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European Mesolithic: Geography and Culture

Philippe Crombé and Erick Robinson
Department of Archaeology, Ghent University, Ghent, Belgium

State of Knowledge and Current Debates

Introduction

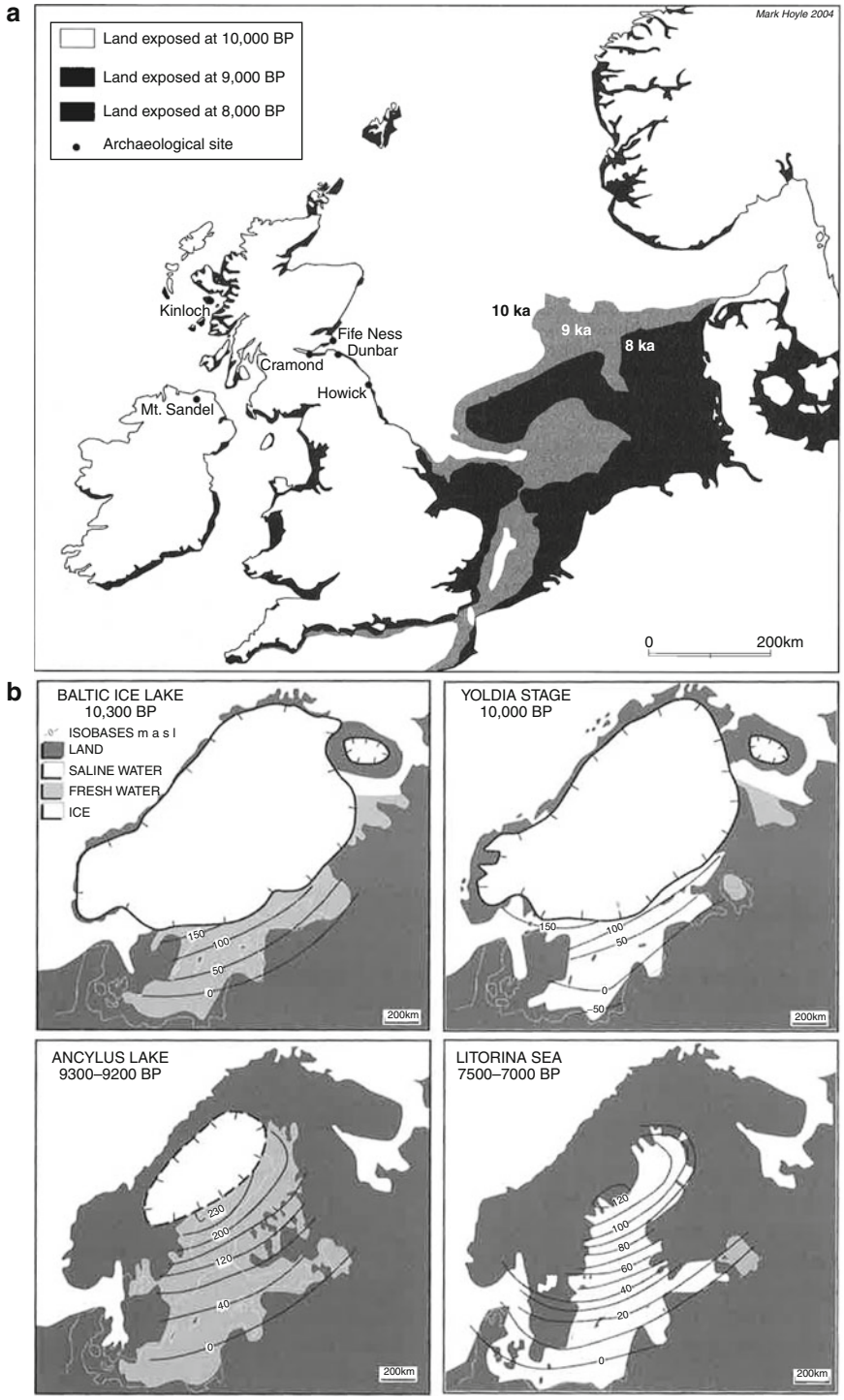
Holocene hunter-gatherers define the European Mesolithic. The beginning of the Mesolithic is marked by the transition from Pleistocene to Holocene, which has been dated to 11,700 cal. BP (Walker et al. 2009). The end of the Mesolithic is marked by the transition from hunting and gathering to agriculture. There is no firm date for the end of the Mesolithic because agricultural transitions occurred at different times in different regions throughout the continent. This variability, however, is not restricted to the end of the Mesolithic. From subsistence to ritual, the Mesolithic was a period of enormous diversity. The evidence for sociocultural diversity during the Mesolithic was largely due to the increasing diversity of regional landscapes caused by the amelioration of climate during the Early Holocene. The Mesolithic is a very important period for our understanding of humanity because it represents the first evidence for human occupation of the postglacial environments in Europe that have been continuously inhabited through contemporary times.

The variability of the Mesolithic archaeological record has caused a number of different subperiod designations between different regions. At a continental scale, archaeologists have traditionally separated the Mesolithic into two subperiods (Early and Late Mesolithic) based on changes in ecology, stone tool technology, and a range of other aspects of life (Jochim 2011). This entry uses this bipartite division of the Mesolithic in Europe.

Early Mesolithic

The Early Mesolithic starts with the massive appearance of microlithic armatures made according to the microburin technique, a technique aiming at producing oblique fractures on bladelets. Although microliths already existed during the Final Paleolithic, for example, within the (Epi)Ahrensburgian culture of northern Europe (Deeben 1988) and the (Epi)Laborian culture of southern Europe (Naudinot 2008), from the early Holocene they become a standard tool all over Europe.

The Early Mesolithic roughly spans the Preboreal and Boreal periods, which occurred between 11,000 and 9,000 cal. BP. It thus coincides with the period immediately following the last extensive glacial stadial, known as the Younger Dryas. The rapidly increasing temperature in the early Preboreal led to an acceleration in the melting of glaciers. Melting glaciers caused an abrupt rise of sea levels, with the impacts being more drastic in northern Europe, particularly in the North Sea and western Baltic Sea, than along coasts of the Mediterranean Sea (Fig. 1). The northern Adriatic Sea region, however, also experienced considerable coastline change due to rising sea levels. The inundation of former coastlines and land bridges, which continued into the Late Mesolithic, resulted in a considerable loss of lowland occupation and hunting grounds and the drowning of Early Mesolithic settlements. Many ongoing underwater survey projects using scuba diving in shallow waters and acoustic methods are starting to reveal offshore remains of Mesolithic settlements, burials, fishing installations (weirs, platforms), and implements



European Mesolithic: Geography and Culture, Fig. 1 Progressive inundation of (**a**) the North Sea basin (Bailey 2007), (**b**) the Baltic Sea basin (Eronen et al. 2001)

(harpoons, hooks), albeit so far most of these seem to belong to the Late Mesolithic (Benjamin et al. 2011). The bias in the recovery of these sites thus far is likely due to Early Mesolithic sites being buried at deeper levels that have rendered them much more difficult to detect.

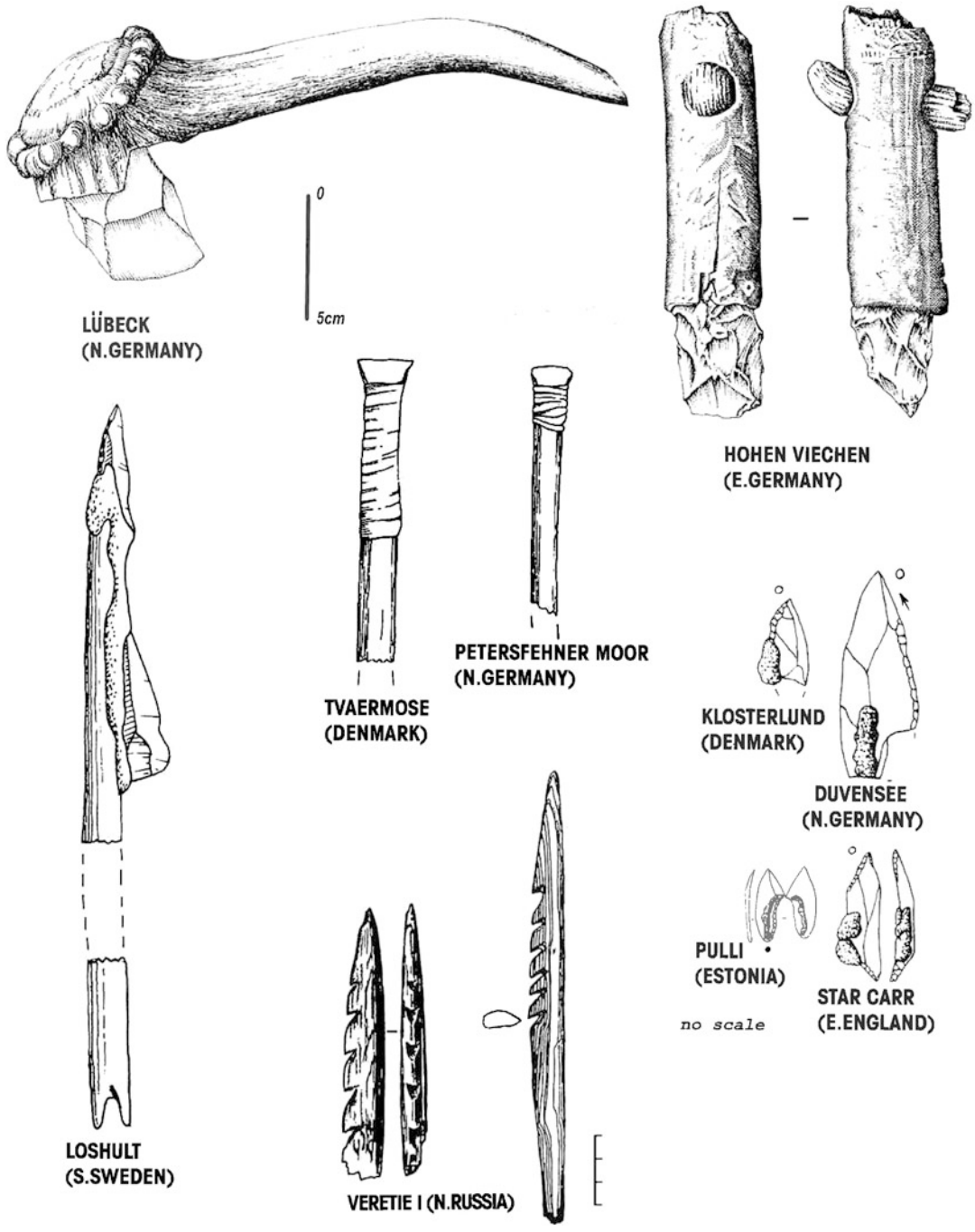
In northern circum-Baltic Europe (Norway, northern and central Sweden, Finland), sea-level changes were outpaced by isostatic rebound of land freed from ice. This situation therefore caused land to be uplifted and newly habitable landscapes to become available for colonization by animals and humans. Based on similarities in stone technology and raw materials, it is believed that hunter-gatherers ("Fosna-Hensbacka," "Komsa," and "Kunda" cultures) colonized these northern regions both from the south (northern Germany, Denmark) and the east (upper Volga river, NW Russia) (Rankama & Kankaanpää 2008; Bjerck 2009). The overwhelming concentration of Early Mesolithic sites along former, now elevated shorelines in southern Sweden and Norway suggests that initial colonization of these regions was organized by societies that had developed an advanced maritime technology (Bjerck 2009). Boats allowed these Early Mesolithic hunter-gatherers to settle on virgin coasts, islands, and archipelagos that were newly born out of the sea by isostatic uplift.

Despite climate during the Preboreal and Boreal being substantially more temperate compared to the preceding Younger Dryas, these periods were characterized by notable climatic instability. According to the high-resolution paleoclimate records from the Greenland ice cores, there were two abrupt, short-term cooling events during the Early Mesolithic that caused mean annual temperatures to drop by around 2 °C (Blockley et al. 2012). A first one, called the Preboreal oscillation (PBO), happened right at the start of the Mesolithic around 11,300 cal. BP and was characterized by a more continental climate with dry, warm summers and cold winters (Bohncke & Hoek 2007). A second cooling event is dated around 9,300 cal. BP. According to recent radiocarbon evidence, this "9.3 event" had a considerable impact on Early Mesolithic hunter-gatherers, especially in the southern North Sea area, which is reflected by changes in sociocultural territory demarcation, raw material distribution, and projectile technology (Robinson et al. 2013). Even though there has been initial evidence yielded for the impacts of short-term cooling events on Mesolithic ecosystems and societies, there is much research to be done in the future that will deepen our understanding of the complexities of ecosystem and Mesolithic responses to paleoclimate change at diachronic, interregional scales of analysis.

Vegetation during the Early Mesolithic shifted from an overall open grass and shrub vegetation in the Preboreal to a more closed birch/pine forest landscape in the Boreal. From the early Boreal onward, hazel colonized large parts of Europe and in some areas constituted a major part of the vegetation.

Early Mesolithic Technology

Throughout Europe the Early Mesolithic is best documented by its lithic industries, which were mostly made on local flints. Standard tools are microliths, end scrapers, borer, and simply retouched bladelets and flakes. Burins, a typical tool of the Final Paleolithic, however, decreased in importance, albeit antler and bone working is still well represented in the Early Mesolithic. Microliths, which were mostly used as barbs and points on arrow shafts, include various types with unretouched bases, retouched bases, crescents, and triangles (Fig. 2). The ratio between these different types varies regionally; crescents, points with retouched base, and isosceles triangles, for example, are characteristic mainly for southern and central European traditions such as "Sauveterrian," "Beuronian," and "Tardenoisian," while points with unretouched bases and scalene triangles occur in large numbers within assemblages from northern European traditions such as the Maglemosian and (Epi)Ahrensburgian techno-complexes. In some regions of Europe, these broader traditions are further separated by



European Mesolithic: Geography and Culture, Fig. 2 Composite technologies (from Kozlowski 2009)

more localized traditions. For example, within the Rhine-Meuse-Scheldt region of northwest Europe, new types of microliths characterized by flat, partially bifacial retouch appear during the last centuries of the Boreal. Also, in certain regions of northern Europe macrolithic tools such as flake and core adzes are frequently found in Early Mesolithic contexts (Fig. 2). These

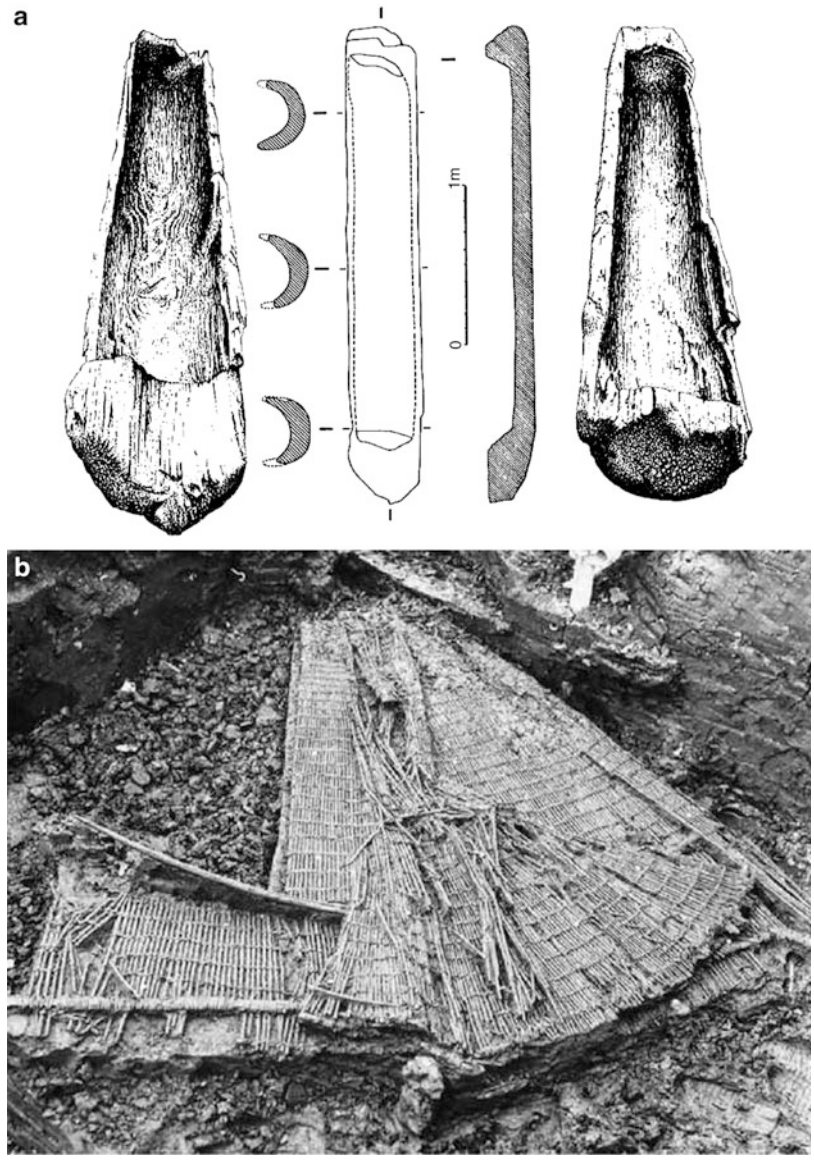
tools were typically associated with various wood-working activities such as tree-felling, debarking, and likely the construction of wooden dugout canoes. Tool type designations are not the only more regionalized demarcations during the Early Mesolithic. The blades used to produce most Early Mesolithic stone tools were also knapped in different ways in different regions of Europe. For example, while blades in most regions of Europe were produced by direct percussion techniques, there appears to be a distinct change in northeastern Europe within which blades were produced by pressure knapping techniques. Pressure knapping techniques appear to be transmitted from the "Butovo culture" of the upper Volga river region of Russia to the "Kunda culture" of the eastern Baltic and finally to the Maglemosian of southern Scandinavia (Sørensen 2012).

In wetland environments, such as peat bogs, river floodplains, and inundated coasts, excavations also revealed a wide range of tools and objects made of organic materials, such as bone, antler, and wood (Fig. 2). Interesting Early Mesolithic contexts are the sites of Star Carr (Clark 1971), Amsterdam "Europoort" (Verhart 1988), Friesack (Gramsch & Kloss 1989), Mullerup I (Brinch Petersen 1973), and Zamostje II (Lozovski 1996), among others. Perforated mattocks, barbed points or harpoons, fishhooks, and axe-sleeves were made from either antlers from red deer and elk or bone. Long bones from large mammals, mainly aurochs and red deer, were also used to make awls, adzes, needles, daggers, and hide-working tools. The techniques used to make these different organic tools have been studies in detail by David (2003). Wood served for the manufacturing of arrow shafts, bow, paddles, and also dugout canoes. The oldest canoes within Europe were found at Pesse in the Netherlands (Fig. 3).

Early Mesolithic Subsistence

The profound environmental changes that occurred at the transition from the Late Glacial to the Holocene necessitated changes in the lifeways of Early Mesolithic hunter-gatherers. The progressive reforestation and resulting installation of a temperate-boreal type of fauna caused changes in hunting strategies from an intercept-based "specie-specialized" and "group-organized" strategy during the Final Paleolithic to an encounter-based "broad-spectrum" and "small-group or individual-organized" strategy during the Early Mesolithic. In most parts of Europe, large herds of migratory animals (horse, reindeer) were no longer present from the Late Glacial onward. In southern Europe reindeer was no longer present in faunal records at the start of the Allerød, while in the hilly upland of western and central Europe were not present by the end of the Younger Dryas. Reindeer migrated further north and survived in Scandinavia well into the late Preboreal (Aaris-Sørensen et al. 2007), where they were hunted by survivors of the Tanged Point Traditions ("Fosna-Hensbacka" and "Komsa" cultures). The large reindeer herds were replaced by small- to medium-sized herds of widely dispersed and less-mobile thermophilous game. Large- to medium-sized animals (red deer, boar, roe deer, auroch, and also ibex and chamois in mountainous areas of southern and central Europe) were hunted by means of bow and arrow, while smaller species were probably trapped. Especially in the Mediterranean area (Portugal, southern France, Italy, Greece), smaller animals, such as lagomorphs, rabbits, and hare, became important meat suppliers from the Early Mesolithic onward (Bicho et al. 2000), while in northern Europe fur-bearing animals such as beaver, otter, pine marten, and wild cat were frequently killed, mainly for their hides. Although on most Early Mesolithic sites a broad range of game is present, there are also sites that provide evidence for more specialized hunting, such as chamois, ibex, or marmot hunting sites in the Pyrenees and Alps (Barbaza 1999).

Data from across Europe also indicate that the exploitation of marine and riverine resources intensified at the transition from the Late Glacial to the Early Holocene. The first evidence of coastal exploitation has been dated to the Middle Paleolithic (e.g., at Gorham's cave in Gibraltar)



European Mesolithic: Geography and Culture, Fig. 3 Aquatic technology. (**a**) Dugout canoe from Pesse, the Netherlands (Kozlowski 2009). (**b**) Fish weir from Bergschenhoek, the Netherlands (Louwe Kooijmans 1987)

but still remains scarce. Evidence of a systematic exploitation of the Atlantic shore comes from Portuguese and northern Spanish sites dated to the Late Paleolithic (c. 40,000–10,900 cal. BP) (Gutiérrez-Zugasti et al. 2011). These sites yielded accumulation of shells, however, without forming true middens. The latter first appeared during the Early Mesolithic, albeit they usually remained smaller and less dense compared to the typical Late Mesolithic shell middens (cf. below). Yet, these Early Mesolithic shell middens prove an intensification of the marine exploitation at the onset of the Holocene. Again, Early Mesolithic shell middens so far have been found only in Portugal and northern Spain, sometimes as far as 60 km away from the former coastline. The marine remains indicate the consumption of molluscs such as limpets (*Patella vulgate* and *Patella intermedia*), top shell (*Osilinus lineatus*), mussels (*Mytilus galloprovincialis*), and common cockles (*Cerastoderma edule*); marine fish such as tope shark (*Galeorhinus galeus*)

and sea bream species (*Diplodus vulgaris*, *Sparus aurata*); as well as crustaceans. Similar species have also been exploited along the Mediterranean coast of Italy and Greece (Pluciennik 2008), although not resulting in true shell middens.

Early shell middens are also absent further north along the Atlantic coast, but this certainly does not imply that marine resources were not important in northern and western Europe; their apparent absence is most likely a result of a bias due to sea-level changes, which had a much stronger impact in northern and western compared to southern Europe. It is clear that Early Mesolithic shell middens are still preserved below sea level, awaiting their discovery. In addition, in northern Europe there is other evidence which supports the importance of marine resources from the start of the Mesolithic. Recent stable isotope analysis on skeletons from Wales (Schulting & Richards 2002) and southern Sweden (Lidén et al. 2004) gives a clear marine signal with an intake of >50 % of marine resources for some individuals, clearly pointing to the existence of a specialized coastal economy already during the early stages of the Mesolithic. Furthermore, in Scandinavia there is increasing evidence of intense and perhaps even specialized hunting of sea mammals, in particular seals, from the Early Mesolithic onward (Bjerck 2009).

In addition of coastal harvesting, numerous inland sites situated in major river valleys provided evidence for the exploitation of freshwater environments. Substantial evidence, such as large amounts of fish bones (pike, tench, bream, and eel), barbed bone projectiles, fishhooks, and fish equipment, has been reported on numerous Early Mesolithic sites especially in the Rhine and upper Danube valley (Svoboda 2008), while in other areas such as the Iron Gates in the lower Danube, heavy reliance on fish has been deduced from isotopic evidence (Bonsall 2008). In many other, mostly smaller river valleys, the evidence is less conclusive, while often (burnt) fish remains are found; their frequency is generally too low to conclude important freshwater consumption. This is also confirmed by stable isotope data from areas such as the Belgian Meuse valley (Bocherens et al. 2007) and French Charente-Maritime (Schulting et al. 2008), which indicate a strongly terrestrial diet dominated by animal protein with just a possibility of a slight contribution of marine-derived protein.

Besides aquatic and animal resources, plants (tubers, roots, mushrooms, various fruits) also became increasingly important within Mesolithic diets (Zvelebil 1994). The Early Mesolithic provides the first clear evidence for the regular gathering of plants and their central component in human diets (Jochim 2011). However, the exact contribution of plants often remains difficult to assess due to the bad preservation of plant remains. On northern European sites, carbonized shells of hazelnuts are frequently encountered in association with open fireplaces, sometimes even in large quantities. Either hazelnuts were roasted in these hearths for preservation purposes and/or destroying contaminants (Holst 2010) or they were dumped as waste in hearths after consumption (Sergant et al. 2006). According to recent estimates (Holst 2010), this high-quality, easy to store and digest resource could have covered 44 % of human energy demands. In the Mediterranean region, remains of wild legumes (vetch, pea, lentil), nuts (acorn, walnut, pistachio), and seeds are frequently found (Pluciennik 2008). Besides plant macroremains, there is also indirect evidence of plant gathering during the Early Mesolithic, especially in northwestern Europe. Recent microwear analyses (Beugnier 2007) have revealed traces of plant processing on many unretouched artifacts, connected with the scraping and splitting of nonwoody, silica-rich soft plants such as reeds. Albeit these tools were clearly not involved in plant harvesting for consumption, they prove that from the Early Mesolithic plants started to play a significant role in the production of fibers, for example, for making basketry and nets. Small fragments of vegetal cords and nets have been found in the bog site of Friesack (Gramsch & Kloss 1989) in NE Germany.

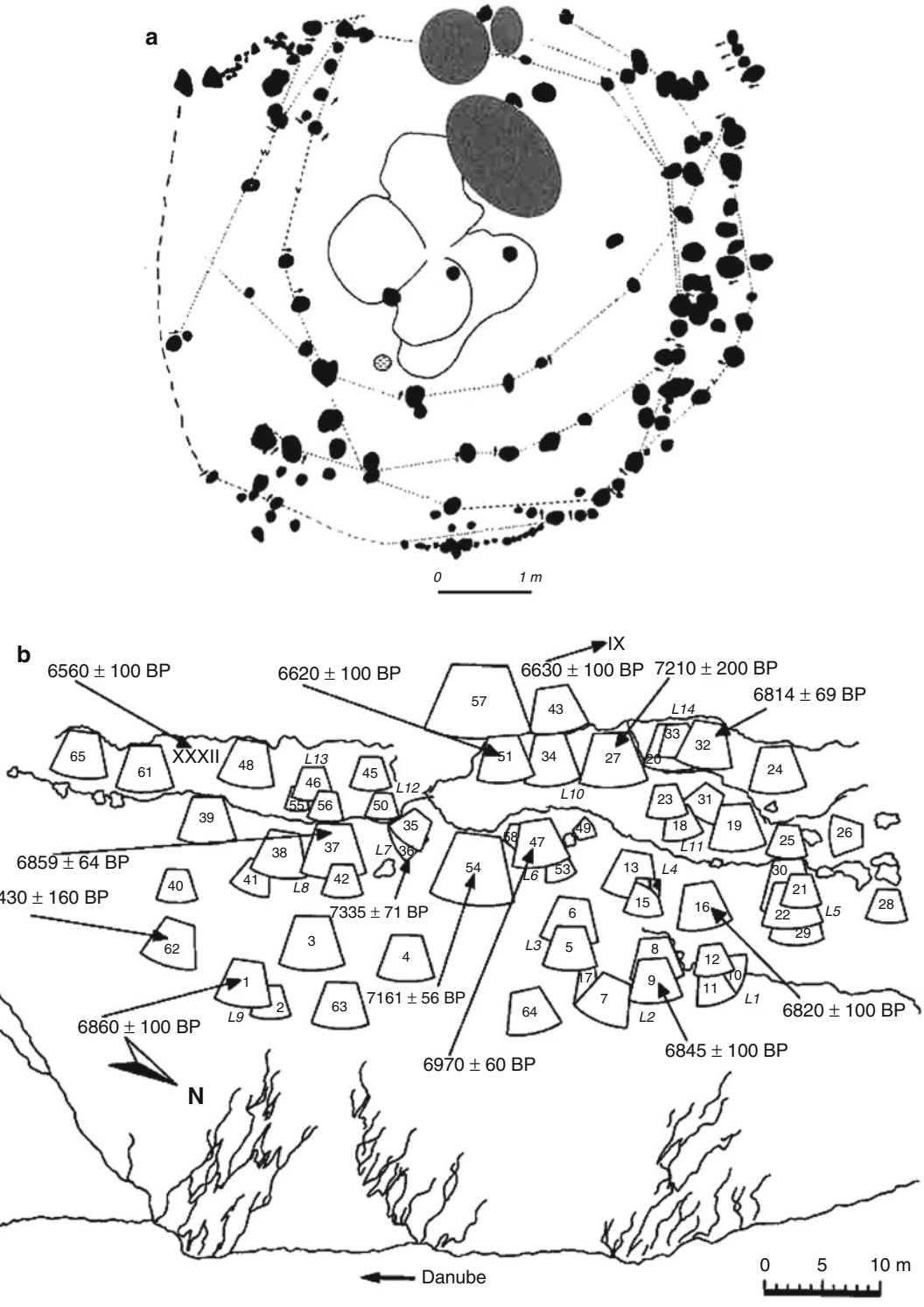
To summarize, Early Mesolithic subsistence varied considerably on a local and regional scale. Along the former coasts, communities mainly

focused on the exploitation of marine resources, with an emphasis on molluscs and fish in southern Europe and sea mammals (seals) in northern Europe. In the interior, subsistence heavily relied on game hunting and trapping combined with plant gathering, except for the main river valleys where the consumption of freshwater resources was also very important. The frequent discovery of marine shells on inland sites, in particular used as beads in burials, possibly indicates contact and exchange between coastal and inland communities. At the French site of La Vergne (Schulting et al. 2008) c. 3300, marine shell beads, originating from the former coast 60–80 km from the site, were found in three grave structures. The near absence of marine isotopes in the skeletal material clearly proves that these individuals did not exploit nor consume marine resources at all, but just exchanges shells.

Early Mesolithic Settlement, Land Use, and Territories

The unpredictable, dispersed character of resources, in particular of wild game and edible plants, must have forced Early Mesolithic hunter-gatherers to move almost continuously through the landscape, in particular those groups that occupied the forested interior of Europe. A high residential mobility can be deduced from both the considerably larger number of sites compared to the Late Mesolithic and the generally small size of the seasonal campsites. Early Mesolithic settlements tend to cluster along open water systems, such as rivers, lakes, and fens, sometimes forming extensive site-complexes covering several hectares (Barton et al. 1995). These latter kinds of site-complexes likely represent cumulative and/or spatial palimpsests (Bailey 2007), resulting from repeated reoccupation of the same locations. Extensive radiocarbon dating of some of these palimpsests has shown that reuse sometimes spanned several centuries or even millennia, in a continuous or discontinuous way (Crombé et al. 2012). Within these Early Mesolithic settlements, lithic concentrations, probably corresponding with former dwelling spaces (Grøn 2003), are usually rather small, covering less than 20–30 m^2. The few preserved remains of Early Mesolithic superstructures, such as at Howick (Waddington 2007) or Mount Sandel (Woodman 1985) (Fig. 4), indicate that these living spaces were sometimes covered by subcircular or subrectangular tents or timber huts and had a shallow dugout floor that might have been covered with organic material. At Howick, high-resolution radiocarbon dating points to a temporary use of these dwellings over several generations up to 150–200 years. On dry-land sites with bad organic preservation, however, it remains unclear whether dwelling tents or huts have ever been present; some archaeologists believe that daily activities such as cooking, stone knapping, and hide-working were carried out in open air. At best, superstructures were erected just for sleeping in areas free of settlement waste, making them almost archaeologically invisible. In wetland environments, such as the Duvensee peatland in northern Germany (Bokelmann 1971), dwellings consist of an organic flooring made of layers of pine, birch bark, and/or bundles of twigs and branches. These "bark floors" probably formed a kind of foundation for settling in a wet and damp peat area. An exceptional wooden construction was found at the lake site of Star Carr (Clark 1971), where on this lake shore settlement, a wooden platform was made presumably to stabilize the edge of what would have been a muddy area.

Most Early Mesolithic dwelling spaces, both open air and sheltered, were provided with one or more central fireplaces which based on the often abundant presence of burnt bones and hazelnut shells served mainly for cooking and heating. On several wetland sites, sand was imported to the site in order to construct these hearths; at Duvensee, for example, considerable amounts of white sand most likely served as a heat conductor for roasting hazelnuts (Holst 2010). Based on the distribution of small flint implements (mainly microliths) combined with the presence of hearths, Grøn (2003) has attempted to reconstruct the social composition and positions of individuals within Early



European Mesolithic: Geography and Culture, Fig. 4 Dwelling structures. (**a**) Mount Sandel (Woodman 1985), (**b**) Lepenski Vir 1 (Bonsall et al. 2000)

Mesolithic ("Maglemose culture") dwellings in southern Scandinavia. According to his analyses, repeated patterning in the spatial distribution of lithics and features leads to the identification of single and two-family dwellings, with a gradual increase of the latter toward the end of the Early Mesolithic. Judging by the small size of the dwellings, the limited (lithic) waste, and the weakly developed wear-traces on the lithic tools, it is generally assumed that most inland Early Mesolithic campsites were used for relatively short stays of small "residential" groups such as nuclear families or small microbands. Special purpose "logistical" sites, such as small hunting camps characterized mainly by a predominance of microliths within the lithic toolkit, are also regionally known, though microliths alone are not sufficient to determine such sites. Studies of microwear traces (Beugnier 2007) and/or faunal remains (Valdeyron et al. 2011) on some of these alleged hunting sites have shown that often a much wider range of activities, including domestic ones (consumption, plant processing), have been carried out. Examples of potential hunting camps can be found, for example, in the Duvensee peat area (Bokelmann 1971) and the Alpine region (Fontana 2011). In the latter region, many high mountain open-air sites and rockshelters covering areas of less than 50 m^2 have yielded evidence of specialized provisioning and exploitation of animal resources such as red deer, ibex, and chamois. These small sites were probably used during summer by small groups living in the surrounding valley in the context of vertical seasonal transhumant migration between uplands and lowlands. The recent discovery of sites with numerous pits, especially in the Paris basin (Verjux 2003), has led some archaeologists to suggest the existence of inland communities with a reduced mobility during the Boreal. At Auneau, for example, altogether more than 60 pits have been excavated next to a number of burials. These pits can be classified in five types: rubbish and cooking pits, cylindrical storage structures with vertical walls, postholes with stones, and pits with intentional faunal deposits (aurochs, deer antler). These kinds of sites possibly represent so-called aggregation sites, as known from (sub)recent hunter-gatherer, where large groups met in order to exchange goods, raw materials, ideas, and mating partners, as well as for feasting and shared ritual activities.

Settlement of upland mountainous regions is also one of the most noteworthy aspects of Early Mesolithic settlement. Early Mesolithic settlements have been found as high as 2,400 m above sea level in northern Italy and as high as 2,200 in the Austrian and Swiss alps (Jochim 2011). Settlement of these high-altitude regions was not confined to particular kinds of sites but rather ranged from caves and rockshelters to open-air sites, often near lakes.

Contrary to the inland occupants, Early Mesolithic groups living along former coastlines and perhaps also major rivers might have known a more restricted residential mobility. The existence of shell deposits in Portuguese caves and rockshelters at a distance of 60 km from the ancient coastline suggests mobility in a relatively small strip along the coast (Gutiérrez-Zugasti et al. 2011). Similar conclusions have been drawn from raw material studies (Marchand et al. 2011) and stable isotope analyses (Schulting et al. 2008) along the west coast of France. In south Wales stable isotopes demonstrate the existence of coastal communities which focused almost entirely on coastal resources year-round (Schulting & Richards 2002).

By analogy with recent hunter-gatherers occupying forested environments, it may be assumed that Early Mesolithic groups had to cover large territories within yearly cycles. Lithic raw material procurement analyses (Gendel 1984; Jochim 2011) point to yearly territories of minimal 80–100 km in diameter. Similar studies also show that these local groups were part of larger cultural units, so-called dialectic tribes, which had extensive social territories. Geographical analyses of specific objects and raw materials, such as Wommersom/Tienen quartzites and flat retouched microliths in the Rhine-Meuse-Scheldt area (Gendel 1984; Robinson et al. 2013); personal ornaments, for example, pendants and

beads (Newell et al. 1990); bone points and harpoons (Verhart 1988); or decorated bone and antler objects (Terberger 2006), all point to social territories covering >50,000 km^2, sometimes even attaining 230,000 km^2.

Early Mesolithic Burials and Rituals

Compared to the Late Mesolithic, Early Mesolithic burial practices are not extensively documented, although in recent years, an increasing number of burials have been discovered. These recent discoveries have been recorded throughout the continent, from northwest Europe (Cauwe 2001; Conneller 2006) to the lower Danube (Bonsall 2008) and Dnieper (Dolukhanov 2008) basins. Early Mesolithic burials occur in both caves/rockshelters and open-air sites. The most common burial rite is inhumation. Cremation burials do begin to appear in some regions of Europe in the later parts of the Early Mesolithic (Toussaint et al. 2009). Burials occur both on settlements and in separate locations.

Inhumation practices are very diverse, ranging from individual burials to multiple burials, collective burials, and secondary burials (Meiklejohn et al. 2009). In single burials the deposition of the dead occurs mostly either stretched out on the back or in sitting position. Grave goods are generally restricted to personal ornaments (perforated animal teeth, shells), faunal remains (mainly deer antler, auroch horns), and ochre. Some graves (e.g., at the French site of Chaussée-Tirancourt), however, contain only parts of an individual and should hence be considered as secondary burials. Single graves are found either isolated (e.g., in caves) or in usually small groups of 5–10 pits.

Eastern Europe has yielded some very large communal cemeteries at sites such as Vasylievka and Volos'ke on the Danube-Dniester interfluve in Ukraine, which indicate a homogeneity of burial rites (Dolukhanov 2008). Many of these burials also yield evidence for bodies penetrated by flint arrowheads that suggest that these people died by violent encounters (Dolukhanov 2008). Combined with the evidence from northern and western Europe, it is clear that there was not a linear progression from single burials to cemeteries from the Early to Late Mesolithic but rather a complex mix of various burial rites throughout the entire Mesolithic (Meiklejohn et al. 2009).

The burial of multiple individuals within the same structure or locality also seems to be a common trait for the Early Mesolithic. In several caves, mainly in Belgium (Cauwe 2001) and the UK (Conneller 2006), and a few burial pits on open-air cemeteries (e.g., La Vergne; Schulting et al. 2007), remains of up to 11 individuals have been discovered. The famous British cave of Aveline's Hole even contained remains of 50–100 individuals, making these burial places real cemeteries which were probably reused over several generations. However, some graves at open-air sites, such as La Verge, probably need to be interpreted as real multiple graves given the fact that different individuals have been interred simultaneously. The way the deceased are treated within these "multiple and collective" burials is very diverse and complex. A common trait, however, is in the disarticulation of bones and partial internment of skeletons, leading to the conclusion that part of the treatment was done outside the burial place. In some caves (Autours, Aveline's Hole) both articulated and disarticulated skeletons have been observed. In addition, some bones display traces of cut and burning marks, pointing to excarnation. At La Verge a burial pit even combined the remains of an inhumation and cremation grave. All this points to the existence of very complex and individualized rituals during the Early Mesolithic, at least along the Atlantic coastline.

Remains of rituals early during the Mesolithic are very scarce and often difficult to determine. Perhaps one of the clearest evidence are the finds of stag headdresses, made out of the skulls and antlers of red deer, smoothed out inside and pierced, presumably for wearing on the head. The most important findspot of such headdresses is Star Carr, where 21 of these were found (Clark 1971). Other European sites (e.g., Bedburg) usually only yield one or two of these finds. There are various interpretations as to how they were used,

including perhaps worn during stag hunts or perhaps in "ritual" ceremonies, as is known in the ethnographic record. The latter hypothesis is further strengthened, especially at Star Carr, by the high numbers of barbed points (191 specimens) made of antler splinters. According to some, Star Carr is therefore "a site where hunter-gatherer's relationship with red deer are negotiated" (Warren 2006).

Late Mesolithic

The Late Mesolithic roughly coincided with the Atlantic period, which occurred between 9,000 and 6,000 cal. BP. The Atlantic period witnessed the highest temperatures throughout the entire Holocene, as well as an increase in rainfall. Vegetation change was the hallmark of the Atlantic, wherein much of Europe open coniferous forests were replaced by closed, mixed deciduous forests primarily comprised of elm and oak. In mountainous regions tree lines rose considerably. Continued increase in sea levels during this period led to the complete inundation of the North Sea basin, thus separating Britain from the continent and flooded regions of the northern Adriatic Sea. This rise in sea level promoted the development of numerous coastal estuaries that were rich in aquatic and marine resources (Jochim 2011). Another major influence on sea-level rise and aquatic and terrestrial ecology during the Atlantic period was a glacier meltwater outburst from the Laurentide Ice Shield over North America, which altered thermohaline circulation over the North Atlantic Ocean and caused an abrupt climate change event around 8,200 cal. BP (Barber et al. 1999). Recent evidence suggests that this cooling event had impacts on Late Mesolithic hunter-gatherer societies (Perrin et al. 2009; Fernández & Jochim 2010). During the course of this "8.2 event," another abrupt environmental change in northwest Europe was caused by the Storegga tsunami, which led to the final drowning of the Dogger Bank in the middle of the North Sea basin and was detrimental to populations settling in the coastal areas of Britain, the Netherlands, Denmark, and Norway (Weninger et al. 2008).

One of the largest challenges currently facing Mesolithic archaeologists is to understand the different impacts that these gradual and abrupt environmental changes might have had on hunter-gatherer societies across the continent (Robinson et al. 2013). There is a possibility that regional resource productivity thresholds were not passed in some regions, and therefore, Late Mesolithic populations were not impacted by these events, whereas in other regions thresholds were passed, and these events had major impacts that are reflected by changes in the archaeological record. The impact of the environment on these Early Holocene hunter-gatherer societies was undoubtedly most complex at the local and regional level (Spikins 2008), and an important area for future research will be teasing apart these various scales of complexity and their possible influence on changes recorded in the Late Mesolithic archaeological record.

The overall increasing productivity and diversity of natural landscapes during the Atlantic period allowed for a wide range of sociocultural adaptations that are reflected in increasingly differentiated archaeological assemblages from one region to the next. The Late Mesolithic also witnessed a rise in regionally differentiated cultural groupings that were most identifiable in the preference for specific stone raw materials and microlithic armature types.

Late Mesolithic Technology

At a continental scale, one of the diagnostics of the transition to Late Mesolithic is the introduction of new stone blade knapping techniques that produced larger blades with more regular shapes in order to produce trapeze-shaped microlithic armatures (Fig. 2). The chronological variability of the transition from Early to Late Mesolithic is largely based on the different times at which regular blade and trapezoidal armatures appear throughout the continent. There is little consensus at present on whether both spread from a specific origin region or whether they entered Europe through two corridors in the western Mediterranean (Perrin et al. 2009) and (south) western Asia

(Binder et al. 2012). Evidence indicates that these industries were accompanied by two different kind of knapping techniques. Work in the Mediterranean region indicates that they were accompanied by pressure knapping techniques (Perrin et al. 2009; Binder et al. 2012), whereas in areas of northwest and central Europe, they were accompanied by indirect percussion techniques (Perrin et al. 2009). The issue of the introduction of regular blades and trapeze industries to Europe is a good example of the major social organizational changes that were occurring during the Late Mesolithic period. During the Late Mesolithic period people were becoming more settled in regional and local landscapes, and rather than ideas and technical innovations spreading by the movement of people to new landscapes, they were rather spread by social networks and a complex range of cultural transmission processes. A further example of the importance of these more regionally restricted social networks during the Late Mesolithic is yielded by the absence of regular blade and trapeze industries in Britain and Ireland.

Increasing regionalization of stone technologies is further exhibited by other innovations that were developed in a limited number of regions. This is evidenced in northern Europe, for example, by the increasing prominence of flake axes. Flake axes likely became more prominent due to a combination of their roles in dugout canoe construction and landscape clearance as populations grew. Likewise, in northwest Spain and Scotland, chipped stone picks were made that seem to support the evidence for increasing reliance on shellfish in these regions.

Other developments in stone technology are indicated by finds of perforated mace head that possibly indicate the growing role of tubers and roots in Late Mesolithic diets (Jochim 2011). Further related to changing diets during the Late Mesolithic, grinding stones and slabs have been recorded at various sites across Europe. Ground stone is also indicated by finds of ground slate points and polished axes and chisels in northern Europe.

Bone and antler technologies continue to increase in importance during the Late Mesolithic period. A new innovation in northern Europe during this time was bone points that were slotted in order to set in place various combinations of microlithic armatures. However, despite these new slotted-bone points, there are few innovations in bone and antler technologies during this period. A more prominent feature is the increasing importance of these raw materials during the Late Mesolithic. This increasing importance is evidenced by greater finds of barbed harpoons, perforated antler mattocks, and axes across Europe.

A key feature of Late Mesolithic technology is the continued development and expansion of wood and other plant technologies. In northern Europe a complex range of fishing technologies such as nets, weirs, and traps have been recorded at sites such as Tybrind Vig (Andersen 1985) and Bergschenhoek (Louwe Kooijmans 1987) (Fig. 3). These fishing technologies were often constructed out of dogwood, alder, or birch branches. Numerous finds of wooden hooks and net floats have also been recorded. The development of these technologies indicates the intensive fishing activities of these northern Mesolithic societies through the course of the Atlantic period.

Further evidence of the increasing role of aquatic activities and exploration comes from finds of dugout canoes in northern Europe. The most impressive finds of this technology have come from the site of Tybrind Vig (Andersen 1985), where decorated paddles have been found alongside a large 9.5 m long dugout canoe made from a linden tree.

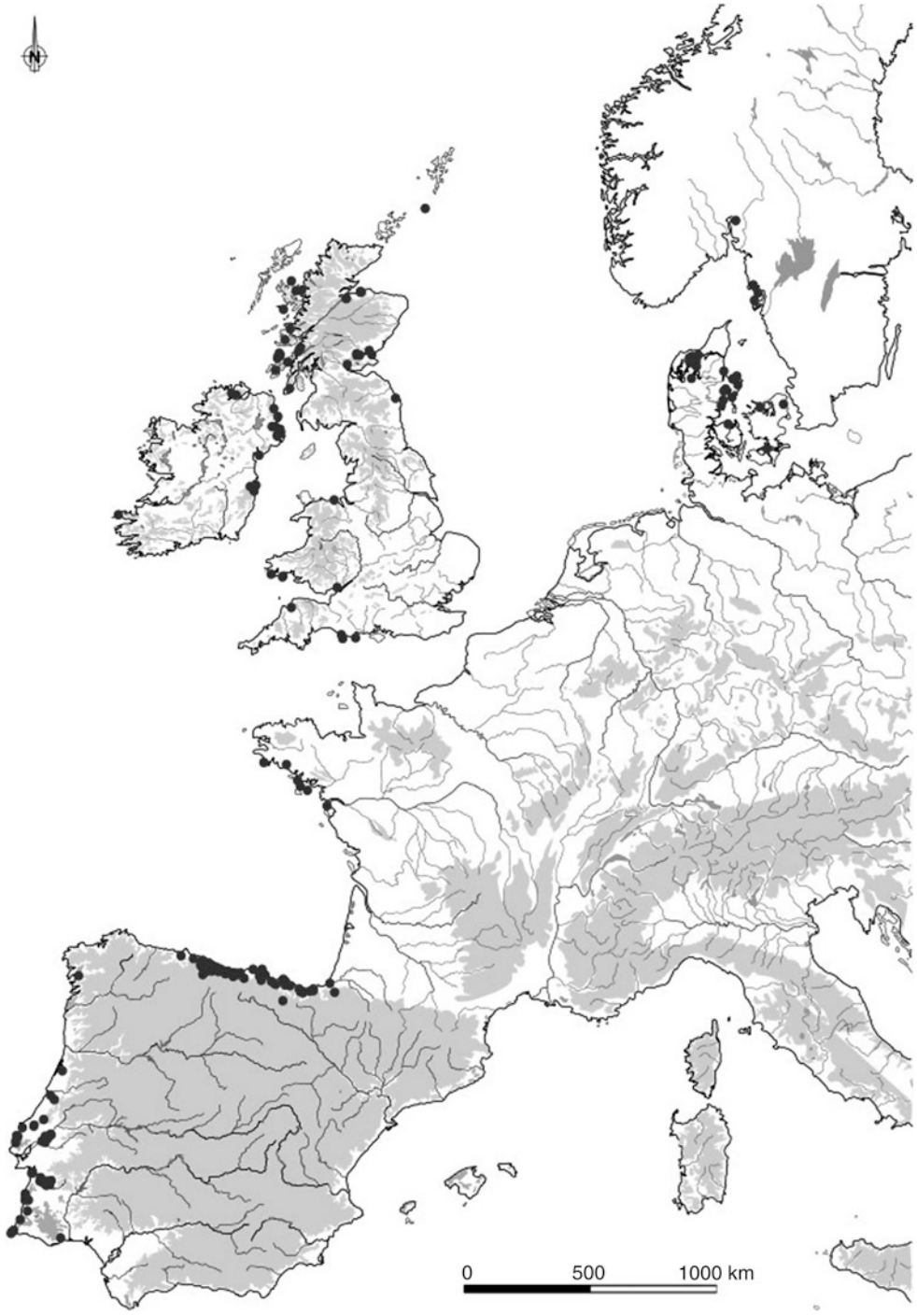
Pottery appeared in some regions of northern and western Europe during the Late Mesolithic. There appears to be two possible sources for the spread of pottery technology to these regions. The first source is from the steppe zone between the Volga and Ural rivers in eastern Europe, wherefrom pottery technologies spread to the Baltic and North Sea basins by around 5,500 cal. BCE (Dolukhanov et al. 2005). The second possible source is from neighboring Early Neolithic farming societies

in the Danube, Rhine, and/or Paris basins (Crombé 2009). Each of these possible sources of pottery technology had different economies; the eastern source was hunter-gatherers, whereas the southern/southwestern source was the earliest farmers in the region. The transmission of pottery technologies to northern hunter-fisher-gatherers was therefore a variable process from one region to the next that was based on specific local social and ecological factors. Stable carbon and nitrogen isotope analyses of lipid residues on pottery from these northern Late Mesolithic sites have indicated that some pottery vessels were utilized for the processing of marine products and freshwater fish (Craig et al. 2007). Thus, while pottery technology was adopted from both hunter-gatherer and early farming societies, the adoption of this technology by northern hunter-fisher-gatherers was incorporated into ongoing subsistence systems.

Late Mesolithic Subsistence

In terms of terrestrial animal and plant species exploited, there was little change between the Early and Late Mesolithic. A key difference from the Early Mesolithic, however, is the increasing regional differentiation of Late Mesolithic diets. The most distinctive subsistence change during the Late Mesolithic was the increased dietary role of a diverse range of aquatic fauna, both freshwater and marine. Extensive shell middens develop for the first time during the Late Mesolithic and are found across the Atlantic coastline from Portugal to Scotland and across the North and western Baltic Sea basins (Fig. 5). A wide variety of shellfish species were exploited, such as clams, cockles, mussels, and oysters. Shellfish were exploited alongside a variety of marine fish such as cod, eel, mackerel, salmon, and even deepwater species such as tuna. An important change in the increase of marine components of Late Mesolithic diets in northern Europe, particularly in the Baltic Sea area, was the exploitation of marine mammals such as seals and whales. The role of aquatic resources in Late Mesolithic diets varied considerably throughout Europe. Assessment of rates of caries in human teeth found that caries rates were low in areas such as southeast (specifically, Greece and the Iron Gates area) and northern Europe due to a relatively high consumption of fish and other aquatic resources, whereas in the western Mediterranean, the higher incidence of caries provided evidence for the higher consumption of carbohydrate-rich plants alongside meat (Meiklejohn & Zvelebil 1991). Variability of the relative components of aquatic versus terrestrial resources becomes even greater when approached from local and regional perspectives.

In parts of northern and western Europe, the uptake of an entire coastal component alongside continued freshwater and terrestrial resource exploitation is one of the main features that delineates the Early from Late Mesolithic. Shellfish undoubtedly comprised an important element of Late Mesolithic subsistence, as indicated by the large size of some shell middens, but shellfish gathering represents just a part of this entire coastal component. Coastal exploitation not only enabled shellfish gathering but also the exploitation of a wide range of fish, sea mammals, and waterfowl (cranes, ducks, eagles) (Blankholm 2008). In these regions there is evidence for smaller more specialized procurement sites both along the coasts and in inland regions. This evidence shows that there were smaller specialized sites along coastal zones for waterfowling and sea mammal hunting and in inland zones for pig hunting and pine marten trapping (Blankholm 2008). These sites indicate that during the Late Mesolithic they were utilized in combination with larger procurement sites that were utilized over many generations, as indicated by the evidence for long-term accumulation of shell middens. Subsistence strategies were thus highly variable and in close relationship with local and regional differences in seasonal coastal and inland resource availability. A good example of the scale of local variability comes from Portuguese shell middens, which indicate differences in the shellfish species that were exploited between neighboring middens. In this region there is evidence for the prominence of different shellfish species between different middens within the same coastal estuary, which was due to variability in local aquatic habitats (Straus 2008).



European Mesolithic: Geography and Culture, Fig. 5 Distribution map of shell middens in western Europe (Gutiérrez-Zugasti et al. 2011: 239)

While the uptake in the coastal component of Mesolithic diets occurred earlier in the Mesolithic in southern Europe, there is evidence for an increase during the Late Mesolithic in this coastal component at some sites in the Mediterranean. This increase in a coastal component was, however, highly variable from one local context to the next. For example, at the Grotto dell'Uzzo in Sicily, there is evidence for a change in the dominance of wild boar and red deer during the Early Mesolithic to a much more diverse diet during the Late Mesolithic that added an entire coastal component of birds, fish, sea urchins, and shellfish alongside an increase in the gathering of a wide range of plant species such as olive, pea, wild strawberry, wild grape, and pulses (Pluciennik 2008). On the other hand, at the Franchthi Cave site in the Argolid of Greece, there is evidence for shellfish exploitation from the late Upper Paleolithic, and the major changes that occurred during the Late Mesolithic were the dominance of bluefin tuna bones and the increasing utilization of a broad range of plant resources (Pluciennik 2008). These contrasting sites provide good evidence for the scale of variability in the coastal component of Late Mesolithic diets in the Mediterranean.

Subsistence evidence from Lepenski Vir in the Iron Gates region of SE Europe indicates that carp and sturgeon were major components of Late Mesolithic diets at this site. Both of these species have periods of large runs up and down the river during and after spawning. Late Mesolithic hunter-gatherers likely took advantage of these seasonal fish runs, which enabled them to maintain a more sedentary lifestyle compared to hunter-gatherers in other inland regions of Europe (Radovanovic 1996). Despite this probably heavy seasonal reliance on fish, Late Mesolithic hunter-gatherers at Lepenski Vir also had very diverse diets that included large terrestrial food components. These terrestrial foods include aurochs, wild boar, domestic dog, and various bird species. The particular aquatic species that were exploited by the inhabitants of Lepenski Vir and neighboring sites of the Iron Gates region were available in abundance at a specific time, which enabled relatively intensive exploitation, but throughout the rest of the year, diets had to be sustained by a range of terrestrial species.

Further evidence of the increasing seasonal variability of Late Mesolithic diets and the relative proportions of aquatic versus terrestrial resources in diets come from wetland sites in the Rhine-Meuse-Scheldt area of the southern North Sea basin. The Hardinxveld sites (Louwe Kooijmans 2001a, b) in the Rhine-Meuse delta of the Netherlands indicate seasonal exploitation of wetlands for hunting and fishing. There is evidence from these sites for particular concentration on trapping species such as beaver and otter and fishing for pike (Verhart 2008). At these sites wide variety of different freshwater species such as bream, carp, eel, perch, and roach were consumed alongside wild boar and red deer and waterfowl such as ducks, geese, and swans.

The diversity of Late Mesolithic diets and the evidence for specialized plant and/or animal procurement have had implications for interpretations of the transition to agriculture. Evidence for the intensive gathering of plants on some sites has led to the proposal of plant husbandry, which has been interpreted as setting the foundations for the incorporation of domestic plants into Late Mesolithic subsistence (Zvelebil 1994). Despite growing evidence for domestic cereal pollen in pre-Neolithic contexts in a few regions of Europe, there is still too little evidence to reliably confirm this hypothesis (Price 2000). There have been proposals of local domestication of both cattle and pigs in different areas of Europe. Analyses of mitochondrial DNA have provided clear evidence for the Near Eastern origin of domestic cattle in Europe and therefore the lack of a role played by indigenous European aurochs to domestication (Edwards et al. 2007). Evidence from wild boar and pig mtDNA, on the other hand, does suggest a much more complex situation in which there were different independent domestication events in a few areas of Europe and that the appearance of domestic pigs was caused by both indigenous and introduced animals (Larson et al. 2007).

Late Mesolithic Settlement, Land Use, and Territories

As with subsistence, Late Mesolithic settlements are characterized by a higher amount of inter- and intraregional variability compared to the Early Mesolithic. The Atlantic period witnessed higher temperatures, precipitation, and dense deciduous forests that created increasingly patchy resource niches and caused a greater differentiation between inland and upland landscapes and those along coasts and rivers. Coastal and riverine sites increased considerably during the Late Mesolithic. Coastal sites have been recorded from Sweden, Denmark, Norway, Britain, France, Spain, Portugal, and Italy. While many of these coastal sites were large and had shell middens, they should not bias our understanding of the variability of coastal and inland settlements during the Late Mesolithic. For example, in southern Scandinavia inland sites of the Early Mesolithic ("Maglemose" and "Kongemose" cultures) have often been contrasted with large coastal midden sites of the Late Mesolithic ("Ertebølle" culture) in order to argue for intensive coastal settlement at the expense of inland settlement during the Late Mesolithic. This interpretation is biased due to both taphonomy and specific histories of research. Early Mesolithic coastal sites are deeply submerged and have not been recorded, and Late Mesolithic survey has been traditionally biased toward coastal areas, leaving inland settlement during the Late Mesolithic heavily underinvestigated (Blankholm 2008). Furthermore, while shell middens are a defining feature of the Late Mesolithic in these regions, the number of coastal sites without shell middens is still higher than sites with shell middens (Blankholm 2008). In recent years the accumulation of evidence from this region has indicated that the relationship of coastal to inland settlements during the Late Mesolithic was much more complicated. For example, a model has been developed for Ertebølle settlement systems in Denmark in which larger base camps were combined with small seasonally inhabited satellite sites in the coastal surroundings (Andersen 1995). This specific model of late Mesolithic settlement has recently been extended to other areas of the western Baltic (Terberger 2006). Certain large sites with shell middens were permanent fixtures in cultural landscapes and were inhabited by a large number of family units over many generations, whereas other sites attest to more ephemeral habitation by small family units for no more than a few select seasons. Dwelling structures had variable layouts that included oval, rectangular, and trapezoidal huts/tents, some with internal platforms. Comparative analysis of Early and Late Mesolithic dwelling structures across southern Scandinavia has highlighted important changes in the internal organization of larger multiple family unit dwelling structures and continuity in the organization of smaller dwellings (Grøn 2003). Large Late Mesolithic dwellings were constructed closer to each other and had no limits on the total number of units that could be included within a single structure, which has been interpreted as an increase in the number of nuclear families that comprised a household (Grøn 2003).

The continental interior of Europe witnessed an increase in river and streamside settlements during the Late Mesolithic. This was likely due to the increasingly closed forest canopy that developed during the Atlantic period, which decreased species richness and productivity in inland areas and increased species richness and productivity in areas beside watercourses. This situation is both good and bad for Late Mesolithic archaeology: on one hand, sites buried by alluvial sediments possess higher organic preservation potential and can yield rich material culture and subsistence data; on the other, sites near rivers or streams could be rendered archaeologically invisible due either to sites being buried deep beneath alluvial sediments or entirely eroded due to fluvial activity.

One of the most remarkable riverside Late Mesolithic sites is Lepenski Vir (Fig. 4), which was rescue excavated in the 1960s due to the construction of a reservoir in the Iron Gates region of the Danube River (Serbian-Romanian border). Lepenski Vir is a special Late Mesolithic site, but in the Iron Gates is just one of many Late Mesolithic sites with house structures and

a variety of formal burials. This site, located on a narrow terrace sheltered in a cove along the right bank of the Danube, yielded a complex arrangement of 95 superimposed trapezoidal-shaped houses constructed over different building subphases (Radovanovic 1996). The houses faced the river and were half-buried or dug-in to the natural hollows of the terrace slope, where wooden posts were slotted in back foundation ditches to support a tentlike construction (Radovanovic 1996). House floors were plastered with a red limestone mixture, and hearths lined with limestone slabs were constructed near the fronts of the houses. Sandstone alters, sculptures of human or fishlike figures, and ornamented portable artifacts are found within houses. The different arrangements of alters and sculptures from one phase to the next indicate that changes were made in the internal spatial organization of houses through time.

The high resource productivity of coastal and riverside sites, and the corresponding suite of material culture and subsistence data found on these sites, had led to interpretations of the relatively sedentary nature of Late Mesolithic settlement in some areas of Europe. The evidence, however, possesses a high amount of local and regional variability which indicates that there are not clear one-to-one relationships between particular site types and sedentarily settled populations. A good example is provided by coastal settlement in the Mediterranean. At Franchthi Cave in Greece there is evidence for decreasing presence on the site through the Mesolithic, and during the Late Mesolithic, there was only sporadic habitation of the site (Pluciennik 2008). On the other hand, Grotto dell'Uzzo in Sicily shows an increasing presence on the site through the course of the Mesolithic, wherein during the Late Mesolithic there were a wide variety of marine, terrestrial animal, and plant species procured across different seasons that has led to an interpretation of lengthy seasonal occupation and possibly year-round occupation on the site (Pluciennik 2008).

On the whole, Late Mesolithic settlement can be characterized by increasing variability of settlement types, locations/concentrations, and regional site densities. There were important changes in the organization of settlement within local and regional landscapes during this period. In many areas of the continent, larger sites that were inhabited over multiple generations are surrounded by smaller more ephemerally inhabited sites. The remarkable coastal sites of southern Scandinavia or riverside sites of the Iron Gates region get the most attention, but our understanding of the realities of Late Mesolithic settlement is based on other less spectacular inland sites and smaller more ephemerally inhabited coastal or riverside sites. By placing these less spectacular sites within the context of the major coastal and riverside sites that had multiple generations of occupation, we are able to gain a more holistic understanding of the complex variability of Late Mesolithic settlement systems in different areas across the continent.

Late Mesolithic Burials and Rituals

Late Mesolithic burials were comprised of a wide variety of different burial types, including cremations, single inhumations, multiple burials, burials of dismembered heads, dog and bear burials, and cemeteries. Cemeteries and burials of dismembered heads are two remarkable characteristic of Late Mesolithic burial practice. However, as mentioned earlier in the discussion of Early Mesolithic burials, cemeteries should not be viewed as a new practice confined to the Late Mesolithic (Meikeljohn et al. 2009). What sets these Late Mesolithic burials apart from the Early Mesolithic is their size, internal complexity and diachronic development, and spatial distribution across many regions of Europe.

Late Mesolithic cemeteries were constructed in a range of different settings. Cemeteries were built within settlements or on sites nearby settlement locations. At Lepenski Vir burials have been recorded inside houses. Burials were placed inside houses in a variety of ways, from under the house floors before the construction of the house, dug underneath already existing floors, on the floors of already abandoned houses, and the secondary placement of different body parts

such as ribs and skulls throughout the houses. During the early phases of settlement, burials are orientated perpendicular to the river, but through time they are solely orientated parallel to the river (Radovanovic 1996). The change to the orientation of burials parallel to the river and the fishlike motifs of some of the sandstone sculptures indicates the major importance of the river not only for resource procurement but also for the identity or cosmology of the people who inhabited this site (Radovanovic 1996).

In some regions, such as southern Scandinavia, researchers have noted the difficulty of actually being able to demarcate settlement and burial places in the landscape, which has led to a rejection of the concept of cemetery as a formal and delimited burial ground (Blankholm 2008). Numerous burials have been recorded from shell middens across Europe, from Denmark to Portugal. On some sites, such as Skateholm in Sweden, multiple cemeteries were constructed. These cemeteries varied considerably in size. Some cemeteries contained around 10 burials, whereas others, such as Olenii Ostrov in Russia, contained an estimated 400 total burials (O'Shea & Zvelebil 1984). At cemeteries across Europe, men, women, and children are found, and there is evidence for the differentiation of individuals based on familial or clan lines, gender, and status/prestige. As in the Early Mesolithic, burials, whether they be isolated, multiple, or in cemeteries, were often sprinkled with red ochre. In terms of variability of mortuary treatment, grave goods vary significantly both within cemeteries and between different regions. In some regions there does appear to be some patterning in the differentiation of people within cemeteries, notably along gender lines. At some sites, female graves have been recorded with goods such as jewelry, whereas male graves have been recorded with bone daggers and projectile points and stone blades and axes. On the whole, an enormous amount of variability is recorded for grave goods during the Late Mesolithic. Some of these notable goods are pendants of bone and stone, perforated animal teeth from a variety of species, carved figurines of bone, teeth or antler, and various stone and bone tool types. One of the most remarkable grave good finds in all of Europe is the famous burial at Vedbaek-Bogebakken in which a child's head was placed on the wing of a swan.

In eastern France and Germany, numerous finds have been made of Late Mesolithic burials with multiple decapitated human heads, which has led some researchers to hypothesize the presence of a "skull cult" during this period. The most remarkable of these skull finds comes from Ofnet cave in southeast Germany, where two shallow pits were found that contained multiple jawbones, skulls, and vertebrae. Around 34 or 38 skulls were found in these two pits, where they all faced west and were covered with ashes and red ochre (Jochim 2011). Analyses of the Ofnet finds have indicated that women outnumbered men and children outnumbered adults and that many of the deaths were due to blunt trauma to the head and the skulls were later defleshed and decapitated. The Ofnet finds, coupled with various other skull burials in neighboring regions and evidence of bones with projectiles imbedded in them from other regions of Europe, have led many researchers to suggest that there was a high rate of violent conflict during the Late Mesolithic (Jochim 2011).

Cross-References

- ▶ Cattle: Domestication
- ▶ Clark, John Grahame Douglas
- ▶ Europe: Mesolithic-Neolithic Transition
- ▶ Lepenski Vir: Geography and Culture
- ▶ Star Carr, Archaeology of
- ▶ Star Carr: Environmental Archaeology
- ▶ Submerged Prehistoric Landscapes
- ▶ Zvelebil, Marek

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European Middle Paleolithic: Geography and Culture

Pascal Depaepe
Institut national de recherches archéologiques préventives, Muséum national d'histoire naturelle, Paris, France

State of Knowledge and Current Debates

Introduction

The Middle Paleolithic, in Europe, comprises an archaeological period between 250,000/300,000 and 35,000 years BP. This period corresponds to several climatic, anthropological (in a biological sense), and techno-cultural events.

From a climatic perspective, the Middle Paleolithic can be merged with the Saalian (Riss in Alpine terminology, Wolstonien in Britain) and Weichselian (Devensian and Würm, respectively) glaciations. Between the two is a brief temperate episode: the Eemian (Riss-Würm; Ipswichien). In isotopic chronology, the Middle Paleolithic generally extends from stages 10 to 3.

A human type is traditionally associated with the European Middle Paleolithic: Neanderthals. This is a typical European hominin species, even though its maximum extent reached the Middle East and the Altai Mountains in southwest Siberia.

The appearance of a new system of stone flake production, the Levallois technique, traditionally marks the beginning of the Middle Paleolithic. However, the limits with the Acheulean of the preceding Lower Paleolithic are not clear; this transition involves a slow continuum rather than an abrupt break. Some bifacial industries of the Final Acheulean are in fact contemporaneous industries with Levallois production (thus Middle Paleolithic in the strict sense). The limits are even more blurred in regions where Levallois production is absent (i.e., much of southern and eastern Europe); in the absence of human fossils, the academic tradition thus relies on dating for a Middle Paleolithic attribution.

The European Middle Paleolithic is nearly synonymous with the Mousterian, a techno-complex for which a range of different expressions are encountered across the same territory (from the Atlantic to the Ural Mountains). The Mousterian is a paradox: it is at once a period of great technological and economic stability lasting over more than 200,000 years and of great variability in its different cultural features. This variability has for years been the subject of heated debates within the Paleolithic scientific community, even creating "schools" of thought (for a history of research, see Jaubert 1999).

While the limit with the Lower Paleolithic is unclear that between the Middle and Upper Paleolithic is by contrast much clearer. A change in the type of human (anatomically modern Humans – AMH – replacing Neanderthals) is also associated to profound technological innovations (use of animal bones and antlers, different lithic techno-complexes with no continuity with the Middle Paleolithic, the appearance of highly developed non-utilitarian behaviors including parietal and portable art).