through biosocial archaeology, reconstruct life histories of people who died long ago. At a theoretical level, we stress that it is individuals and their life-long history and experience that collectively create communal histories and transform cultural traditions, leading to cultural innovations that the LBK represents. We conclude that Vedrovice was, in all likelihood, a Neolithic "gateway community", both receiving individuals from afar and maintaining long-distance, extra-regional contacts, and also contributing through out-migration to the generation of other LBK communities in Bohemia.*

KEY WORDS: *Mesolithic – Neolithic – Agricultural transition – Bioarchaeology – Vedrovice – LBK – Ancient DNA – Biochemical analyses – Personal identities – Contact-induced culture change – Cultural transmission*

INTRODUCTION

The Vedrovice bioarchaeology project was conceived as a multi-disciplinary approach to reconstructing biological and social life at Vedrovice, with an overall relevance to deepening our understanding of the transitions to agriculture in central Europe. At the heart of the project was the notion of synergy between the various analyses

undertaken on representative samples of human skeletal material from the "Široká u lesa" cemetery associated with the Vedrovice LBK settlement. This represents a new approach to understanding and interpreting human remains, which takes us beyond previous bioarchaeological studies that have been mostly focussed on reconstructing dietary patterns from bone chemical analyses and conducted in relative isolation from associated cultural material, even

though the advances these studies had achieved and major debates they had generated must be acknowledged (e.g. Tauber 1981, 1986, Lidén, Nelson 1994, Lidén 1995, Larsen 1997, Bonsall *et al.* 1997, Katzenberg, Weber 1999, Antanaitis, Ogrinc 2000, Lillie, Richards 2000, Richards, Macaulay 2000, Schulting, Richards 2000a, 2000b, 2002, Richards *et al.* 2003, Eriksson *et al.* 2003, 2006, Eriksson 2004, but see Eriksson 2003, Bentley *et al.* 2002, 2003a, 2003b, Lillie *et al.* 2003, Milner *et al.* 2004, Ogrinc, Budja 2005, Richards, Schulting 2006, Lillie, Jacobs 2006). It was clear to us during the formation of the project that certain analytical techniques would complement each other and enable us to draw out elements of individual life histories that were otherwise invisible using single analytical approaches. The result of this synergy is an unprecedentedly detailed view into the human condition of Neolithic individuals, culminating in the reconstruction of specific individual life biographies which we present below. Thus, for the first time, the lives of people linked by a common tradition – the LBK or Linear Pottery culture – are reconstructed in detail.

Earlier treatment of human skeletal remains has concentrated either on human biological conditions such as mortality profiles, health and pathologies, on dietary patterns, or on societal and ideological aspects of the buried population (e.g. O'Shea, Zvelebil 1984, Bennike 1985, O'Shea 1996, 2003, Jacobs 1995, Larsson 1988, 2002, 2003, 2004, Zagorskis 1987, 2004, Eriksson *et al.* 2003, Meiklejohn *et al.* 1998, 2000, and references above). Our approach, which we prefer to call *biosocial archaeology*, recognises that humans are both biological organisms and social creatures, and emphasises the interaction between these two aspects of the human condition. It is only when we understand both the biological and social aspects of human existence that we fully understand the individual, the community and the society in which they lived. This approach has been outlined in earlier works (Bush, Zvelebil 1991, Meiklejohn, Zvelebil 1991, Larsen 1997, Eriksson 2003). We have applied the approach to its greatest extent in this study of the Vedrovice skeletal population. The results that we have obtained fully validate our theoretical viewpoint, and elucidate the importance of understanding a number of scientific applications from a synergetic perspective. In terms of explanation we can now comprehend prehistoric populations at different levels; beginning with an individual life history, moving on to the communities that were comprised of such individuals, and beyond that the broader social identities which are usually referred to as "cultures" in the archaeological literature.

Although a number of scholars have analysed various aspects of the major archaeological resource that Vedrovice represents, there has been a marked lack of cross-fertilisation and information exchange between these individual studies (see articles by Crubézy 1996, Crubézy *et al.* 1997 and 2002 on mortality profiles and skeletal pathologies; Frayer 2004 on dental remains; Květina 2004 on the reconstruction of social identities through grave goods; Smrčka *et al.* 2006

on stable isotopes of bone from the Vedrovice settlement; and more recently by Jarošová *et al.* 2008 on buccal microwear, Fojtová *et al.* 2008 on the physical anthropology of the Moravian Neolithic and Smrčka *et al.* (2008b) on stable isotopes and migration within the Moravian Neolithic). By contrast, the comprehensive publication of the Vedrovice excavations (Podborský 2002) stands out as a commendably integrated approach to the archaeology and physical anthropology of the site. Our work on the Vedrovice burials represents an attempt to explore new analytical avenues to the material, as well as to strengthen communication between otherwise isolated studies, and hopefully represents a change of direction.

While the hunter-gatherers of the Mesolithic practiced a wide range of burial practices (Larsson 2004, Nilsson-Stutz 2003), it nevertheless seems to be the case that normative burial practice in the Mesolithic was "quite homogenous, bearing archaic features and revealing the hunter-gatherer way of life" (Gerhards *et al.* 2004: 560). The extended inhumation formed a part of this normative burial practice, although other forms of interment, including flexed or contracted position, seated position, disarticulated deposition, and cremations were also practiced. These departures from the norm were variously interpreted as expressions of social or ritual position (e.g. O'Shea, Zvelebil 1984, Clark, Neeley 1987), in terms of gender, sexual orientation and social identity (e.g. Meiklejohn *et al.* 2000, Schmidt 2000), regional and chronological variation (e.g. Larsson 2003) or in part as an artefact of burial practice and taphonomic processes (Jacobs 1995, Nilsson-Stutz 2003).

The first Neolithic communities of temperate Europe, including central Europe and involving the LBK cultural tradition, appear to have had a far more standardised burial practice, based on flexed or contracted inhumation, mostly laid on the left side and oriented towards the east or south-east more often than in other directions (e.g. Čížmář, Dočkalová 2008, Pavlů, Zápotocká 2007, van der Velde 1995). This form of burial has clear links to practises in the Danubian Basin and southeast Europe (Whittle 1996, Pavlů, Zápotocká 2007, Bailey 2000). It is only towards the end of the LBK tradition in central Europe that cremations take over as the principal form of burial within the context of the Stroke-Ornamented Ware and the Lengyel cultures (including the Moravian Painted Ware); while in the west and the north of the LBK region, there is, ultimately, a return to extended inhumations within the context of the formation of the Funnel Beaker, or the TRB cultural tradition (e.g. Midgley 1992, 2002) emphasizing, arguably, the role of social traditions of Mesolithic ancestry.

Around 300 burials exist for the Moravian LBK. This is an important resource, given that the number of known burials declined through the LBK as cremation rose in importance, becoming a standard form of burial in the succeeding Middle and Late Neolithic (only eight inhumations are known for the Stroke-Ornamented Pottery culture and 40 for the Moravian Painted Ware/Lengyel

culture – Dočkalová, Čížmář 2008). Even though flexed burial was the norm, this involved several forms of mortuary disposal in the Moravian LBK: inhumation in cemeteries associated with small hamlets; group inhumations within settlements, group inhumations outside settlements; single inhumations within settlements; inhumations within house structures; inhumations bearing traces of violence; and the recovery of disarticulated skeletal parts. One of the oldest examples of human remains from the period in Moravia is a bone fragment recovered from a granary pit (Dočkalová, Čížmář 2008). LBK burials generally fall into Phase 1B of the regional scheme developed by Pavlů (2007: 27–28). A number of the Vedrovice burials fall into this phase, although three phases are represented overall, i.e. subphases 1B1 and 1B2 beforehand and 2A afterwards. This having been said, the amount of individuals that can be assigned to Phase 2A numbers only three, thus we are unable to undertake any serious comparison of change over time, i.e. between phases (Pettitt, Hedges 2008).

The inhumations in the "Široká u lesa" cemetery at Vedrovice were deposited over the course of the 53rd century BC and, perhaps, a little into the early 52nd century BC, a period spanning five or six generations (Pettitt, Hedges 2008). Over this time ceramic fashions changed, with an early phase (1B) that lasted two or three generations giving way to a later phase (2A) around 5200 BC. In the wider context Vedrovice falls within the middle LBK Flomborn phase which saw a major expansion of the LBK into central Europe (Gronenborn 1999, Price *et al.* 2001). To a certain extent then, the Vedrovice community can be seen as pioneer to the region, at a time when agriculture was newly established in central Europe. The relevance of the Vedrovice project to understanding social and biological conditions of human life at the origins of agriculture in the region is therefore clear. The dead were buried contracted, usually lying on their left hand side (with eight exceptions) in shallow oval pits generally aligned SE-NW and facing broadly towards the east (Podborský 2002, Dočkalová, Čížmář 2008). The richness and type of grave goods differed between males, females and children (see chapters in Podborský 2002, Květina 2004 and compare the wider study of John 2005). This accords with wider observations about LBK grave goods such as at Elsloo in the Netherlands and elsewhere within the LBK cultural tradition (e.g. van der Velde 1995, Whittle 1996, Bailey *et al.* 2008).

BIOLOGICAL ORIGINS, LIFETIME MOVEMENTS

While the degree of preservation of DNA molecules in the skeletons sampled for sequencing was poor, Bramanti (2008) successfully sequenced ancient mtDNA from six individuals (three male and three female) of sixteen originally sampled for analysis. She observed a prevalence of mutations belonging to haplogroups T2 (male individuals 15/75, 23/75) and K (female individuals 22/75, 72/79 and

91/80), to which one can add H (male individual 59/78) and U (probably female individual 93a/80), all of which derive from the European Early Upper Palaeolithic and probably the initial expansion of *Homo sapiens* into the continent. These have also been observed in other LBK material from sixteen LBK sites in Germany, Austria and Hungary (Haak *et al.* 2005), and form the later Eneolithic Corded Ware site of Eulau, where K1b group was found (Haak *et al.* 2008). Identification of mutation 16298c of haplogroups V and K (V in male individual 77/79, K in female individuals 22/75, 72/79 and 91/80) shows a western European Late Upper Palaeolithic contribution respectively. Haplogroup J1c (female individual 48/77) is widespread among modern Eurasian populations and according to Richards *et al.* (2000) has a major association with the spread of the Neolithic.

The genetic complexity of the six individuals sequenced is apparent. Although we must be cautious that these data reflect genetic ancestry and not movement patterns, the European material in the identified sequences has a notable distribution in present-day eastern Europe as noted by Bramanti (2008) and is at least consistent with a degree of biological origins in the east of the continent and thus with a degree of population movement. Haplogroup K is widespread among living individuals in Eurasia, the Near East and northern Africa and accounts for ~7% of total data in modern western Europe, and probably derives from the human recolonisation of Eurasia from refugia as the conditions of the Last Glacial Maximum ameliorated after ~16,000 BP. As with the study by Haak *et al.* (2005) our results support the notion of an *in situ* European (i.e. Palaeolithic) ancestry for central European Neolithic populations; this is reinforced by the apparent absence of the N1 haplotype at Vedrovice so far (cf. Haak *et al.* 2005: 1017–1018).

Kráčmarová *et al.* (2006) have elaborated recently upon the relative contributions of "Palaeolithic" and "Neolithic" Y-chromosome haplogroups to the modern Czech population. Variations on the Y-chromosome trace ancestry and movement of male populations, rather than female ancestry and female relocation, have been encoded in the mtDNA chromosomal variation, and so it is subject to different pace and patterns of movement and migration, as we know from anthropological and ethnographic sources. Even so, the major conclusion of the study of modern Czech male ancestry shows the overwhelming predominance of Palaeolithic genetic markers – about 80% of the sample – and the relative paucity of the Y-chromosomal haplogroups associated with the Neolithic expansion of the first farming communities from their initial homeland in Anatolia and the Near East (Kráčmarová *et al.* 2006, see Zvelebil, Pettitt 2006 for further discussion).

The study reaches clear and highly significant conclusions. First among these is the predominantly Palaeolithic origin of the modern (male) Czech populations as indicated by the Y-chromosome polymorphisms. This is fully in keeping with the pan-European picture with the exception

of southeast Europe and the Aegean (Semino *et al.* 2000, 2004, King, Underhill 2002, Chikhi *et al.* 2002, Kayser *et al.* 2004). This general conclusion about male ancestry is now beginning to be increasingly supported by studies in ancient mitochondrial DNA, tracing the female line also to European lineages of Palaeolithic ancestry (Haak *et al.* 2005, Bramanti 2008).

The second conclusion of Kráčmarová *et al.* is that the contribution of individual Y-chromosome haplogroups R1a (31.7 %), R1b (28.3 %), and I (20.6 %) to overall ancestry in the Palaeolithic is of key importance. In the original study by Semino *et al.* (2000) R1a and R1b were linked with Early Upper Palaeolithic ("Aurignacian") dispersals into Europe between ~40,000 and 30,000 BP, while haplogroup I was linked to the later (Mid Upper Palaeolithic) emergence and dispersals of the Gravettian cultural tradition between ~29,000 and 21,000 BP. These haplogroups arose as a consequence of mutations M170=I, M173 (M207 in the Czech study)=R1b, and M17 (M207 here as well, p. 242–243)=R1a. It has been suggested by Kráčmarová *et al.* (2006: 245–246) and others (e.g. Semino *et al.* 2000, Wiik 2002) that R1b, which is predominant in southwest Europe (Kayser *et al.* 2004), constitutes the genetic trace of a Late-glacial dispersal out of the Solutro-Magdalenian glacial refugium of southern France and northern Iberia to recolonise central Europe and further the Northern European Plain, while R1a represents a Late-glacial recolonisation from the refugium in the Ukraine, where this haplotype is predominant. More tentatively, haplogroup I is held to represent recolonisation from the Balkan peninsula or southern France (Kráčmarová *et al.* 2006: 245).

There is one more element to this story. The distribution of M17 (haplogroup I) is greatest in northern Italy, the Rhineland, and the Alpine and north Balkan regions (e.g. Marjanović *et al.* 2005, Perićić *et al.* 2006). It is in this region that the Gravettian and its Late-glacial continuation, the Epigravettian, persist longest. The frequency of M17 (I) genetic signature declines sharply further south to southeast in Europe and the Aegean, where haplogroups associated with the Neolithic introduction of farming predominate (Gkiasta *et al.* 2002, King, Underhill 2002, Perićić *et al.* 2006, but see Marjanović *et al.* 2005).

In our opinion, we are dealing here with a demographic palimpsest that marks the first major cultural frontier in the dispersal of Neolithic farming into Europe (Zvelebil 2000, 2004). Farming was brought into the Aegean and the southern Balkan regions by farmers who physically migrated from the Near East and Anatolia, using both the sea route across the Aegean and the land route across the Dardanelles, early in the 7th millennium BC (Perlès 2003). Culturally, this is marked by the "First Balkan Neolithic" traditions, while genetically, Neolithic haplotype signatures overlay the earlier M17 – mutated I haplogroups – leading to a sharp genetic boundary in modern populations. Cultural and genetic interaction between the Starčevo–Karanovo and Criş–Körös communities and local hunter-gatherers in the

coastal Adriatic, northern Balkans, and south-central Europe resulted in the next generation of Neolithic communities, including the LBK culture ~5600 BC. Genetically, this included the M17 (I) haplotype males, in other words, the local population. First, the consolidation of the LBK culture in the core area of origin occurred (eastern Austria, southern Moravia, southern Slovakia and western Hungary; see for example Gronenborn 2004, Bánffy 2004, Lukes, Zvelebil 2004). Subsequently, expansion to Bohemia, Germany, Saxony and southern Poland occurred, defining the extent of the "earliest", or "älteste" LBK horizon culturally. This population dispersal carried the M17 (I) genetic signatures to the regions of central Europe covered by the earliest LBK dispersal.

The emerging genetic picture, then, while based at the time of writing mainly on modern mtDNA and Y-chromosomal DNA, is also supported by ancient mtDNA studies carried out so far, including the Vedrovice sample (see above), and corresponds broadly to the archaeological data revealing a palimpsest of ancestral cultural traditions, that can be summarized as follows:

- A refugium phase in which European populations were restricted to the southwest, south-central, and southeast peripheries of Europe, associated with the Solutrean and Epigravettian groups.
- An eastwards spread of the Badegoulian from central Europe, possibly associated with the mitochondrial haplogroups H and pre-V.
- A major demic expansion of the southwest refugium associated with the Late Upper Palaeolithic Magdalenian, correlating with major founder effects in the mitochondrial and Y-chromosome haplogroups (particularly the R1b haplotype), reaching as far north and east and the Vistula and western Carpathians, i.e. close to the modern Czech/Slovak border.
- A major demic expansion of groups from the eastern refugium of the eastern Carpathian Molodovan culture possibly associated with the mitochondrial haplogroups H and pre-V and with the M17 (R1a) Y-chromosomal haplotype, reaching as far west as the Vistula and western Carpathians.
- The development of regionally diverse Final Upper Palaeolithic and Mesolithic groups from these, reflecting genetic and cultural inheritance and increasing development of woodland into the Holocene.
- The physical dispersal of agriculturalists into the Aegean, southern Italy and the Balkans, associated with the First Balkan Neolithic.
- Interaction between early Neolithic communities and indigenous hunter-gatherers which resulted in the LBK tradition and further dispersal marked by Y-chromosome haplotype variations.

While modern and ancient DNA analyses inform us about individual and collective ancestry of modern and prehistoric populations, sulphur isotope analyses of skeletal remains reflect where individuals have been living over the last 10–20 years of life, and thus their recent geographies.

TABLE 1. Comparison of individuals in terms of local or exotic habitation, based on strontium (start life) and sulphur (later life) isotopes (Richards *et al.* 2008, Smrčka *et al.* 2008a). Where only strontium (Sr) or sulphur (S) measurements are known for a specific individual we make the default assumption that individuals are local in the missing dimension.

	Later life: local resident	Later life: local travellers
Start life: localborns	adult males 15/75, 23/75 (S only), 25/75 (S only), 50/77 (S only), 54/78, 57/78 (S only), 59/78 (Sr only), 66/70 (Sr only), 71/79 (S only), 73/79, 77/79 (S only), 82/79, 95/80 (S only), 99/81, 108/84 (S only), adult females 13/75 (S only), 38/76 (S only), 42/77, 48/75, 62/78, 64/78, 72/79 (S only), 75/79, 80/79, 86/78 (S only), 86/80 (S only), 87/80 (S only), 91/80 (S only), 93a/80, 97/80 (S only), 100/81 (S only), 104/81, 107/82, unsexed adults 89/80 (S only), 90/80 (S only), 96/80 (S only), children 16/75, 17/75 (S only: high sulphur probably due to breastfeeding/development), 28/76 (S only), 30/76, 31/76 (S only), 39/80, 43/77, 44/77 (S only), 56/78 (S only), 81b/79 (newborn), 84/80, 105/81, 106/82 (S only) (N=48)	adult females 14/75 (S only) and 101/81 (S only), adult male 63/78 (S only) and very old male 95/80 (N=4)
Start life: exotic "bornaways"	adult females 38/76 (Sr only), 51/77 (Sr only), 102/81, 70/79 (N=4)	adult male 79/79, adult female (51/77)? (N=1)

These were analysed from 50 Vedrovice individuals (Richards *et al.* 2008). The results were consistent with local origins for the majority of the population, although five possessed values indicative of living elsewhere over the last 10–20 years of their lives. Of these, two adult males and one adult female possessed higher sulphur isotope values than average, and one adult male and one adult female possessed lower, which, while specific locations cannot as yet be identified, suggest that Vedrovice immigrants came from at least two distinct areas.

In contrast to the sulphur isotopes, strontium isotopes extracted from teeth reflect where individuals were living while their tooth enamel was forming, thus their childhood or developmental geographies. Richards *et al.* (2008) analysed strontium isotopes from 22 Vedrovice individuals. Predictably, the majority of values are local in origin, although five individuals differ from the norm; one female had higher values than the majority, and one female and two males lower, indicating that they spent at least part of their childhood away from Vedrovice. These "bornaways" probably grew up in the upland areas to the northwest and to the southeast of the settlement. In addition, one or possibly two individuals were born away and lived most of their life away from Vedrovice (Table 1). Table 1 contrasts the location where individuals grew up (as reflected by strontium from teeth) and where they spent the last 10–20 years of life prior to ending up buried at Vedrovice.

It is clear that most of the individuals in the Vedrovice death assemblage were born, lived and died in the locale, especially so as it is likely that individuals for whom we have no data may be assumed to have been local too. Several individuals, however, stand apart from this pattern. Two adult females, one adult male and a male who lived to a very old age, while local in origin, had clearly spent some of their adult lives away from the Vedrovice area; four adult females were clearly born elsewhere, and one adult male (79/79) must have spent much of his childhood and adulthood away

from the Vedrovice area, possibly in coastal regions where marine resources were utilised. Of these exotic late-in-life incomers, the female was buried with a standard female grave goods assemblage (decorated pottery vessels), whereas the male was buried with one of the richest grave goods assemblages in the cemetery including a shoe-last adze, bowl, imported Polish flint blade fragments possibly indicative of a hunter's status, boar tusk, and a Spondylus pendant. In addition to individuals who immigrated into the community, Lillie (2008b) has considered whether the under-representation of males in the Vedrovice cemetery (see below) is indicative of out-migration (for example of males older than 20s). Smrčka *et al.* (2006) note on the basis of a multi-elemental chemical analysis of a smaller sample of 11 burials from the Vedrovice settlement that 67% of the buried were "migrants" (Smrčka *et al.* 2006: 329).

The results suggest that a small but significant percentage of the Vedrovice community (about 10%) were exotic to the settlement and derived or interacted with areas at all points of the compass. This includes upland areas to the north, west and east and the Danubian Basin to the south. There are suggestions archaeologically that the upland areas would at this point of time still be supporting Mesolithic hunter-gatherer communities (e.g. Pavlů 2005, Lukes, Zvelebil 2006, more broadly Gronenborn 2003, Svoboda 2003, Kind 2007, but see Vencel, Fridrich 2007) although this is difficult to confirm by chronology, but given the lack of early Neolithic settlement in these areas we suspect that derivation from or interaction with hunter-gatherers is highly likely. Males and females were clearly mobile into and out of the Vedrovice area. This is a pattern that has been observed elsewhere. Strontium analysis of LBK individuals from Flomborn and Schwetzingen in the Rhine Valley, for example, has demonstrated evidence of migration of both males and females, with females in the main joining the agricultural community having grown up in the uplands surrounding the Rhine Basin (Price *et al.* 2001, Bentley

et al. 2002, 2005, Gronenborn 2003). This is a common pattern observable in ethnographic contexts in Africa and the Philippines and is widely discussed in anthropological literature (Zvelebil 1986, 1996, Pennington 2001, and see references therein). We suspect it was a critical mechanism for keeping scattered LBK communities viable and facilitating its spread (see below).

PALAEODEMOGRAPHY, HEALTH AND NUTRITION

From the analysis of 81 individuals available for study we were able to reconstruct the palaeodemography, and health and nutritional status of the Vedrovice population in some detail, i.e. from 22 males, 35 females, 22 non-adult and two indeterminate individuals. Mean stature for males was 167.23 ± 3.55 cm and for females 155.12 ± 5.92 cm. Lillie (2008b) compared these to means for the Mesolithic and Neolithic as presented by Meiklejohn *et al.* (1984) and suggests that the Vedrovice males approximate the Neolithic stature and the females the Mesolithic, although given the standard deviations on these estimates this is difficult to demonstrate with any confidence. Life expectancy at birth based on a sample of 104 individuals from the cemetery and settlement is most confidently estimate at ~31 years, a little lower than the Neolithic average of ~34 years (Crubézy *et al.* 1997), although Lillie's estimation using only cemetery data shows how this can be skewed as it resulted in an estimate of ~27 years. We suspect that the cause of this skew in cemetery data is out-migration of mature individuals which are therefore under-represented in the cemetery sample. Relatively low mortality rates were observed for ages under 20, and low rates continued through to the mid 30s, after which mortality rates markedly increased. The under-representation of non-adults is noticeable, which accords well with later Mesolithic samples from Skateholm and Olenii Ostrov.

The reasons for the under-representation of children, however, may be different in the two kinds of communities. In Mesolithic cemeteries, there is no consistent evidence that children would be buried elsewhere (e.g. Lillie 2008a, Nilsson-Stutz 2003, Larsson 1988, 2003, 2004, Eriksson 2003, Zagorskis 2004/1987). The paucity of child burials may be related to differing taphonomic histories (i.e. the fragile preservation of child remains), or to social factors such as the age at which a child became a social being and community member, and was therefore thought fit for formal burial. In the central European Neolithic (including Vedrovice), we note that the isolated burials within settlements are predominantly children (Smrčka *et al.* 2006, Čížmář, Dočkalová 2007, Schenk 2007, cf. Lillie 2008a) which may perhaps be taken to support the social interpretation. At Vedrovice, seven out of 11 burials at the settlement were of children (Smrčka *et al.* 2006), while at a cognate early LBK settlement at Těšetice-Kyjovice, six out of 11 burials belonged to children (Čížmář, Dočkalová

2007). This practice seems to represent foundation and/or closure acts associated with houses, and can also be found in the Early Neolithic of Southeast Europe as well as in central Europe (e.g. Hodder 1990, Whittle 1996, Thomas 1999). While its roots probably lie in the emergence of the Neolithic in the Near East (Hodder 1990, Cauvin 1989, Kuijt 2000, Báčvarov 2008), it represents a tradition of a very *longue durée* indeed: a child skeleton was embedded in the foundation of an early medieval castle at Rokštejn, not too far from Vedrovice (Měřínský 2007), bearing witness to the persistence of pre-Christian traditions in nominally Christian Moravia in the 13th century.

By contrast, individuals in the 10–15 years age category at Vedrovice are over-represented relative to Mesolithic samples, which as Lillie (2008b) notes may reflect the increased carrying capacity of early farming populations over that of hunter-gatherers, especially the reduced child mortality during the weaning stage arising from the greater availability of soft diets (Meiklejohn, Zvelebil 1991). In this context it is interesting to note that while there seems to be a trend toward decreasing child mortality in the course of the Neolithic (Dočkalová, Čížmář 2008, Lillie 2008b), this is matched by the reduction in stature: while in the early LBK the average adult male stature was ~164 cm, and of women ~158 cm, by the end of the Neolithic the average height of both sexes was ~154 cm (Dočkalová, Čížmář 2008). Similar trends were observed in the Danish Mesolithic-Neolithic (Bennike 1993), and suggest that while reduced child mortality allowed greater number of children to survive to adolescence and adulthood, the overall health condition of the population may have worsened during the Neolithic and in comparison with the Mesolithic (Meiklejohn, Zvelebil 1991, Pluciennik, Zvelebil 2008).

Interesting patterns emerge when one compares the cemetery mortality profile by gender. Overall there is a clear under-representation of males in the cemetery. This under-representation occurs across all age groups with the exception of the twenties, over which males slightly outnumber females (8 to 6 respectively). The clear dominance of females in their late teens (5 to 1 respectively), thirties (9 to 3), forties (7 to 3) and fifties plus (5 to 2) is, however, striking. If it is fair to generalise, the cemetery is dominated by males in their twenties and females in their thirties and forties, with a significantly greater female "theme" overall. Clearly, males were less-likely to be interred in the cemetery after their twenties whereas adult females were more-likely to.

How might one interpret these differences? One explanation might be that we are witnessing a pioneer phase in the agricultural expansion for which the LBK is a signature. This would include males leaving the Vedrovice settlement at least after their twenties, in order to found new settlements elsewhere, for example in eastern Bohemia for which we have clear evidence of contact in the form of exchange of lithic raw materials (Figure 1, after Šída 2006, Přichystal 1985, 2002, 2004, Podborský 2002, Mateciucová 2002, 2004, 2008). Similarly, there are

strong links with the area of southern Poland, reached from southern Moravia via the Moravian Gate, where the early LBK settlement has tools made of raw materials linking southern Moravia, Slovakia, western Hungary and southern Poland (Schenk, 2007, Mateiciucová 2000).

Overall, the interred Vedrovice individuals were surprisingly healthy during life. Lillie (2008b) has noted a rise in the relative percentage of deaths from the age of five, which he suggests could be explained by compromised health status, although the number of incidences of dental enamel hypoplasias is too low to allow meaningful conclusions to be drawn in this area. Lillie has identified significant levels of dental pathologies, including childhood stressors such as enamel hypoplasias. Of these, dental caries are the most obvious, visible on 5/17 males with evident dentition (~29% of males with surviving dentition and nearly 2% of the total teeth) and 18/32 females (~56% and ~4% of the total teeth). One must remember that these are considerable under-estimates given the frequent evidence for ante-mortem tooth loss. The expression of dental caries is clearly more expressed in females than males, as is the amount of ante-mortem tooth loss.

Mechanical modification of the enamel of the anterior teeth is observable in a number of individuals, although is most noticeable in females from a young age, which has been noted by Frayer (2004) and is discussed by Lillie. This attrition seems to result from the repeated use of the teeth as tools, and in this light is suggestive of female-specific activities. The most likely cause of the wear patterns is the processing of fibrous materials such as sinew (Frayer 2004: 98) and could thus pertain to the production and repair of clothing and/or organic equipment (see also Dočkalová, Čižmář 2008, Jarošová *et al.* 2008).

Postcranially, the expression of pathology is limited, and primarily relates to age-dependent degenerative conditions relating to osteo-arthritis, and evidence of *cribra orbitalia* on several crania. Mild forms of arthritis were common in the shoulder region, followed by the hands, hips, wrists and elbows (Crubézy *et al.* 2002). Fractures are implicated as causes of degenerative conditions in a number of cases. Lillie (2008b) has noted three exceptions to this pattern. Individual 64/78 (a young adult female) had severe fusion of the vertebrae throughout the spinal region, with evidence of the collapse and re-modelling of the lumbar vertebrae extending upwards to the thoracic and cervical vertebrae, with lipping and eburnation evident on the right ulna and pitting and osteophytes on the right femoral head. Individual 82/79 (a mature adult male 50+) had his left arm severed, perhaps deliberately amputated, above the wrist, with possibly associated osteoarthritis (Crubézy *et al.* 2002, Crubézy 1996) in addition to degenerative pathologies of the vertebrae. Overall, the amputation, which was successful, may have been performed as a response to fracture and trauma. Individual 15/75 (a male in his 40s at death) exhibits evidence of trepanation in the frontal bone, an early case of such an intervention which, judging by the healed bone, the individual survived (Lillie 2008b, Crubézy

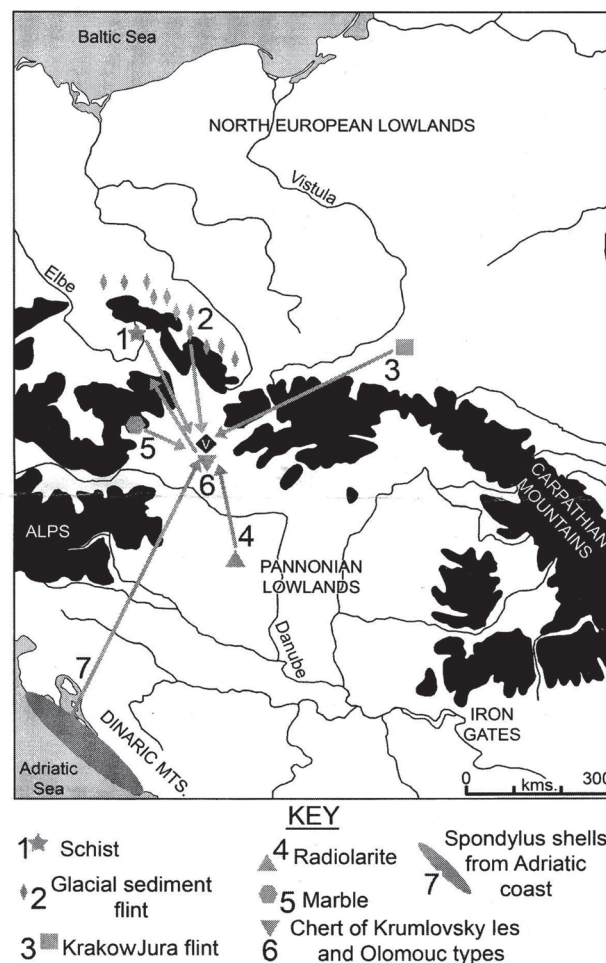


FIGURE 1. Evidence of contacts between Vedrovice and other regions based on material culture.

1996). It is interesting that this individual, contracted on his left side with his hands close to his left temple, was buried with a suite of relatively rich grave goods including considerable quantities of red ochre, a stone tablet, two ceramic vessels and a fragment of a third, a cylindrical stone, shoe-last adze and a retouched blade of Jurassic Krakow flint, and a necklace, bracelet and pendant from a total of 18 *Spondylus* shells.

BURIAL AND STATUS

As numbers of authors note, the burial practice in the LBK tradition was considerably standardised and a part of a social norm (Pavlů, Zápotocká 2007: 83). The dead were, as a rule, buried in the flexed position, either on the left or on the right side (the latter being slightly less common). There are exceptions, however. The context of burials can be first divided into settlements and cemeteries, with burials within the settlements themselves prevailing. Here, the dead were buried in either primary burial pits, or as secondary

depositions under house floors, in construction pits, storage or refuse pits. Disarticulation is evident in some areas, and includes isolated bone elements, skull burials, partially burned remains, and traces of cutting and anthropophagy.

Grave goods were gender-specific in the first instance. Male grave goods primarily included polished stone artefacts, Spondylus shell pendants and other pendants particularly fashioned from wild boar tusks. Grave goods mainly associated with females included grindstones or polishing stones and various ceramic forms, although both ceramics and Spondylus pendants are found in both male and female graves. Chipped stone artefacts were found in both male and female graves, irrespective of gender (Pavlů, Zápotocká 2007, John 2005). Children were often interred with elaborate range of grave goods, including rare Spondylus shells; three out of five Spondylus-containing burials found in Bohemia were child burials (Pavlů, Zápotocká 2007), while child burials at Vedrovice as well as elsewhere in Moravia – for example Předmostí II in the Moravian Gate – also included Spondylus pendants (Podborský 2002, Čižmář, Dočkalová 2007, Květina 2004, Schenk 2007).

Factor analysis performed by John (2005) on the Bavarian LBK material from four cemeteries emphasizes not just the type of artefact and the material from which it is made, but also the location of the object in relation to the body. So for example, male-associated artefacts include polished stone axes, bone awls, and Spondylus bracelets, buckles and pendants, that were placed above the left arm (bracelets), waist (buckles functioning as parts of belts), and pendants that must have been attached to clothing or formed parts of necklaces. In the case of females, Spondylus medallions were placed in the pelvic region, and correlate with other female-associated goods, such as necklaces from stone beads (such as marble at Vedrovice) and perforated shells, and bone or antler combs. In addition, John (2005) identified two male-related subgroups, one linking chipped artefacts, pyrite fragments and bone awls, the other defined by animal bones, projectile points, and shoe-last adzes/axes. The significant association of shoe-last adzes and projectile points with males was also identified at the LBK cemeteries of Elsloo in the Netherlands and Niedermerz in the Rhineland (van der Velde 1995). Female equipment is less structured, but it is possible to identify a female subgroup linked by the presence of ground stones. The meaning behind such structural variation can relate to either status of individuals and their special occupational roles in a community, as for example identified by O'Shea and Zvelebil (1984) in the case of the Mesolithic Olenii Ostrov cemetery, or to their personal life history and social standing at the time of their death, as O'Shea argued was the case of the villagers of Maros in the Eneolithic (O'Shea 1996).

For Vedrovice, a similarly comprehensive analysis was performed by Květina (2004), while the broader context was summarised by Podborský (2002), and Dočkalová and Čižmář (2008). Correlation between males and shoe last-adzes and chipped projectile points were noted at the

Vedrovice cemetery, although other polished stone artefacts – such as polished chisels/axes – or chipped stone (blade?) fragments did not carry gender-specific associations (Salaš 2002, Mateciucová 2002, Podborský 2002). An interesting pattern occurs in the presence of red ochre; at Vedrovice, red ochre occurs in both male and female graves, though it is twice as common in female burials we have analysed (Table 2), and rare in child graves (Podborský 2002). At Elsloo, red ochre forms a typical attribute of female burials (van der Velde 1995, Květina 2004).

Factor analysis enhanced by the application of GIS, performed by Květina (2004) on the Vedrovice material revealed a number of interesting trends. In terms of ceramics, the trend was to place bowls with men and globular pots with the women, while other forms did not reveal gender associations (Květina 2004: 385). In addition to bowls, grave goods typically associated with males at Vedrovice included shoe-last adzes, projectile points, Spondylus artefacts, and, arguably, red ochre. Typical range of artefacts placed with females included globular vessels, Spondylus necklaces and medallions, and red ochre. Both genders were also equipped with bottle-shaped vessels. Males as a rule had richer grave equipment than females, with the exception of a rich child grave 39 (not analysed in this study for ancestry or origin).

There are some spatial trends associated with gender and age within the cemetery, where children tended to be buried in the eastern part of the burial ground, women in the western part, while males do not display any spatial clustering. In the eastern part, the orientation of the skeletons was towards the southeast; in the western part towards the east. Unusually for the LBK (e.g. Pavlů, Zápotocká 2007) in 14 cases the head of the deceased was turned towards the northwest (Podborský 2002, Květina 2004). And contrary to the prevailing norm at Vedrovice and elsewhere within the LBK tradition, six inhumations were placed on the right side, three of which also have an unusual orientation (Květina 2004: 386).

Květina identified several dimensions that inform on the composition of grave goods at Vedrovice. In addition to age and gender, this involves at least two levels of social variability. The more richly equipped graves (Figure 3, for example), associated with older individuals or those with an orientation to the southwest, are thought to belong to community leaders or "elders". The other social dimension reflects the horizontal subdivision of the community into smaller social units based on kinship and age, which Květina called "social identity" (Květina 2004: 389). Podborský (2002) notes that the burials at Vedrovice clustered into particular groups, and Květina suggested that such clustering reflected kinship ties and ancestry, either real or fictional (Květina 2004: 389). A more extensive DNA analyses than the one we were able to perform in this study could effectively test this hypothesis.

The tendency of female graves to cluster in the western and northwestern parts of the cemetery is also thought-provoking. More often than males, females are buried

facing towards the east. Our own mtDNA analysis, though based on a very small sample, shows that all female ancestry in the maternal line, with one singular exception, was of eastern origin (Bramanti 2008, and see discussion above). Other LBK burial grounds, such as Flomborn, Schwetzingen, Sondershausen, Stuttgart-Mühlhausen and perhaps Aiterhofen-Ödmühle male-female spatial separation was also noted. Based on his studies of ceramic decoration at Elsloo and Niedermerz, van der Velde (1995) argued in favour of a strong matrilinear organisation of the early Neolithic society. Alternatively, the spatially clustered and sometimes marginal burial of females at the early LBK cemeteries, as for example at Flomborn and Schwetzingen (Bentley *et al.* 2002) could symbolize the integration of women from final Mesolithic communities into the early Neolithic settlements (Bentley *et al.* 2002, Zvelebil 1996, 2000). Our analyses of a sample of Vedrovice individuals show, however, that the majority of both men and women were born locally (Table 1), without major distinction between the genders.

In this project, we used biochemical analysis to investigate the birth and life geographies of 50 individuals (see discussion above, and Tables 1, 2, and 3).

In further elucidation of analyses found in Podborský (2002) and also in Května (2004), our analysis indicates that for locally born males and females, there is a tendency for the richness of grave goods to increase with age. With immigrants, however, the pattern is different: it is noticeable that only mature and old individuals of both sexes possess grave goods at all (Tables 2 and 3).

The most impoverished graves are those of children, save for the child grave 39. At the same time all children we have analysed were born locally. This is in a stark contrast with children buried at the contemporary Vedrovice settlement, analysed by Smrčka *et al.* (2006). There, three out of seven child burials belonged to individuals born elsewhere, while the majority – 67% – of all those buried at the settlements were "[im]migrants" (Smrčka *et al.* 2006: 329). This would suggest that out of 11 burials found at the settlement, all four adults were incomers. At the same time, child burials

TABLE 2. Correlation of gender, local/immigrant status and grave goods. Based on strontium and sulphur analyses (Richards *et al.* 2008) and cemetery data (Podborský 2002).

	Female local	Female immigrant	Male local	Male immigrant	Child local	Child immigrant
Plain bowls or fragments	48/77, 62/78, 72/79, 97/80, 104/81	14/75	23/75, 50/77, 57/78, 59/78, 71/79			
Decorated bowls or fragments	62/78, 97/80, 100/81, 107/82	14/75	15/75, 66/78	79/79	30/76, 106/82	
Plain jugs	72/79, 107/82		23/75, 99/81			
Decorated/handled jugs	72/79, 86/80, 91/80, 100/81	51/77	15/75, 50/77, 54/78, 66/78, 77/79			
Knapped stone tools	62/78, 86/80, 91/80, 104/81	14/75	15/75, 54/78, 57/78, 59/78, 66/78, 73/79	79/79	43/77	
Polished stone tablets, pebbles and tools		101/81	15/75, 54/78, 57/78, 59/78, 71/79, 77/79, 108/84	79/79	30/76, 31/76	
Bone/antler awls & points			71/79			
Quernstones					30/76	
Unmodified animal bones						
Spondylus shell items	42/77, 62/78, 72/79, 75/79, 86/80, 91/80, 93a/80, 100/81	14/75, 102/81	15/75, 54/78	79/79		
Beads & perforated teeth	72/79 (imported marble bead)		15/75, 77/79		84/80 (imported marble pendant)	
Boar tusks				79/79		
Ochre	13/75, 42/77, 48/77, 72/79, 75/79, 86/80, 91/80, 97/80, 100/81, 104/81	14/75, 102/81	15/75, 71/79	79/79	28/76, 30/76	

TABLE 3. Correlation of grave goods by gender, age and geography. Adult age categories: young = 18–29; mature = 30–39; old = 40+. Note that each grave good "item" includes red ochre or objects found in the grave fill which may represent funerary rituals. Each separate item is counted as one, irrespective of how many examples of that object were recovered.

	Absence of grave goods	One item	Two items	Three to four items	Five or more items
Child local	16/75, 56/78, 81b/79 (newborn), 105/81	17/75, 28/76, 31/76, 43/77, 84/80, 106/82	44/77	30/76	
Female local unspecified age	87/80	13/75			
Female local young		93a/80, 107/82	42/77, 75/79	86/80, 91/80, 100/81	
Female local mature	38/76		97/80	62/78, 72/79	
Female local old			104/81		
Female immigrant unspecified age					
Female immigrant young					
Female immigrant mature				14/75	
Female immigrant old		51/77	101/81, 102/81		
Male local unspecified age	25/75	50/77, 108/84			
Male local young		23/75, 73/79, 99/81		54/78, 59/78	
Male local mature				71/79	15/75
Male local old	82/79			57/78, 77/79	
Male immigrant unspecified age					
Male immigrant young					
Male immigrant mature					79/79
Male immigrant old		95/80	63/78		

at the settlement were on the whole better equipped than those in the cemetery (Podborský 2002: 12).

The provenance of the individuals buried on the right hand side (13/75, 38/76, 59/78, 96/80, 102/81, 105/81) shows that three out of six were born locally, two were not analysed for place of origin, while one adult female had a biochemical signature indicating place of birth north-west of Vedrovice, in the Bohemian Massif region. One other individual of the six, an adult male, though born locally, had a shoe-last adze among his grave goods that was made of the olivine diabase originating from northern Bohemia, to the north-west of Vedrovice. All but one of the males with the head orientation to the north-west also show links to northern Bohemia in terms of artefacts placed in their graves (Nos. 15/75, 19/75, 57/78, 69/78; female-associated artefacts are not made, on the whole, from raw materials of north-west origin). Somewhat provisionally, then, we can draw a tentative link between people buried on the right-hand side or NW-head orientation and links to the west/northwest.

Both Podborský (2002) and Května (2004) discussed the clustering of graves within the early LBK cemetery at Vedrovice. Putting together the distribution patterns of grave goods and the bioarchaeological information we have obtained, and mapping them onto the clusters identified by Podborský (2002: 301), the clusters appear to be internally

structured in similar patterns, and this is the case especially if we recognise one more cluster around graves 91/80–83/80–63/78–95/80 (*Figure 2*). Each cluster has either one or both of two kinds of outstanding individuals, either those marked by exceptionally rich grave equipment, marked by the number of exotic objects made of imported materials ("rich": cluster 1: 57/78, 54/78; cluster 2: 46/77, cluster 3: 15/75, 69/78; cluster 4: 36/76, cluster 5: 70/79, 19/75, 38/76; cluster 6: 79/79; cluster 7: 83/80, 91/80; cluster 8: none) or/and by the presence of individuals born away or having lived away (cluster 3: 14/75, perhaps 51/77; cluster 5: 38/76, cluster 6: 79/79, cluster 7: 95/80, and 63/78; cluster 8: 101/81, 102/81; clusters 1, 2, 4: none). Six out of eight clusters contained several graves with shoe-last adzes, a fact that should not be surprising given that 76% of male graves at Vedrovice contained a shoe-last adze or axes (Salaš 2002). What is notable is that a group of graves in the western part of the area (our cluster 7) and cluster 8 in the north-west part, consisting of four female and two child burials (Lillie 2008b; or female only, Podborský 2002) did not hold any such artefacts. Such absence in cluster 8, composed of women and children only, cannot be expected to have shoe-last adzes, a symbolic male artefact, and in any case, this may be an incomplete cluster, as it is situated at the edge of the excavated area. In cluster 7, it is remarkable though, that the three male burials (63/78, 73/79, 99/81)

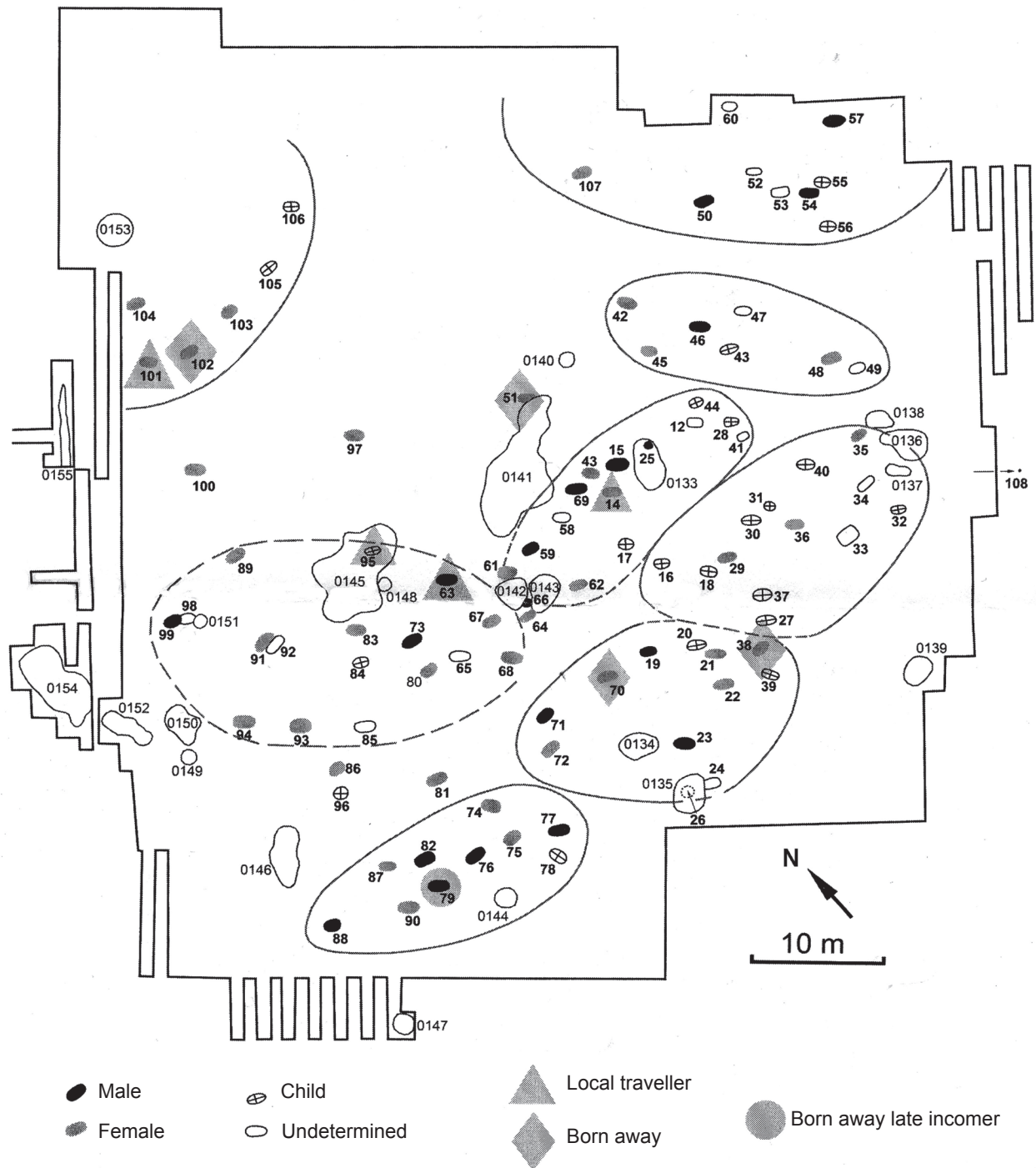


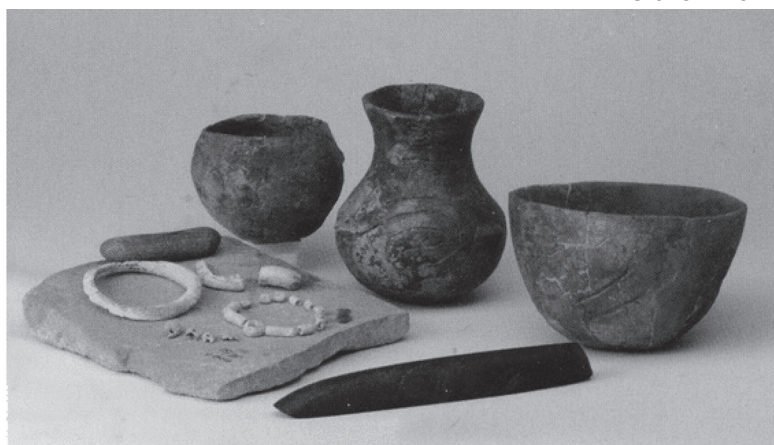
FIGURE 2. Grave clusters within the Vedrovice cemetery, revealing internal structure. Based on Podborský 2002 originally, alterations and additions by the authors.

are all poor, judging not only by the absence of shoe-last adzes, but also by the general poverty of grave equipment, undecorated pottery fragments, fragments of chipped stone tools made of local Krumlovský les hornstone, rather than of imported sources. There are, however, two "rich" female burials, equipped with *Spondylus* jewellery (Podborský 2002; Nos. 83/80, 91/80). One is tempted to ask, whether this is a case of matrilineal kinship group in a normatively patrilineal society (e.g. van der Velde 1995).

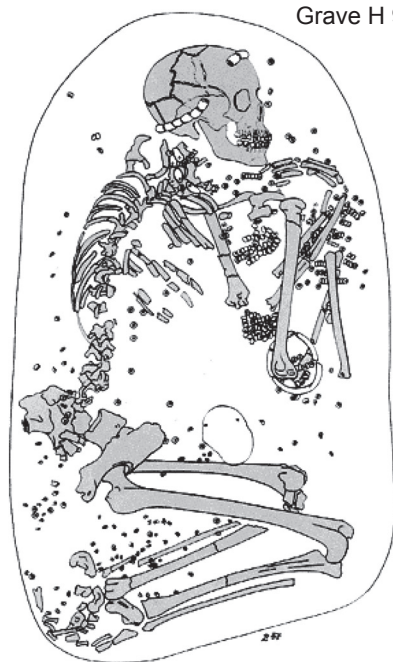
DIET

Nystrom (2008) and Jarošová (2008) achieved clear agreement in their results for occlusal and buccal dental microwear respectively. Occlusal microwear – which turns over quickly and thus reflects the last few weeks of life – was examined for 22 individuals with suitable enamel preservation (Nystrom 2008). Females possessed more microwear features than males, but otherwise both

Grave H 15/75



Grave H 9/88



Grave H 69/78

FIGURE 3. Unique rich burial equipments at Vedrovice, Grave Nos. 15/75, 69/78 and 9/88. After Dočkalová and Čižmář (2008).

sexes revealed a heterogeneous signal indicative of a complex and diverse diet probably comprising both wild and domesticated food groups, the latter "hard" forms represented, along with food processing by querns, by a high frequency of pits. Size of pits and striations are suggestive of an abrasive and hard diet. Nystrom identified several clusters of wear patterns within the heterogeneous population, which, she speculates, could represent seasonal dietary variation, but also could reflect inter-individual variation in diet. One individual – 73/79 (a male in his 20s) possessed a very hard diet with pit and striation dimensions in excess of those for typical hunter-gatherer diets.

Jarošová (2008) analysed the buccal microwear of 18 individuals with suitably preserved buccal enamel (13 adult females and five adult males). She found a similarly heterogeneous pattern, ranging from several individuals with soft diets to several with hard, as well as individuals with meat elements and those with predominantly plant-based diets.

The dental microwear of the Vedrovice population fits with the pattern of transition from the "hard diets" characteristic of hunter-gatherers to the "soft diets" of

agriculturalists, as both Nystrom and Jarošová point out. The suggestion that the diets of the Vedrovice population were to some extent in transition to softer forms is further supported by Lillie's (2008b) observation of dental twisting/rotation, overcrowding, the reduced size of the third molar and impaction/congenital absence of the third molar. Caries observed on some individuals (e.g. female individuals 22/75 and 38/76) support the notion of a mixed diet with a noticeable meat element, inclusive of abrasive particles, and of high-carbohydrate diets with soft vegetarian foodstuffs (female individual 42/77). Also of relevance here is the study by Smrčka *et al.* (2006) of isotopes from human and animal remains at the Vedrovice settlement, which showed that juvenile biochemical profiles correspond to those of deer (roe and red deer), suggesting high or regular consumption of forest plants, fruit and nuts by children at Vedrovice.

A degree of inter-population dietary variation was observed among the sampled individuals. Several females consumed soft mixed diets through the presence of caries and on the basis of buccal microwear (Lillie 2008b, Jarošová 2008). Buccal microwear, however, demonstrated

TABLE 4. Diet types by age and gender, based on dental pathologies (Lillie 2008b) and dental microwear (occlusal by Nystrom 2008 and buccal by Jarošová 2008).

Age category/diet type	Mixed, significant vegetal element	Mixed	Mixed, significant meat element
20s	Females 81a/79, 91/80, 100/81 Male 23/75	Female 42/77	Males 46/77, 69/78, 76/79
30s	Female 67/78	Females 38/76, 45/77, 80/79	Female 22/75
40s	Female 101/81		Female 70/79 Male 57/78
50s			

a preponderance of vegetal diet among females (represented by horizontal striation lengths), although this was not reflected in the occlusal microwear. The lack of difference in the latter may to some extent result from the restriction of the sample to individuals in their 20s, although as other differences can be observed in this age range one might expect the results to be generally characteristic rather than a result of sample bias.

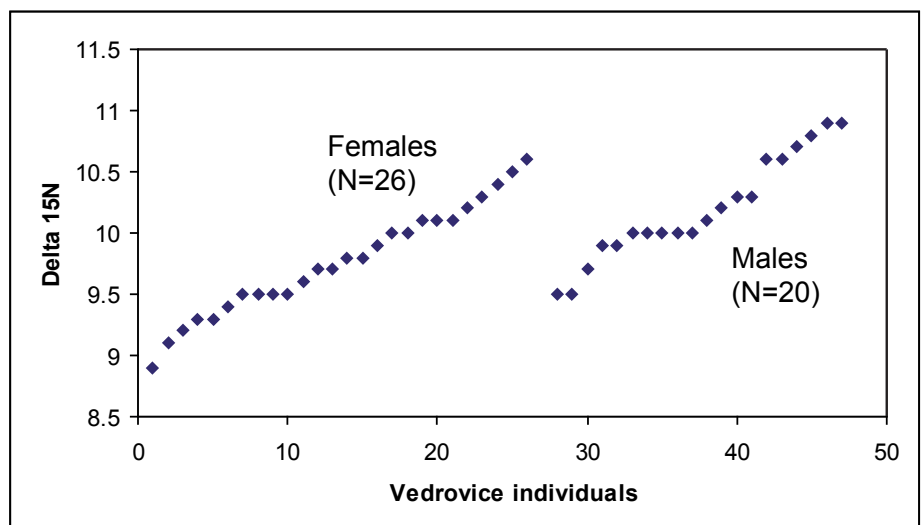
A degree of age-related dietary change is suggested by the buccal microwear whereby the total number of striations tends to increase with age, although it is not statistically significant. The older female individual 70/79 (40–50 years at death) bore considerable dental pathologies such as maxillary abscesses, tooth crown losses through caries and poor oral hygiene, a carious lesion on a premolar, and ante-mortem tooth loss of two molars. The buccal microwear of this individual reported by Jarošová (2008) indicates the consumption of a highly-abrasive, meat-rich mixed diet by this individual. *Table 4* compares diet types by age categories and gender.

From *Table 4* one can see that diets with significant vegetal elements are restricted to females (of all adult age categories), whereas some males from their twenties and females in their thirties and forties had access to significant levels of meat in otherwise mixed diets. Assuming that access to meat was a mark of status (we refer to this here

as *dietary status*), one might infer from this that some females gradually accumulated status as they aged into their thirties and forties, whereas dietary status was more apparent from the onset of adulthood among males. The dietary "base" of females was perhaps largely vegetarian, with access to meat increasing through age and/or prestige to mixed levels and, on occasion, to levels of meat intake commensurate with some males.

In contrast to the microwear data, the nitrogen isotopes of the studied individuals (57 individuals analysed by Richards *et al.* 2008 and complementary 17 individuals analysed by Smrčka *et al.* 2008a) show no significant differences, suggesting a homogeneous diet over the course of the individual lifetime. Since wide-ranging trace element analyses were not performed on child burials at the cemetery, it cannot be demonstrated that children buried at the cemetery consumed forest produce as did those buried at the settlement, though it can be reasonably assumed. Nitrogen values demonstrate that dietary protein came almost entirely from animal sources, although carbon isotopes do not reveal any significance of aquatic resources. One infant (17/75) possessed the high nitrogen values of an individual who was still breastfeeding at death, although other juveniles aged ~3 years at death do not possess these elevated levels, indicating that weaning occurred in the population before this age. Smrčka (Smrčka *et al.* 2008a)

FIGURE 4. Mean $\delta^{15}\text{N}$ values for Vedrovice adults by gender. Data from Richards *et al.* (2008) and Smrčka *et al.* (2008a).



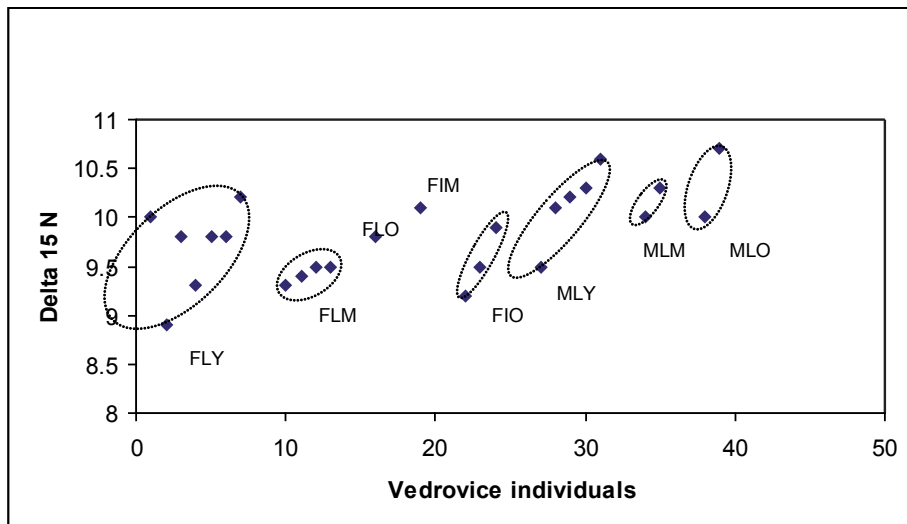


FIGURE 5. Comparison of mean $\delta^{15}\text{N}$ values for Vedrovice adults by gender, geography and age. Key: FLY female local young; FLM female local mature; FLO female local old; FIM female immigrant mature; FIO female immigrant old; MLY male local young; MLM male local mature; MLO male local old. Data from Richards *et al.* (2008) and Smrčka *et al.* (2008a).

has suggested that, of his sample, the nitrogen level in six males is consistently higher than that of females, raising the possibility that they secured access to higher quantities of meat. In *Figure 4* we compare the nitrogen values by gender for the entire set of Vedrovice adult individuals sampled for which gender attribution is clear ($N=46$).

It can be seen quite clearly that although there is some overlap between females and males, in general male $\delta^{15}\text{N}$ values (~ 9.5 – 10.9 per mil) are consistently higher than female (~ 8.6 – 10.6 per mil); ten females have lower ratios than any of the males, and Smrčka's observation from his own dataset that six males have higher values than any female still stands. We interpret this as reflecting a clear *tendency* for males to secure greater access to animal protein.

This issue can be explored further by age. *Figure 5* compares nitrogen values by gender, geography and age categories (following Lillie 2008b).

Aside from the gender difference in access to meat it is difficult to see any convincing patterns, although the data could support the hypothesis that both males and females

enjoyed increasing access to meat as they grew older. If true, this could relate to an age-based status acquisition; though it could also reflect the imposition of a taboo on high protein diet – meat in particular – upon younger females in many hunter-gatherer and subsistence farmer societies (e.g. Kent 1989, Zvelebil 2000 and references therein). Whether this practice represents a strategy of control and oppression, or whether it is in fact a benign dietary rule that increases chances of successful child delivery through reduced protein intake remains a matter of debate (Zvelebil 1992). Whatever the case, such food taboos would have been relaxed in the case of older females.

We can now compare these suggestions with status. *Figure 6* compares nitrogen values by relative richness of graves.

Although a degree of overlap is again evident and sample numbers are low, some possible patterns emerge which would benefit from future research. The two females buried without obvious grave goods have lower nitrogen values than the four buried with rich grave goods assemblages; similarly, while overlap is greater, males with relatively

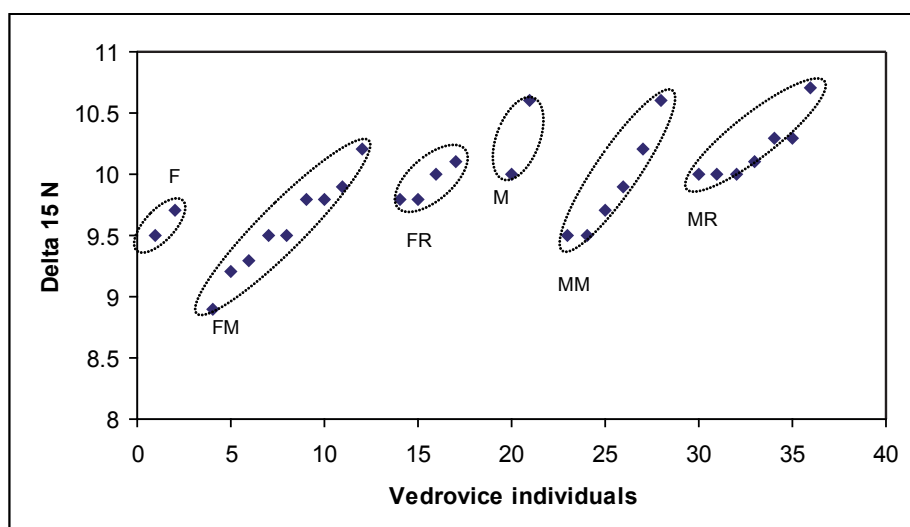
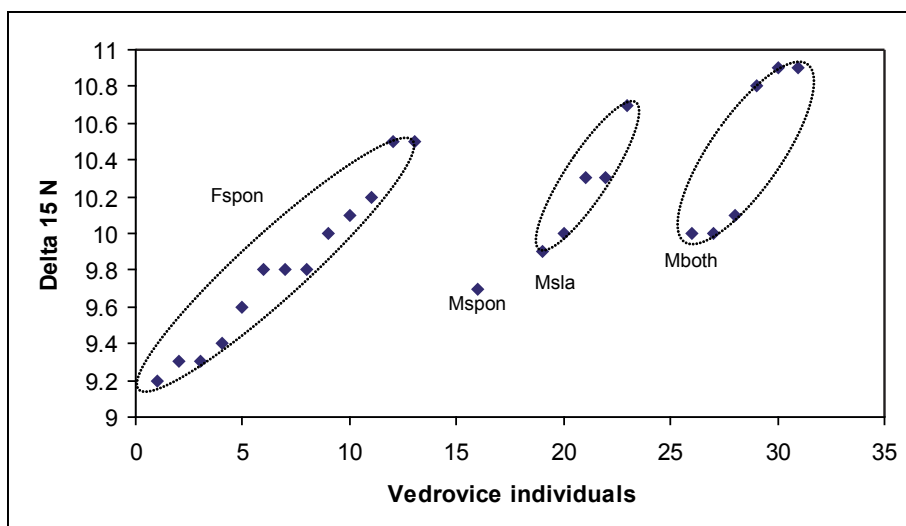


FIGURE 6. Comparison of mean $\delta^{15}\text{N}$ values for Vedrovice adults by grave goods. Key: F female grave with no grave goods; FM female grave with moderate grave goods (1–2 categories); FR female grave with rich grave goods (3+ categories); M male grave with no grave goods; MM male grave with moderate grave goods (1–2 categories); MR male grave with rich grave goods (3+ categories). Data from Richards *et al.* (2008).

FIGURE 7. Comparison of mean $\delta^{15}\text{N}$ values for Vedrovice adults and grave goods assumed to be indicative of status. Key: Fspan = female grave with Spondylus shell artefacts; Mspan = male grave with Spondylus shell artefacts; Msla = male grave with shoe-last adzes; Mboth = male grave with both Spondylus artefacts and shoe-last adze/s.



power and personal standing, and experienced individual life histories. By combining recently developed biological analyses of human skeletal remains and cultural analyses of the burial rite and the archaeological remains within the burials, we can, perhaps for the first time in the practice of archaeology, apprehend the individual life histories, or life biographies of people long deceased.

Until now, notions of personal identity, life biography, and personhood have been much discussed in social anthropology (e.g. Ingold 2000, Fowler 2004), or in archaeology in general terms, where notions of identity were applied more often to groups of individuals, rather than individual human beings (e.g. Jones 1997). In a few pioneering studies, these attempts at apprehending identities and life histories utilized the bioarchaeological approach advocated here by combining archaeological and human biological analyses (Bentley *et al.* 2006 on Talheim individuals: late LBK, 4900–4800 BC, and Eriksson 2003 on Mesolithic and Neolithic burials in the Baltic), but these studies remained by and large focused on a group level.

In this section, and as a conclusion to our Vedrovice project, we attempt here to reconstruct individual life biographies of the people of Vedrovice. Our point of departure is the emphasis on the Vedrovice individuals as real human beings who once lived, with their own personal life experiences and histories. Although we may never know their names, we strive to reconstruct as much personal detail about their human condition and personal destiny as we can by the application of bioarchaeological analysis. We now reconstruct personal life biographies of 15 individuals.

Individual 48/77: This female died at the relatively early age of 18–20, sometime between 5310 and 5210 BC (most probably in the 53rd century BC). She was placed on her left side in a shallow grave typical of the Vedrovice cemetery, with her arms flexed and her hands above her head. She was a rare example of a female who had died relatively young. No ceramic vessels or tools of non-perishable materials were placed directly into her grave, although red ochre staining on her left femur and pottery fragment identified in the fill suggest that a formal burial, marked by ceremony, was held at her death. On the basis of the lack of non-perishable grave goods we might infer that she was relatively low in status, perhaps because at her young age she had not the time to acquire a stronger social position, although several fragments of fine-grained pottery found in her grave fill may suggest that her passing was marked by a funerary ritual. She grew up locally and never spent any considerable time away from the lands surrounding her agricultural hamlet. Judging by her haplogroup J1c, ethnically and ancestrally, she was typical of the Neolithic peoples that were ultimately incomers into Europe from the Near East. Her teeth were in good condition, although the biting surfaces were markedly pitted, in relation to her conspecifics and especially in relation to the other Vedrovice women. Unlike many of them she clearly ate food that was tough and stringy, and perhaps breads which

had been prepared from flour ground with stone and which incorporated the small stone dust so hard on the teeth. The isotopes in her bone indicate that although a dietary omnivore like the other villagers, she was accustomed to a healthy portion of meat on a regular basis. Before her death she seems to have been a healthy young woman fairly typical of others in her immediate world.

Individual 23/75: This young male died at 18–20 somewhere between 5300 and 5050 BC and most likely in the 53rd century BC. At his time of death his wisdom teeth had just begun to erupt. Although generally in good health in life, the small amounts of *cribra orbitalia* around his orbits indicate that he had at some stage been somewhat deficient in iron. Some kind of dietary stress in his youth might also be suggested by a reduction in the size of his teeth, although this could be due to a relatively soft diet. Ethnically the male was of old European stock, going back to the local European Upper Palaeolithic. This is marked by the presence of mtDNA T2 haplogroup in his teeth and bones; he had grown up locally and remained local until he died. He ate a mixed diet, although had regular access to meat which had left traces of shearing wear on the biting surfaces of his teeth. His diet was typical of many other Vedrovice villagers. When he died he was placed contracted on his left side in a shallow grave typical of those of the rest of the cemetery, without any non-perishable grave goods, although fragments of at least six different pottery vessels may indicate that a similar funerary ritual to the young female 48/77 marked his passing.

Individual 102/81: This female died as a mature individual aged 40–45 between 5300 and 5040 BC (most probably in the 53rd century BC). Despite her relatively advanced age, she led a healthy life: no pathology was recorded on the post-cranial skeleton, the molars show heavy traces of wear normal for her age, but no other pathologies. She was born in an area to the north or northwest of Vedrovice, in the uplands of the Bohemian Massif, where older regions of geology, granites or gneiss, generate a specific strontium signature. She might have joined the Vedrovice community in young adulthood, coming either from the last hunter-gatherer communities living in the uplands of that area, or from the first farming settlements that were just becoming established in eastern Bohemia. Though buried oriented to the east-south-east, she was unconventionally laid on her right side, arms flexed, hands folded. She was, then, part of the group with links to regions of Bohemia to the northwest (see above). A double perforated Spondylus pendant was placed around her waist or hip, and the head was covered with red ochre. The lack of ceramics, together with a health condition free of farming dietary stressors is thought-provoking: was she born a hunter-gatherer, turned farmer upon joining the Vedrovice community, with her liminal identity symbolised by the exclusion of ceramics: the most standard in the range of grave goods typical for Vedrovice females?

Individual 77/79: This male had died at the ripe old age of 40–45, between 5350 and 5210 (most probably in the

53rd century BC). He had several pathological conditions associated with a relatively old age and active physical life, his teeth were heavily worn but still had some traces of calculus, pointing to a meat-rich diet. His ancestry probably goes back to western European Late Upper Palaeolithic (Magdalenian) cultural tradition, since one of his teeth yielded mtDNA belonging to haplogroup V, although this result could not be corroborated (Bramanti 2008). This would suggest his foremothers came into Moravia at the end of the Pleistocene, some 15,000 – 12,000 years ago from the Franco-Cantabrian refugium. Chemical trace analyses were not carried out on this individual, so we do not know whether he was locally born, though we may presume so by default. He was buried with a jug, shoe-last adze made from green schist/amphibolite from northern Bohemia, and a worked and polished antler tine, placed below the neck. The location of this antler artefact is significant in that it resembles a common Mesolithic practice of placing the dead upon the antler tines, head often resting upon the antler beams, as was the case for example at Hoëdic and Téviec in western France, Vedbaek in Denmark, or Skateholm in southern Sweden. The practice is linked to the cosmology of northern hunter-gatherers, where antlers symbolize the link between the worlds of the dead, the living, and the supernatural, and facilitate the journey of the souls of the deceased to the underworld (Zvelebil, Jordan 1999, Zvelebil 2003).

Individual 79/79: This relatively healthy male was a born-away late incomer into Vedrovice community, having been born and having spent last 10–20 years of his life in coastal regions utilising marine resources. Given that the age at death is about 30 years, and considering trace elemental indicators, a coastal location in south-east Europe seems to be the best option as a place of this male's birth, childhood and adult life. Yet he ended up buried at Vedrovice, and moreover, his is one of the richest graves in the community. The head was covered with red ochre. Two pots, boar tusk, and six flint blades – two from an imported Polish flint – were placed around the head, while a perforated Spondylus pendant was placed into his left palm, and two Krakow (Polish) flint blades and a shoe-last adze were placed along the body. So although he was a newcomer to the Vedrovice community, he gained respect and achieved high social status, marked by the presence of imported flint tools, shoe-last adze and Spondylus. Was he a life-long traveller maintaining contact between communities of different traditions (LBK, and Vinča in this case), facilitating the transfer of knowledge, information and exchange of goods?

Individual 59/78: This male lived between 5310 and 5070 BC (most probably in the 53rd century BC), died aged 25–30 years (Lillie 2008b), earlier than originally estimated (Podborský 2002). His personal biography can be seen as typical of Vedrovice males. He was relatively healthy in life, with no significant postcranial pathology recorded. Dentition shows some traces of calculus, indicating a significant consumption of protein-rich, meat

diet. The mtDNA analyses identified the presence of haplogroup H, which demonstrates ultimately a local Upper Palaeolithic ancestry for this individual. The strontium ratio and concentration are within local range, suggesting this man was locally born. The burial rite was fully within the standard for males of his age cohort, laid on the left side, oriented east to south-east with the head orientation eastwards. Pottery vessel was placed above the head, and the other grave goods consisted of a shoe-last adze of green schist/amphibolite sourced to northern Bohemia, and two flint blade fragments made of Baltic erratic flint.

Individual 14/75: This female died at the age of around 40, and her dentition indicates a complex dietary pattern that included acidic, vegetable-dominated diet at some points in her life (caries, tooth loss due to cariogenic processes) and meat-based diet, marked by the presence of calculus, at other times. Given the overall pattern, this was more likely to have occurred later in life (see above). Trace element analyses indicate that our female lived mostly outside of the Vedrovice area over the last 10 to 20 years of life. Buried in a standard position on left hand side, her head was oriented to the northwest however. Her grave goods were finer than the standard equipment: they included a double perforated Spondylus pendant, blade fragments, and pottery fragments placed above the head, some of which came from a black, hard-fired clay vessel, treated with graphite, probably an import. Like individual 79/79, was this female a traveller, facilitating exchange and transfer of knowledge between different regions of the LBK tradition and beyond?

Individual 46/77: This male died relatively young around the age of 25. Despite this, his grave is one of the most remarkable in the cemetery. He was born locally, but we do not know whether he travelled afar during his lifetime – although the grave goods suggest that he had far-reaching links and that one of his identities was linked to hunting. The grave goods indicate a high-status male, marked by two elaborately decorated, polished pottery bowls, large Spondylus pendant, another Spondylus bead, shoe-last adze, and two sets of blades arranged in a semicircle around the body. One of the sets includes imported Polish Jurassic Krakow flint and local chert, the other consists of eight fragments of radiolarite, derived from the Szentgál region of north-west Hungary. So in terms of extra-regional links, he had all the long-distance contacts noted at Vedrovice marked among his grave goods: with northern Bohemia (shoe-last adze), southern Poland (Jurassic Krakow flint), east Mediterranean (Spondylus) and western Hungary (radiolarite). His was also the only grave that contained radiolarite artefacts. There is evidence of a healed wound evident on his forehead, and dental examination suggests noticeably higher proportion of meat consumption than in other individuals. The flint and radiolarite blade sets, together with the dietary and pathological indicators suggest his role of a hunter or a warrior was recognised by the community: as a result of that he may have gained his high status despite his relatively young age.

Individual 15/75: This male oozed status. Yet the latter part of his life was filled with pain. He died at the age of 35–40 between 5360 and 5210 BC (most probably in the 53rd century BC). Although his age at death was fairly typical for his people, he seems to have died as a consequence of a violent injury to his head. Someone had delivered a crushing blow to his skull. Perhaps he had suffered pains ever since the wound was received, as an attempt had been made to trepane his skull at the point of the wound – a remarkably rare example of early surgery. He was buried on his left side with his hands placed close to his temples, perhaps a reference in dead to pains caused by his injuries. His head was orientated to the northwest, suggesting perhaps links with that region (see above). As a man of experience in the community he had achieved a high status. His grave was filled with a jug and a bowl and another vessel, a shoe-last adze made of a stone imported from northern Bohemia, a flint blade from the Krakow Jura, an elaborate necklace of 16 Spondylus shell beads, one marble bead, and four perforated deer teeth, and also a double-perforated Spondylus pendant, another L-shaped pendant and a Spondylus bracelet. There was also a stone tablet by the deceased's head and cylindrically shaped stone found inside a jug that also contained lumps of red ochre. A large amount of red ochre was found around his upper body and under his skull, possibly as red was known to be the colour of transformation and passage from one life to another. He wore pendants and a bracelet made of Spondylus shells that originated from the Mediterranean, and his grave contained other artefacts from imported materials (marble bead, shoe-last adze, flint blade). He was a local man, born in the region, and had remained there until his death. The mtDNA analyses reveal the presence of haplogroup T2, indicating female ancestry of European Upper Palaeolithic origin. Throughout his life he had a varied diet of wild and domestic plants and animals, but more than his fellow villagers he had enjoyed regular access to meat. The extraordinary amount of Spondylus jewellery, the presence of what appears to be a red ochre processing kit (jug and pounder), the large amount of red ochre around his upper body, the head injury and the very elaborate burial in general emphasise the extraordinary position of this male within the Vedrovice community – perhaps that of a ritual specialist, invested with the role of performing rites and rituals and communication between the worlds of the dead, the living, and the supernatural.

Individual 91/80: This female is of biologically local provenance, but of a genetic heritage going back to the Upper Palaeolithic of eastern Europe, marked by the presence of mtDNA haplogroup K. She died relatively young, at the age of 18–20 sometime between 5370 – 5210 BC (most probably in the 53rd century BC), and suffered from pathological conditions indicative of general stress, marked by the presence of hypoplasia and dental overcrowding. She appears to have consumed soft diets with relatively low inclusion of extra-dietary material in the food, such as dust from grinding stones. She was buried

with chipped stone artefacts made of the local material, two jugs, one of which had a secondary decoration engraved in the form of a V, indicative of local traditions, and with two perforated cylindrical Spondylus beads, imported from the southeast. In many ways this is a female burial typical of the local Vedrovice standards and traditions.

Individual 51/77: This female groups together with the man 79/79 in terms of her travels and possibly birthplace. Both have a strontium profile suggesting marine diet and coastal environment, probably somewhere in southeast Europe. Were they partners in their life and travels? She lived to around 50 years of age, having lead a relatively healthy life, with no significant pathologies recorded. Her grave was disturbed by a later Neolithic feature (Moravian Painted Ware) so we cannot be sure of the full range of her grave goods; certainly fragments from two pottery vessels were found in the undisturbed part of the grave.

Individual 82/79: This male died aged 50–60, an extraordinary achievement since his left arm has been amputated about four inches (11 cm) above the wrist. Remodelling of the bone shows successful healing after the accident or operation. Interestingly, he was also the tallest individual in the cemetery community, at 175 cm about 8 cm taller than the male mean (167 cm). Other pathologies include large osteoma on left side of the cranial vault – possibly the cause of his death – and advanced wear on his dentition, perhaps associated with the use of his teeth as tools, a compensation for the loss of left arm. If so, this would suggest that our male lost his arm quite a few years before his death. The strontium ratio and concentration shows that he was born locally, though we do not know if he travelled far during his long life. For a male of his age it is remarkable that he was buried with no grave goods at all, an exceptional situation compared to Vedrovice standard. Was this perhaps due to his disability, such that the lack of left hand prevented him from achieving higher social status in the course of his long life? Although tolerated by the community, he ended up in what effectively could be seen as a pauper's grave.

Individual 69/87: This male belonged among higher social status men symbolized in their grave goods by both Spondylus artefacts and shoe-last adzes. Other such males were, for example, individuals 19/75, 57/78 and 54/78. Often there were other exotic imports. This male lived between 5320 and 5070 BC (most probably in the 53rd century BC) and died aged 20 to 25. His was a mixed diet, and there is no indication of the high meat consumption that occurred with others of his social group (e.g. individuals 57/78 or 54/78). However, his food included some hard staple, such as nuts or chewing on bones. He was buried in a standard way on the left hand side, but his head was turned to the northwest: and his exotic grave goods support the notion of a personal link to the north-west, towards Bohemia. A stone tablet below his head was made from Jihlava River gravels, as was a flat rock grinder; a shoe-last adze was made from the usual amphibolite coming from northern Bohemia, and along with local Krumlovský les hornstone

blade fragments, there was a Jurassic Krakow flint blade from southern Poland. There was also a Spondylus necklace of 18 perforated beads, and 10 Spondylus beads were found about the body. Bone awl was placed under the right leg, and three complete pottery vessels and further ceramic fragments were distributed around the body. The male was richly covered in red ochre around the head, and a layer of red ochre covered one of the complete pots placed upside down by the head.

Individual 70/79: Originally sexed as a male, this individual was re-classified as a female in this study (Lillie 2008b). She died aged 45–50, in the ripe old age and must have led a relatively healthy life, as no pathologies were recorded. The dentition shows carious lesions and abscesses, pointing to a mixed diet including very abrasive components and a good proportion of meat – a pattern normal for women living into an older age (see above). Chemical trace analyses point to a non-local origin of this female, and this, as well as her generally robust health condition match her with the female 102/81 (see above). In this case, however, there was a jug among the grave goods that also included 19 perforated Spondylus beads from a necklace placed upon her chest, and a Spondylus medallion found in the pelvic region.

Individual 39/76: This child received a remarkably elaborate burial. Aged 2–3 years, the child was buried on the left side facing southeast, following the Vedrovice norm. Fragments of crushed pottery were placed above the skull, a necklace consisting of 12 perforated Spondylus shells was placed around the neck, and further 12 beads were placed into the palm of right hand. Seven fragments of Jurassic Krakow flint blades were placed in a semi-circle along the right leg, and further flint fragments from southern Poland as well as from local chert were placed along the body. As such a young person, this child must have acquired status through kinship ties or inherited it from parents, the grave goods arrangements suggest hunter or archer associations (see the male 46/77 above).

CONCLUSIONS

As a part of the Early LBK tradition, the Vedrovice community represents first farming settlements at the edge of the formative area of this culture, itself the first Neolithic culture in central Europe. The origin, emergence, and dispersal of this cultural tradition has been a much debated subject in the archaeology of the Neolithic and in the prehistoric reconstructions of events that led to the formation of Neolithic Europe, and, more broadly, the foundation of European civilization in general (e.g. Childe 1925, 1957, Piggott 1965, Ammerman, Cavalli-Sforza 1984, Zvelebil 1986, Lüning 1988, Price 2000, Ammerman, Biagi 2003, and more specifically Neustupný 1956, Quitta 1960, Tichý 1962, Pavúk 1980, Modderman 1988, Rulf 1995, 1997, Pavlů, Zápotocká 2007, Gronenborn 1999, 2003, 2007, Lukes, Zvelebil 2004, Zvelebil 2005).

In terms of the origin and the emergence of the LBK, the debate revolved mainly about the identity of the people responsible for the formation of this cultural tradition. Ever since Childe (1925, 1957) the LBK was seen as a classical case of demic diffusion, a migration of entire farming communities from southeast Europe into central Europe in the first instance, and then beyond into western Europe and upon the Northern European Plain (Ammerman, Cavalli-Sforza 1984, Ammerman, Biagi 2003, Gkiasta *et al.* 2002, but see Gronenborn 2007 for the critique of this Anglo/American-centric position). On the other hand, alternative forms of the origin and dispersal of the LBK, involving a major genetic and cultural contribution to the formation of the LBK by the local hunter-gatherer communities of the Mesolithic, was also proposed and discussed by various authors (e.g. Tillmann 1993, Gronenborn 1999, 2003, 2007, Zvelebil 2000, 2004, 2005, Lukes, Zvelebil 2004, Whittle 1996). The dialog about LBK origins that unfolded in these publications was carried out at the population or community (group) level, and useful as it was in elucidating the complexity of the processes that were behind the Neolithisation of central Europe, it engendered a level of anonymity and generality that disallowed efforts to consider individual social agency or key roles played by social groups in the process of the LBK origins and formation. As a result, a large amount of fascinating variation has been missed.

In summarizing our results of bioarchaeological research at Vedrovice, we can envisage a settlement of first farmers in southern Moravia, that also served as a gateway community both in terms of incoming individuals and, we would like to argue, individuals leaving to begin other early farming communities.

Vedrovice, we propose, was founded by a small community of incomers, founders who probably originated in western Hungary towards the end of the formative phase of the LBK (Phase 1a/1b) some time before 5300 BC. The Vedrovice settlement itself, as Smrčka *et al.* (2008a) note, mostly contained burials of people who had originated elsewhere. Links with western Hungary are evident in the material culture, notably among the ceramic element and with the presence of radiolarite. It is tempting therefore to see western Hungary as the source area of the Vedrovice founders.

Soon after Vedrovice was founded, it attracted people from hunting-gathering communities within the region and outside it. It is at this point or shortly after that the "Široká u lesa" cemetery was founded to serve the Vedrovice community, upslope from the settlement and around 5300 BC. The burial here of incomers who had been born elsewhere, among whom females in particular seem to have joined the society, shows the growing cosmopolitan nature of the settlement. Judging by their material cultural associations, and in one case by biochemical analysis, these immigrants seem to have come mostly from the region of Bohemian-Moravian Uplands and from northeast Bohemia.

Vedrovice also served as a focal point of a far-flung contact network that facilitated the exchange of goods and information. This included regions a considerable distance away from southern Moravia, notably southern Poland, northern Bohemia, western Hungary, and coastal southeast Europe. These connections are evident in the material culture that utilized resources from those areas, such as the *Spondylus* ornaments, southern Polish flint, Hungarian radiolarite, or schist/amphibolite from northern Bohemia (Figure 1). It is also evident by the burial of "travellers" in the cemetery – people that had spent much of their adult life away from Vedrovice though they ended up buried there, and in one case, by the presence of a man who was both born away and in adult life mostly lived away from the settlement. In most cases, these people had gained high social status and were buried accordingly. The importance of these individuals in facilitating exchange of information and transmission of knowledge, as well as contributing to the overall cultural coherence of the LBK tradition as a social phenomenon cannot be overestimated.

We propose that Vedrovice also served as a founder ("donor") community for other early LBK settlements. The relative absence in the cemetery of females aged 15–20 and males in their twenties suggests that these people had left Vedrovice and moved elsewhere, either to join existing communities or to participate in the foundation of new ones. It is perhaps no coincidence that people in this age range would have been at their most fertile, and therefore best suited for reproduction in terms of fertility, cultural knowledge and physical strength. Yet their cultural knowledge would correspond to their age cohort – mostly twenties – and as such could serve as a vehicle for culture change. The strong and recursive links with northeast Bohemia lead us to suggest that the movement from Vedrovice most likely occurred towards that region.

We were surprised at how the individual life biographies that we have constructed show considerable variation in material culture residues that relate to the ancestry, personal identity, social position and life experience of Vedrovice individuals, as well to dietary status (i.e. access to meat). Females, males and children of local or exotic origin could have been accorded rich burial, and/or relatively high degrees of access to meat. Because of this, it seems that status and its behavioural and material correlates was acquired both "vertically" through inter-generational transmission of culture, and "horizontally" through contact and interaction. It was furthermore reinterpreted and symbolized, transformed through social agency of the individual or through unthought, routine practice – habitus – and as such new cultural traditions were formed, or the older ones were altered. Such a nuanced understanding of archaeological materials as residues of processes of cultural transmission, inter-generational passage of knowledge and reception of information through contact, processes where the individual and individual agency plays a key role, transforms our understanding of what archaeological culture actually is, how it came into existence, and what it

means. Far from being a generalised signature of an ethnic group, or of a population sharing a common group identity, as the culture historical, normative concept of culture would have it, the LBK culture can now be seen to have been far more complex than its "corporate" archaeological signature at first sight suggests. We can now understand that archaeological cultures were the taphonomically-sorted, observable end results of socially structured cultural transmission processes and of their transformations through individual and collective agency and routine practice.

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