ANTHROPOLOGIE • XXXVII/2 • pp. 155–162 • 1999

OLGA SOFFER

DYNAMIC LANDSCAPES AND LATE PLEISTOCENE SOCIAL GEOGRAPHY: CLOVIS AND KOSTENKI COMPARED

ABSTRACT: During the Late Paleolithic empty continents saw range expansion by anatomically modern humans while occupied ones witnessed human groups undergo range contractions and demographic shifts. To understand what effects these different types of population movements had on the archaeological record, this paper compares the records of two allopatric Late Paleolithic hunter-gatherer groups: those who left behind the Clovis and the Willendorf-Pavlov-Kostenki -Avdeevo inventories. Ecological theory as well as insights from migration theory are used to generate specific archaeological correlates which are then identified in the archaeological records. These records show the existence of very diverse phenomena including colonization, abandonment, refuging, and demographic shifts. The resultant consequences differ depending on both social and environmental realities of the Late Pleistocene landscapes.

KEY WORDS: Late Paleolithic demographic shifts – Clovis – Willendorf-Pavlov-Kostenki-Avdeevo cultural entities

INTRODUCTION

The Late Paleolithic saw a number of demographic shifts. Empty continents – Australia and the Americas – witnessed colonization by anatomically modern humans. Upper Paleolithic Eurasia, on the other hand, saw human groups undergo range contractions and range expansions, as well as demographic shifts. In this discussion I use the term demographic shift to denote the relocation of groups across space without, necessarily, conscious intent to move. This term is preferable to the often used migration which not only presupposes purpose – something which has to be proven – but also operates on time scales probably too brief to be recognized by Paleolithic archaeologists. To understand what effects the different types of population movements may have had on the archaeological record, I compare the Late Paleolithic records of two allopatric groups of Late Paleolithic hunter-gatherers: those who left behind the Clovis and the Willendorf-Pavlov-Kostenki-Avdeevo inventories.

I focus on these two entities because of a number of points they share in common. First, both show wide spatial spreads. Second, both were generated by anatomically modern hunter-gatherers who inhabited northern latitudes with similar cold and, especially in Eurasia, often harsh open environments. Third, organic remains recovered from these entities suggest that people occupying the two continents subsisted largely by exploiting broadly similar faunal communities.

As Praslov and I pointed out elsewhere, in spite of these similarities, the archaeological records of the two regions are strikingly different (Soffer, Praslov 1993). Central and East European sites assigned to the Willendorf-Pavlov-Kostenki-Avdeevo entity contain numerous dwellings and complex features as well as rich faunal and lithic inventories. They also have an abundance of socially and

ideologically important objects of personal adornment and portable art. Clovis sites lack evidence for elaborate facilities, jewelry, and art, but do contain evidence for an elaboration of stone working technology. Lastly, the widespread Clovis complex transformed in time into a myriad of regionally circumscribed complexes, while the Willendorf-Kostenki-Avdeevo one dissipated in a time and space transgressive fashion.

The literature addressing the significance of the wide spatial spread in both these cases suggests demographic shifts or colonization, as well as exchange over large distances as explanations (for central and eastern Europe see, for example, Gamble 1993, Otte, Keeley 1990, Otte 1993, for the Clovis see Kelly, this volume, Meltzer 1989). To help unravel the two, I begin by outlining some general ecological principles guiding mobility and generating some archaeological correlates for different types of demographic shifts.

ARCHAEOLOGICAL CORRELATED OF DEMOGRAPHIC SHIFTS

First, principles of evolutionary ecology show that range expansions and contractions, as well as range relocation or migration, are all demographic processes in need of explanation (Pianka 1974). Such population shifts can be expected to occur as a response to factors of pull and push, for example, when previously unavailable areas open up and a species takes advantage of the situation by colonizing virgin territories, or when changes in local conditions require changes in adaptations (Jochim 1981, Lee 1966, Lewis 1982).

For a mobile and highly adaptable species such as humans, the pull of a newly opened area leads to colonization. For foragers, such a pull can come about through a number of factors including climatic changes as well as technological innovations. Archaeological signatures of this include the advent of artifacts and features in an area previously unoccupied, and a unidirectional spread of them in a time and space transgressive manner. Once initial settling in has occurred, we can expect regional differentiation to begin.

The push leading foragers to move comes when the energetic returns on harvesting the resources they rely on diminish significantly. Such a decline can result from a number of factors including climatic deterioration and, as argued by Kelly (this issue), behavioural changes of the exploited prey. Foragers faced with declining resources can cope by a number of strategies that include broadening their resource base in the same area or by moving to different areas.

Moving to different areas can occur in various ways and on various time scales, each of which can be expected to have different archaeological signatures. The most obvious and almost universal example of this, one taking place over short time frames, is seasonal mobility (Bettinger 1991, Jochim 1981).

Ethnographic literature indicates that hunter-gatherers also alleviate resource stress by moving in with relatives in other regions (Minc, Smith 1989, Soffer 1989, Wiessner 1983). When these moves are very temporary and involve very small groups – a season or two – such moves will probably be archaeologically invisible.

We can hypothesize that repeated directional moves by people into territories occupied by others, kin or not, will generate a more complex archaeological record. Not all such moves need to be conscious ones, however. A very minor relocation of the exploited territories by a few kilometres per generation in 500 years or 20 generations may see the descendants of the group located some 200 km away from the original range used 500 years before. If such moves take the groups into similar environments, they may continue their cultural practices and retain their technology. The archaeological signature for such moves should indicate broad structural similarities between the records of the old and new areas along a number of discrete categories in the patterning material culture – but ones that are separated in space and time. As Rouse (1986) pointed out, what is important is the structural redundancy in the archaeological records of the two areas rather than just typological, technological, or stylistic similarities in specific items of material culture (e.g. types of stone points). Since the newcomers cannot be expected to bring with them the entire complex of their culture. founders effect guides us not to expect exact replication of the archaeological record in space or time. Similarities, however, should be greater the less time involved. This scenario clearly presupposes a minimum of contact with groups already in the area – as would be the case in sparsely and patchily populated regions.

In the case of groups moving into territories more densely occupied by other people, whose cultural practices can be expected to differ, we can anticipate a complex set of interactions between the resident and incoming people. Such social negotiations should, however, be finite in archaeological time Paleolithic specialists work with. At point of contact – and for us this can be over hundreds of years – we should see the coexistence of disparate but internally consistent sites and inventories which in time, and depending on the result of social negotiations in contested space, may begin to show borrowing from one to the other, and lead to syncretism and convergence.

Finally, when groups move into territories with a different resource mix, we should anticipate seeing an initial continuation of past cultural practices and a subsequent change to incorporate more of locally successful ones.

The listed predictions clearly presume the "Pompeii Premise" – namely, perfect preservation of instant moments in prehistoric time. They also presume ideal chronological controls. Since both are absent in prehistoric archaeology, we cannot expect the archaeological record on hand to show the projected patterns unambiguously. The best that we can ask for is redundant patterning which, through parsimony, is best explained by a particular scenario.

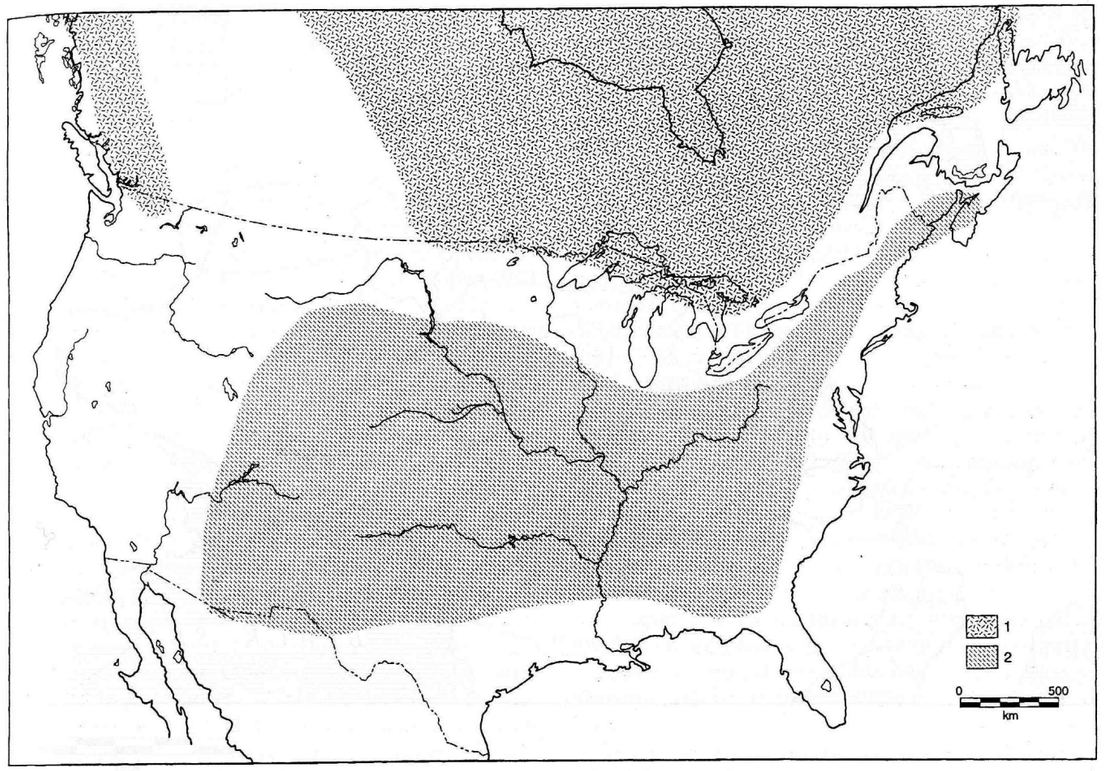

FIGURE 1. Late Paleolithic North America: 1) Glaciated regions at the last glacial maximum; 2) Distribution of Clovis Sites.

KOSTENKI AND CLOVIS COMPARED

Clovis

The Clovis complex, one spread over a continental region some 5,000,000 km^2 in size, was surprisingly short lived – lasting well under 1,000 years, when it was replaced by more regionally circumscribed entities (*Figure 1*) (Haynes 1993, Dincause 1993, Kelly, this issue). What is striking about this record is its continent-wide redundancy consisting of small sized widely scattered kill sites found in combination with equally small sized and ephemeral residential areas. All the sites show minimal energy expanded on features – Clovis hearths and dwellings are ephemeral at best. Evidence for food storage is all but absent and burials very infrequent. Some Clovis tool caches are known, these, like the burials, however, are widely scattered across the western part of the continent and not associated with occupation sites (Kelly, Todd 1988, Kelly, this issue).

Clovis inventories, when compared to Kostenki ones, are quite impoverished in diversity. Although some bone and ivory was worked into hunting implements, neither organic nor inorganic materials were transformed into items of personal adornment, decorated pieces, or portable art.

Clovis groups did, however invest a great deal of time and energy into refining certain aspects of lithic technology for the production of curated weaponry (Bradley 1993, Kelly, Todd 1988, Kelly, this issue). They used superior raw materials originating from great distances to produce spectacular and difficult to make fluted points. The unidirectional west to east or north to south distribution of these exotic materials is in good accord with the unidirection trajectory of Clovis colonization (Kelly, Todd 1988, Tankersley 1991).

In sum, Clovis sites show time and energy invested into hunting weaponry at the expense of features and of non-utilitarian components of material culture. Such a material record, with its absence of socially significant paraphernalia, is one that we can expect of people in socially simple landscapes. Ones in which they are either totally alone or expanding their range into a very sparsely and patchily occupied regions.

The Willendord-Pavlov-Kostenki-Avdeevo entity

Background

The Willendorf-Kostenki cultural entity, dating between some 28,000 and 18,000 B.P., was spread over an area measuring some 2,000 km in length (*Figure 2*). The rational

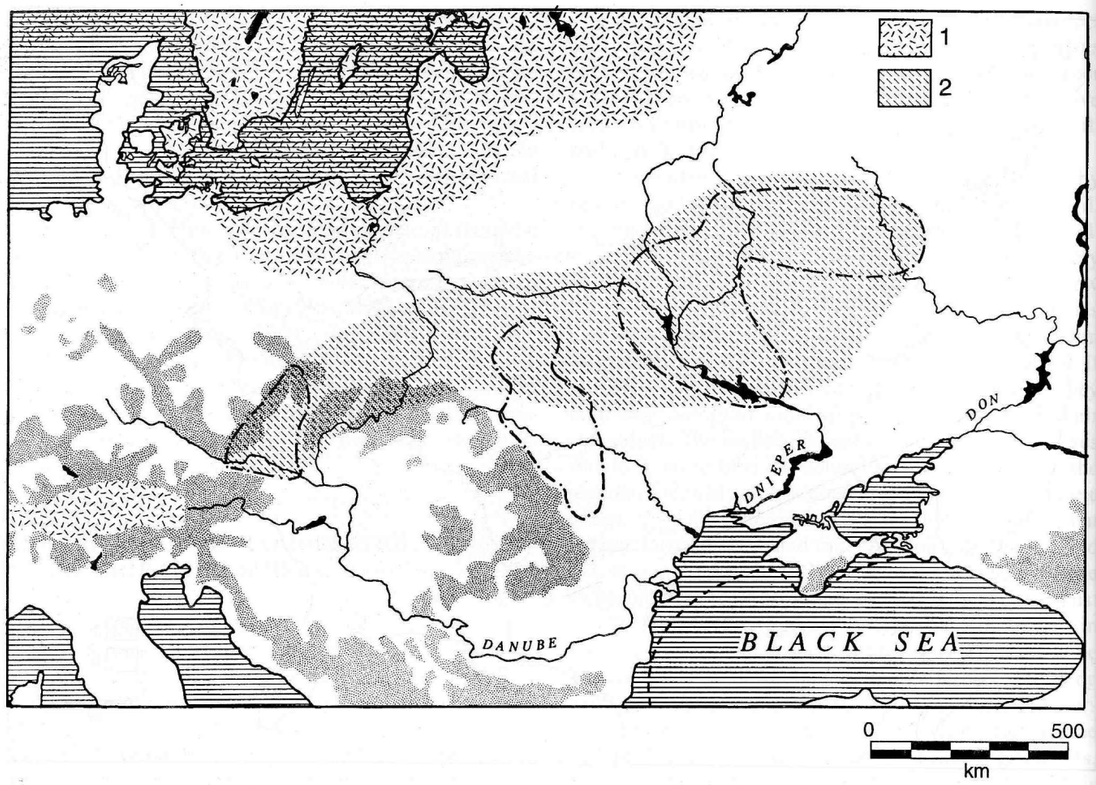

FIGURE 2. Late Paleolithic Europe: 1) Extent of the Fennoscandian Ice Sheet and Alpine Glaciers at the last glacial maximum; 2) Distribution of the sites assigned to the Willedorf-Pavlov-Kostenki-Avdeevo entity.

for seeing some sort of unity between these sites includes similarity in the lithic inventories and tool types, in the bone industry, in art and ornamentation, as well as in features, site structures, in the structure of faunal inventories, and in ways of exploiting occupied regions.

While not identical, the closest parallels are found between Moravian sites and Kostenki and Avdeevo on the eastern part of the plain. Fewer parallels exist between Moravian sites and Khotylevo II and Berdyzh on the central part of the plan and Molodova V, layer 7, along the Dniester in the west (Grigor'ev 1968, 1993, Soffer 1993).

In contrast to the almost "instant" Clovis record, this record shows a considerable west to east time lag with Moravian sites dating some 2,000–6,000 years earlier than Kostenki and Avdeevo and up to 2,000 years earlier than Khotylevo II or Molodova V (Soffer 1993).

As I have argued elsewhere, regional focus on past human adaptations, together with chronological controls, and the contextualization of archaeological data within the paleoenvironmental setting, suggest that some sort of a demographic shift is the most parsimonious explanation for the distribution of these sites and for understanding what may have motivated such shifts (Soffer 1993).

Paleoenvironmental reconstructions indicate that central and eastern Europe between 28–18,000 years ago, saw first interstadial and then the onset of full glacial conditions. The consequence of these changes in climate were more dramatic in central and eastern Europe – the first located in the corridor between the Alpine glaciers and the Fennoscandian Ice Sheet, and the second, in a region of maximal expansion of the Ice Sheet (Soffer 1992). This part of Europe saw both earlier and more severe climatic, and therefore, biotic consequences of glacial expansion, as well as inter-regional time lags in environmental changes. These data also indicate that this region underwent far more dramatic oscillations and that some of these areas, such as Moravia, were turned into polar deserts 20,000 to 18,000 years ago during the Last Glacial Maximum (Frenzel *et al.* 1992, Kozlowski 1990, Svoboda 1990).

Geomorphology, and the configuration of the Fennoscandian Ice Sheed, which expanded further south in the west than in the east of this region, brought about some biotic differentiation. On the Russian Plain, for example, the western part saw a somewhat different faunal mix than was present on the centre along the Dnieper and Desna (Bibikova, Belan 1979, Baryshnikov, Markova

1992). The area around the Don, on the other hand, was further removed from the Ice Sheet than was the centre. This resulted in milder climatic conditions which found their expression in the area's resource structure (see *Figure 2*, Soffer 1990, Spiridonova 1991).

Moravia

Stratigraphic and radiocarbon data from Moravian sites assigned to the Pavlov culture clearly indicate that this region was the earlier locus of settlement, dating between 28,000 and 24,000 B.P. (Kozlowski 1986, Soffer 1993, Svoboda 1994a,b, Svoboda *et al.* 1996)

Data on annual ranges of north latitude foragers suggest that Moravia, measuring some 22,200 km² in size, is likely too small a region to reflect a complete settlement pattern of these people (see Binford 1978). The fact that that more than 90% of the lithic inventories were made on exotics originating from 100 to 300 km north and east of the sites indicates that people making and using them were quite mobile and seasonally visited southern Poland, the Danube region near Willendorf, northern Hungary, and both western and eastern Slovakia (Kozlowski 1986, 1991, Soffer 1992, Svoboda 1994a, Svoboda *et al.* 1996).

With the deterioration of climatic conditions associated with the advent of the L.G.M., which occurred earlier here than further east, we witness an earlier collapse of the resource base. Moravia's archaeological record between some 24,000 and 22,000 B.P. indicates a shift in the core area occupied as groups relocated east to western Slovakia and north, around Krakow. This was followed by a 3,000 year period when the area was abandoned. Its subsequent recolonization may have begun about 19,000 years ago, but was intensified only some 14,000 years ago, when groups with Magdalenian inventories came to occupy the area (Kozlowski 1986, 1990, Svoboda 1990, 1994b, Svoboda *et al.* 1996).

This demographic shift also resulted it the influx of some central European groups and their descendants onto the east European or Russian Plain – an area with a resource mix more akin to the now collapsed open grassland river valleys of Moravia.

This west to east shift clearly occurred over a long span of time and was obviously not a conscious process. Similarly, it probably did not consist of a single migration episode but a series of population incursions separated in time. The earliest evidence for it may be at Khotylevo II on the central part of the plain, dating to about 24,000 years ago, and at Molodova V – layer 7, with a date of ~ 23,000 B.P. (Grigor'ev 1993 with references).

The shift was initiated and continued due to the west to east shift in the natural resources used by these groups, and it is the time transgressive shifts in the exploited biomes which give us the time and region transgressive Willendorf -Pavlov-Kostenki-Avdeevo record.

The East European Plain

The size of the unglaciated plain that Pavlov descendants came to, some 1,500,000 km² stretching from the Carpathians to the Urals, clearly could have accommodated a number of hunter-gatherer groups. Its Upper Paleolithic record, with regionally distinct archaeological cultures along the river valleys and in the southern steppe zone, indicates that this was indeed the case (Boriskovskij 1984, Soffer 1985).

In contrast to Clovis groups, people who moved onto the Russian plan came into a region not only occupied by other groups but also one with a record of human occupation of considerable time depth. This record does, however, show unequal lengths of occupation for the different regions. The greatest number of sites dating before the L.G. M. are found concentrated along the western and eastern parts – along the middle Dniester and the middle Don (Gribchenko, Kurenkova, this volume, Soffer 1990, Velichko, Kurenkova 1990). The central part of the plain, on the other hand, shows some human presence during the warmer time some 25,000 years ago, but does not show intensive occupation until after 20,000 B.P. (Gribchenko, Kurenkova, this volume, Soffer 1990).

A salient feature which differentiates the archaeological record of the Plain from that of Moravia is that although there is some evidence for a north – south latitudinal relocation of groups in response to deteriorating environments around the L.G.M., this vast area was never abandoned. Rather, it appears to have served as a population refuge.

Its archaeological record between some 25,000 and 23,000 B.P., the time Moravian groups were shifting their ranges, shows faint evidence for the advent of these people. This evidence is found at the sites closest to Moravia: Molodova V some 800 km to the south-east and Khotylevo II, some 1200 km to the east (Grigor'ev 1968, 1993, Kozlowski 1986). In both cases the evidence for Moravian presence is muted not only by time but by local environmental and resource realities which necessitated changes in subsistence practictices. In both cases we see this presence very briefly.

People arriving at Molodova not only came to an already occupied landscape, but one with a different resource structure. I suggest that data from Molodova V layer 7 show us these people already undergoing a shift in economy and technology. The structure of this layer, as well as the nature and the distribution of both the features and the inventories, differ from preceding and subsequent layers, but bear some similarity to some Moravian sites (compare Chernysh 1987 with Klíma 1963, Absolon, Klíma 1977, Svoboda 1994b). The way of using the landscape, however, already is different from Moravia and more akin to the Dniester pattern. Subsequent layers at Molodova and other sites in the area are devoid of this "Pavlov" influence. Taken together, I suggest these data point to an incursion of a small number of people who quickly acculturated.

The record from the central part of the plain is more ambiguous. The sparseness of sites here dating before

20,000 suggest scant human presence (Gribchenko, Kurenkova, this volume, Soffer 1990). We see this area intensively occupied only after 20,000 P.B. by local groups using in-ground storage economy to cope with seasonal food shortages. I have argued elsewhere that the resource structure extant here could only have been successfully exploited with food storage (Soffer 1985, 1989). I therefore suspect that the ephemeral evidence for human presence here before ~20,000 B.P. may reflects this, and that newcomers to the region some 24,000 years ago who were seasonally highly mobile, left this area fairly quickly.

While we see changes in economy, technology, and cultural practices in the west and a failure to occupy the region in the centre, both of which effectively removed the "Willendorf-Pavlov" impact from archaeological view, landscapes further to the east, in an area further south from the ice sheet, indicate a different scenario.

The Kostenki-Borshchevo area along the Don shows intensive occupation between 25,000 and 20,000 years ago (Praslov, Rogachev 1982, Soffer 1990). The salient point about this area, is that some 22,000 years ago this region, especially along the Sejm and the Don, shows the appearance of sites with inventories and features typologically, technologically, organizationally, and stylistically similar to the Moravian ones (Grigor'ev 1993, Kozlowski 1986). These sites and inventories are not identical to Moravian ones, nor, given their asynchrony, should we expect them to be. These inventories, like the Moravian ones predating them by from 2,000 to 6,000 years, are rich in jewellery and art, most notably in animal and female figurines. As in Moravia, their lithic inventories show the habitual use of exotic superior raw material originating at distances of 150 to 300 km from the sites (Soffer 1991).

The Dòn sites are co-terminous with others assigned to different archaeological cultures (Boriskovskij 1984, Praslov, Rogachev 1982). This suggests that, as in Molodova, the newcomers to this area came into an occupied landscape. The structure of this landscape, however, was more similar to that of Moravia, and could be exploited by customary cultural practices that involved seasonal mobility and, probably, aggregation/dispersal pulsations.

Coeval sites lacking these multiple similarities to Pavlov sites, such as Kostenki XI layers 1a and 2, Kostenki XII layer 2, or Kostenki XIV layer 2 (see Praslov, Rogachev 1982), suggest we consider a number of different scenarios that would permit the co-existence of different peoples in a small area. While chronological controls here are far from satisfactory, and our understanding of subsistence practices and settlement systems inadequate, I suggest a scenario positing initial, most likely seasonal, co-existence of disparate groups in the area, with subsequent acculturation. The presence of some animal figurines and some decorated bone at such sites as Kostenki XI layer 2 or the upper layer of Kostenki IV, whose inventories and features are considered different from those at Kostenki I and Avdeevo, may reflect just such cultural borrowing by one group from the other.

While the ultimate outcome of this inter-cultural contact is far less clear than at Molodova, these data do support a hypothesis for a unidirectional west to east population shift that ultimately did bring descendants of Moravian hunter-gatherers some 2,000 km to the east.

SUMMARY AND CONCLUSIONS

The archaeological records from Kostenki and Clovis do have some implications of how we understand and interpret the data as well as offer some implications for future testing. First, the Upper Paleolithic central and east European data show: 1) the asynchronic nature of climatic amelioration and deterioration, the asynchronic and region-specific response of the biotic communities to these climatic changes and, therefore, the asynchronic nature of environmentally generated resource stress on Upper Paleolithic hunter-gatherers who occupied these regions, and 2) the different and unsynchronized cultural solutions to this resource stress. In some cases, as in Moravia between some 24,000 and 22,000 B.P., these solutions involved shifting settlement loci from core to peripheral regions and an eventual abandonment of the region.

Evidence from the different parts of the Russian Plain shows the arrival of people from elsewhere, and the use of the region as a refugium – reflected, most clearly, in the archaeological records of the Dniester and of the Don.

This dynamic scenario, in contrast to our previous static ones which saw Upper Paleolithic Europe peopled from the Atlantic to the Urals sees Europe far from fully and steadily packed. Rather it shows ebbs and flows in the regional occupation records, and these carry a number of implications both for the paleoanthropological and archaeological records.

The disparate regional European Upper Paleolithic record for colonization, abandonment, refuging, and demographic shifts, calls for the development of models of gene flow and of genetic drift, and the impact of environmental change upon the expansion/contraction and admixture/isolation of different European populations. The Clovis record, on the other hand, suggests more of a genetic stasis.

Third, regional differences in environmental degradation and concomitant resource stress, as well as the asynchrony of their onset, indicate that we should find both direct and indirect morphological evidence for this stress at different time periods in different parts of Upper Paleolithic Europe. Data from Late Paleolithic Moravia, which show traumatic lesions and fractures on many adult and adolescent male crania – resulting, presumably, from inter-personal conflict – may be presenting us with precisely this type of indirect evidence of stress (Soffer 1995).

Furthermore, the record from central and eastern Europe indicates that periods of environmental stress with the

concomitant human response of increased mobility and intra as well as inter-regional demographic shifts, can bring about a record of wide spread and long-standing similarities subsumed under the term technocomplex (Dolukhanov *et al*. 1980, Gamble 1993). The regional and inter-regional ebb and flow of hunter-gatherer populations is expected to product little local continuity through time between one complex and the next – a situation which we may be seeing at the Kostenki-Borshchevo sites along the Don. Clovis shows us that the same record can result from colonization and warn us, once again, about equifinality – specifically, that in the imprecise archaeological time we work with, both ebb and flow of human groups as well as colonization can leave superficially similar archaeological records.

In sum, shifting populations are difficult to deal with in prehistoric archaeology – yet the Kostenki and Clovis cases tell us that we must.

REFERENCES

ABSOLON K., KLÍMA B., 1977: Předmostí: Ein Mammut Jägerplatz in Mähren. *Fontes Archaeologiae Moraviae* T.VIII. Academia, Praha.

BARISHNIKOV G. F., MARKOVA A. K., 1992: Main mammal assemblages during the second half of the last glaciation. In: B. Franzel, M. Pecsi, A. A. Velichko (Eds.): *Atlas of paleoclimates and paleoenvironments of the northern hemisphere*. Pp.127–131. Hungarian Academy of Sciences Geographic Research Institute, Budapest – Gustav Fischer Verlag, Stuttgart.

BETTINGER R., 1991: *Hunter-Gatherers*. Plenum Publishing Corp., New York.

BIBIKOVA V. I., BELAN N. G., 1979: Lokal'nye varianty i grupirovki pozdnepaleoliticheskogo teriokompleksa iugo-vostochnoy Evropy. *Bulleten' Moskovskogo obshchestva ispytanya prirody, otdel biologii* 84,3: 3–13.

BINFORD L. R., 1978: *Nunamiut Ethnoarchaeology*. Academic Press, New York.

BORISKOVSKII P. I. (Ed.), 1984: *Paleolit SSSR*. Nauka, Moscow.

BRADLEY B.A., 1993: Paleo-Indian flaked stone technology in the North-American high plains. In: O. Soffer, N. D. Praslov (Eds.): *From Kostenki to Clovis*. Pp. 251–262. Plenum Publishing Corp., New York.

CHERNYSH A. P., 1987: Etalonnaya mnogosloynaya stoyanka Molodova V. In: I. K. Ivanova, S. M. Tseitlin (Eds.): *Mnogosloynaya paleoliticheskaya stoyanka Molodova V*. Pp. 7 – 93. Nauka, Moscow.

DINCAUZE D. F., 1993: Fluted points in the eastern forests. In: O. Soffer, N. D. Praslov (Eds.): *From Kostenki to Clovis*. Pp. 279–292. Plenum Publishing Corp., New York.

DOLUKHANOV P. M., KOZLOWSKI J.K, KOZLOWSKI S. K., 1980: Multivariate analysis of Upper Paleolithic and Mesolithic stone assemblages. *Prace Archeologiczne* 30. Universytet Jagiellonski, Krakow.

FRANZEL B., PECSI M., VELICHKO A. A. (Eds.), 1992: *Atlas of paleoclimates and paleoenvironments of the northern hemisphere*. Hungarian Academy of Sciences Geographic Research Institute, Budapest – Gustav Fischer Verlag, Stuttgart.

GAMBLE C., 1993: People on the move: Interpretations of regional variation in Palaeolithic Europe. In: J. Chapman, P. Dolukhanov (Eds): *Cultural transformations and interactions in eastern Europe*. Pp. 37–55. Avebury, Aldershot, Great Britain.

GRIGOR'EV G. P., 1968: *Nachalo verkhnego paleolita i proishozhdenye Homo Sapiens*. Nauka, Leningrad.

GRIGOR'EV G. P., 1993: The Kostenki-Avdeevo archaeological culture and the Willendorf – Pavlov – Kostenki – Avdeevo cultural unity. In: O. Soffer, N. D. Praslov (Eds.): *From Kostenki to Clovis*. Pp. 51–66. Plenum Publishing Corp., New York.

HAYNES V. C. Jr., 1993: Clovis-Folsom geochronology and climate change. In: O. Soffer, N. D. Praslov (Eds): *From Kostenki to Clovis*. Pp. 251–262. Plenum Publishing Corp., New York.

JOCHIM M. A., 1981: *Strategies for survival*. Academic Press, New York.

KELLY R., TODD L., 1988: Coming into the country: early Paleoindian hunting and mobility. *American Antiquity* 53: 231–244.

KLÍMA B., 1963: *Dolní Věstonice*. Nakladatelství Československé akademie věd, Prague.

KOZLOWSKI J. K., 1986: The Gravettian in Central and Eastern Europe. In: F. Wendorf, A. E. Close (Eds.): *Advances in world archaeology*. Vol. 5. Pp. 201–252. Academic Press, Orlando.

KOZLOWSKI J. K., 1991: Raw material procurement in the Upper Paleolithic of central Europe. In: A. Montet-White, S. Holen (Eds.): *Raw material economies among prehistoric hunter-gatherers*. Pp. 187–196. Publications in Anthropology 19. University of Kansas.

LEE E. S., 1966: A Theory of Migration. *Demography* 3: 47–57.

LEWIS G. J., 1982: *Human migration: a geographical perspective*. St. Martin's Press, New York.

MELTZER D.J., 1989: Was stone exchanged among Eastern North-American Paleoindians? In: C. J. Ellis, J. Lothrop (Eds.): *Eastern Paleoindian lithic resource use*. Pp. 11–39. Westview Press, Boulder.

MINC L. D., SMITH K. P., 1989: The spirit of survival: cultural response to resource variability in North Alaska. In: P. Halstead, J. O'Shea (Eds.): *Bad year economics*. Pp. 8–30. Cambridge University Press, Cambridge.

OTTE M., 1993: Upper Palaeolithic relations between central and eastern Europe. In: J. Chapman, P. Dolukhanov (Eds.): *Cultural transformations and interactions in eastern Europe*. Pp. 56–64. Avebury, Aldershot, Great Britain.

OTTE M., KEELEY L., 1990: The impact of regionalism on Palaeolithic studies. *Curr. Anthrop*. 31: 577–82.

PIANKA E. R., 1974: *Evolutionary Ecology*. Harper & Row, New York.

PRASLOV N. D., ROGACHEV A. N. (Eds.), 1982: *Paleolit Kostenkovsko-Borschevskogo Rayona na Donu 1879–1979*. Nauka, Leningrad.

ROUSE I., 1986: *Migrations in Prehistory*. Yale University Press, New Haven.

SOFFER O., 1985: *The Upper Paleolithic of the Central Russian Plain*. Academic Press, Orlando.

SOFFER O., 1989: Storage, sedentism, and the Eurasian Palaeolithic record. *Antiquity* 63: 719–732.

SOFFER O., 1990: The Russian Plain at the Last Glacial Maximum. In: O. Soffer, C. Gamble (Eds.): *The World at 18 000 B.P., Northern Latitudes*. Pp. 228–254. Allen & Unwin, London.

SOFFER O., 1991: Lithics and lifeways – the diversity in raw material procurement and settlement systems on the Upper Paleolithic east European plain. In: A. Montet-White, S. Holen (Eds.): *Raw material economies among prehistoric hunter-gatherers*. Pp. 221–234. Publications in Anthropology 19. University of Kansas.

SOFFER O., 1992: Cultural elaborations and evolutionary dead ends: the Upper Paleolithic of Central and Eastern Europe. Paper presented at the symposium Microblade Industry in Northern Eurasia and Northern North America. Sapporo University, Sapporo, Japan.

SOFFER O., 1993: Upper Paleolithic adaptations in central and eastern Europe and man – mammoth interactions. In: O. Soffer, N. D. Praslov (Eds.): *From Kostenki to Clovis*. Pp. 31–50. Plenum Publishing Corp., New York.

SOFFER O., 1995: Artistic apogees and biological nadirs: Upper Paleolithic cultural complexity reconsidered. In: M. Otte (Ed.): *Nature et culture*. ERAUL. 68: 617–627. Liège, Belgium.

SOFFER O., PRASLOV N. D., 1993: Fluted points and female figurines – understanding Late Paleolithic people in the New and Old Worlds. In: O. Soffer, N. D. Praslov (Eds.): *From Kostenki to Clovis*. Pp. 3–14. Plenum Publishing Corp., New York.

SPIRIDONOVA E. A., 1991: *Evoliutsia rastitel'nogo pokrova basseyna Dona v verkhnem pleistotsene – golotsene*. Nauka, Moscow.

SVOBODA J., 1990: Moravia during the Upper Pleniglacial. In: O. Soffer, C. Gamble (Eds.): *The World at 18 000 B.P., Northern Latitudes*. Pp.193–203. Allen & Unwin, London.

SVOBODA J., 1994a: The Pavlov Site, Czech Republic: lithic evidence from the Upper Paleolithic. *J. of Field Archaeology* 21: 69–81.

SVOBODA J. et al., 1994b: *Paleolit Moravy a Slezska. Dolnověstonické studie 1*. Brno.

SVOBODA J., LOŽEK V., VLČEK, E., 1996: *Hunters between East and West*. Plenum Publishing Corp., New York.

TANKERSLEY K. B., 1991: A Geoarchaeological investigation of distribution and exchange in the raw material economies of Clovis groups in eastern North America. In: A. Montet-White, S. Holen (Eds.): *Raw material economies among prehistoric hunter-gatherers*. Pp. 285–304. Publications in Anthropology 19. University of Kansas.

VELICHKO A. A., KURENKOVA E. I., 1990: Environmental conditions and human occupation of northern Eurasia during the late Valdai. In: O. Soffer, C. Gamble (Eds.): *The World at 18 000 B.P., Northern Latitudes*. Pp. 255–264. Allen & Unwin, London.

WIESSNER P., 1983: Style and social information in Kalahari San projectile points. *American Antiquity* 48: 253–276.

Olga Soffer
Department of Anthropology
University of Illinois
109 Davenport Hall
607 S. Mathews
Urbana, Illinois 61801
USA
Tel. (217) 333 2100
Fax: (217) 244 3490
E-mail: o-soffer@uiuc.edu