

## HUMAN BEHAVIOURAL ADAPTATIONS TO INTERGLACIAL LAKESHORE ENVIRONMENTS: AN INTRODUCTION

During the course of human evolution, we have successfully adapted to various environments. Changing climates and landscapes often required new behavioural strategies for survival; human societies indeed came into being against the background of this challenge. Although the connection between human behavioural adaptation and environmental change is well acknowledged, the processes involved are not fully understood. To what extent, how rapidly and at what scale climate and environmental change led to modifications and adaptations in human behaviour are issues that are only just beginning to be intensively addressed. A fundamental problem is the complexity and interdependence of human behaviour and environmental conditions, necessitating the identification of relevant levels of comparability in order to provide a solid foundation on which to base the archaeological record as a product of behavioural adaptation.

In this sense, interglacial environments offer an excellent opportunity to analyse how humans adapted to changing climates and landscapes. Warm environments have traditionally been regarded as a challenge to human survival (Gamble 1987; 1986), mainly due to the limitation that forested landscapes impose on the growth of herds of large herbivores, which are considered to be the basis of Pleistocene hominins diet. However, northern Europe was occupied intensively during interglacials, and recent works highlight the research potential of warm, forested environments in regard

to human subsistence (Gaudzinski-Windheuser et al. 2014; Gaudzinski-Windheuser/Roebroeks 2011; Roebroeks/Conard/van Kolfschoten 1992).

On the north European plain, interglacials often correlate with the flooding of basins, resulting in the appearance of lacustrine landscapes with different types of freshwater localities, from small ponds to large lakes. Lacustrine environments offer a broad range of highly predictable resources, such as fish, birds, water plants and regular sources of fresh water (Dinnin/van de Noort 1999; González-Morales 1999; Nicholas 1998; 2006). Freshwater localities are considered to have played a major role in human evolution (Cunnane/Stewart 2010), and therefore hold great potential for studying prehistoric hunter-gatherer behaviour (Nicholas 2006).

The relationship between lakeland environments and human settlement, as well as the consumption of aquatic resources, is clearly demonstrated in the European Mesolithic (Kaiser/Terberger/Jantzen 2000; Jochim 1998; 2006; Naito et al. 2013). In contrast, the consumption of freshwater resources during the Pleistocene is less evident, but hominin diets may have been broader than previously considered (Fiorenza et al. 2015; Villa/Roebroeks 2014). Nevertheless, accepting evidence for a diet mainly based on meat consumption (Richards/Trinkaus 2009) indicates that lacustrine localities would have been essential to hominin subsistence considering the regular presence of ungulates around these areas. Indeed, the expected concentration of ungulates in

these areas attracted hominins, as demonstrated by the presence of many Palaeolithic sites in lakeland environments (Gaudzinski-Windheuser/Roebroeks 2011).

From an analytical perspective, interglacial wetland deposits often contain high-resolution archives of the past, with favourable conditions for the preservation of archaeological, organic and botanical remains, as well as large-scale, detailed stratigraphic sequences and ecological records (van de Noort 2008). Owing to this excellent preservation, lacustrine deposits permit detailed environmental, chronological and archaeological analyses (Gaudzinski-Windheuser et al. 2014). In the archaeological records, lakeshore sites are well-known as locations for the procurement and butchering of animals, lithic provisioning, gathering vegetal resources, collecting aquatic resources and, occasionally, more permanent visits by hunter-gatherers. In this respect, interglacial lakeshore environments are essential for studying past human behaviour.

The MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution (Neuwied, Germany) has defined one of its core research themes under the title of *“Human behavioural strategies in interglacial environments”*. The aim of this research is to undertake a holistic and diachronic analysis of survival strategies under similar environmental parameters in order to document the evolution of hominin subsistence behaviour and to gauge whether certain subsistence adaptations arose in direct response to distinct environmental conditions. This research focus covers a wide spatial framework and temporal span ranging from the Middle Pleistocene to the Holocene. With this aim in mind, a session titled *“Human behavioural adaptations to interglacial lakeshore environments”* was organized at the XVII Congress of the UISPP, held in Burgos, Spain, in September 2014. The session provided a forum for specialists to present and discuss data from localities of different character, from ephemeral sites to extensive, multi-occupation localities and to highly detailed information preserved at early Holocene sites. The aim of the session was to understand the importance and attractiveness of

freshwater localities as focal points for human behaviour during interglacials. This volume gathers some of the lectures given at that session.

For our oldest locale, Turner focuses on the Middle Pleistocene site of Miesenheim I, located on the edge of the Neuwied Basin in the Central Rhineland of Germany. Dating to approximately 500,000 years ago, the site produced an interglacial fauna associated with a small assemblage of lithic artefacts, deposited close to a flood-plain pond. The evidence currently available hints at a transient use of the site by hominins, providing another, ephemeral, facet of human behavioural adaptations in interglacials.

Brasser addresses the issue of whether the accumulations of fauna along the lakeshore at the Lower Palaeolithic locality of Bilzingsleben can be related to human activity or to other factors, such as natural accumulations and/or post-depositional processes. In this case, the presence of cut marks and the prey age profiles proved useful for differentiating the role of hominins from other processes in the creation of the deposit.

The archaeological locality of Schöningen 13II-4 is one of the most well-known examples of a Pleistocene lakeshore site. Here, a series of wooden spears were discovered, considered to be the standard of Palaeolithic organic hunting weapons. In the paper by Hutson and colleagues, the zooarchaeological record of the site is introduced, showing the potential for Schöningen to inform on the use of wooden tools in the Palaeolithic and the development of complex behaviours during the Middle Pleistocene.

Starkovich and Conard evaluate the inclusion of meat into the hominin diet during the Pleistocene. The authors offer a wide, diachronic review of the origins of hominin meat acquisition, a process in which lakeshore environments likely played a major role due to their attractiveness for both ungulates and their predators, including hominin hunters and other carnivores.

On a similar topic, the Eemian locality of Neumark-Nord offers a unique opportunity to approach ungulate carrying capacities and biomass production. With its high-resolution stratigraphic sequence, excellent preservation conditions and archaeological

richness, the faunal assemblages of Neumark-Nord, featuring more than 450 hundred large- and medium-sized herbivores, provide the means to evaluate Neanderthal prey selection patterns and subsistence strategies.

Two papers focus on the Mesolithic site of Bedburg-Königshoven. Dated to the beginning of the Holocene interglacial (11,600 BP), in the middle of the Preboreal Pollen Zone, the mammal fauna is already fully temperate in character (e. g. red deer, roe deer, aurochs, wild boar) with possible indicators for surviving open conditions (horse, white stork, crested lark). As Street shows, the waterside location was used by humans for the butchery and disposal of large game, which appears to have been hunted close by. However, there is also evidence for a number of other activities, as indicated by the appearance of antler frontlets, analysed here by Wild.

Finally, Gross examines lakeshore archaeological sites for a detailed reconstruction of prehistoric

landscapes. The archaeological locality of Rhinluch is a valuable area for analysing the Early Holocene exploitation of a micro-region. With three contemporaneous archaeological sites, this locality offers promise for the analysis of early Holocene hunter-gatherer-fisher behaviour and for the understanding of Holocene environments.

Taken together, these papers provide a broad, diachronic perspective on the human use of lakeshore environments, from the Middle Pleistocene to the Early Holocene. These environments exhibit remarkable ecological diversity with highly concentrated and predictable resources. With their high-resolution stratigraphic deposits and excellent conditions of preservation, lacustrine localities are exceptional archives for detailed analyses of human adaptations to changing, dynamic environments. In conclusion, interglacial lakeshore archaeological sites are keystones in the long path of human evolution, providing critical insight into what makes us human.

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