The Final Palaeolithic Hunter-Gatherer Colonisation of Lithuania in Light of Recent Palaeoenvironmental Research

Livija Ivanovaitė and Felix Riede

This paper critically reviews the culture-historical framework for the re-colonisation of Lithuania during the Final Palaeolithic in the light of recent palaeoclimatic and palaeoenvironmental data. We argue that the existing chronology of the Final Palaeolithic in Lithuania suffers from an undue western European orientation grounded in research history, and that it likely requires reconsideration. The lack of well-constrained excavations, the paucity of both radiocarbon dates and of palaeoenvironmental data pertinent to the Last Glacial-Interglacial Transition (LGIT) lead us to be cautious with regard to the existing chronology. In reviewing the typological classification of the relevant lithic material, we argue in particular that there is a lack of reliable evidence not only for Hamburgian occupation but also for any substantive Federmessergruppen, Brommean and Ahrensburgian presence. Whilst Swiderian sites are better represented, a large majority of these may date to the early Holocene. In light of the current evidence, we question the usefulness of existing archaeological taxonomies for this period and favour a model of punctuated colonisation for the Lithuanian territory, where periodic and ephemeral forager presences are interspersed with longer periods of depopulation. In closing, we outline avenues for future research in the region.

Keywords: Final Palaeolithic; Baltic Magdalenian; Lithuania; classification; Last Glacial Interglacial Transition; pioneer colonisation

Introduction

During the height of the last ice age, hunter-gatherer groups were pushed southwards, leaving Northern Europe depopulated for several millennia (e.g. Burdukiewicz 2001). Despite some initial forays northwards very early after peak glaciation (Terberger & Street 2002), Northern Europe was once again colonised by hunter-gatherer groups only during the Late Glacial, i.e. from about 14,700 years ago (Riede 2014b; Wygal & Heidenreich 2014). This process can be said to have proceeded in several waves and in relation to the see-saw warming and cooling that occurred during the final phases of the Late Pleistocene (the so-called Last Glacial Interglacial Transition, LGIT; see Rasmussen et al. 2014).

Initially, the topographically and hence ecologically more varied regions of Western and Central Europe were occupied by Magdalenian horse and reindeer hunters expanding outward from the south-western refugial areas. The settlement of Europe remained at low densities and patchy, however, with vast swaths of land effectively uninhabited (Maier 2015). Areas north of ca. 54° N – here specifically the Baltic region in the broadest sense – were colonised even later and only during the Meidendref Interstadial warming (Gl-1e) at the earliest. In the Western Baltic, this re-colonisation sequence is reasonably well investigated with a traditional succession of an initial colonisation by the Hamburgian (Meidendref/Bolling – Gl-1e; Grimm & Weber 2008), followed by the Federmessergruppen (early/middle Allerød – Gl-1c and b; Riede & Edinborough 2012), then the Brommean interlude (late Allerød/early Younger Dryas – Gl-1a and into GS-1; Fischer et al. 2013; Riede 2017), and finally the Ahrensburgian (late Younger Dryas/early Holocene – GS-1; Eriksen 2002; Brinch Petersen 2009; Weber, Grimm & Baales 2011).

Increasingly, the Hamburgian colonisation in the Western Baltic is seen as highly ephemeral and possibly unsuccessful (Riede 2014a; Riede & Pedersen 2018). Although the subsequent Allerød-period settlement and especially the autochthonous Brommean are often viewed as the best-understood of these Scandinavian techno-complexes (Eriksen 1999), an interesting debate about its taxonomic status and relationship to the Federmessergruppen has recently emerged (Riede 2013; Buck Pedersen 2014; Riede 2014c; Buck Pedersen 2015; Riede 2017). In particular, an analysis of supposedly diagnostic artefacts – the large tanged points – from the Brommean as well as a range of other Final Palaeolithic techno-complexes indicates that regionally and chronologically consistent
patterns are difficult to establish (Riede, Laursen & Hertz 2011b; Serwatka & Riede 2016). Whilst still preliminary, these analyses cast doubt on the utility of this supposed Leitfossil as both a cultural and chronological marker in the Western Baltic region and beyond.

Large tanged points also occur outside of the Western Baltic and similarly critical arguments with regards to their culture-historical sensitivity have already been made previously (Kobusiewicz 2009b; Kobusiewicz 2009a). Yet, outside of Scandinavia, large tanged points – usually labelled typologically as Bromme or Lymborgy points – are commonly used as proxies for the presence of these hunter-gatherer groups: Barton & Roberts (2001) extend the territory of the Brommean to the British Isles, and Breest & Gerken (2008) see these hunters also ranging south of the River Elbe. Likewise, and with specific reference to Lithuania, Šatavičius (2004) sees the presence of large tanged points as indicative of Brommean foragers in the region, who succeeded earlier cultures in lock-step with the Western Baltic. Others still would like to see additional Final Palaeolithic groups characterised by large tanged points present in the Eastern Baltic (Sinitsyna 2002). In contrast, however, Rimantienė (1971) – Lithuania’s very own ‘trowelblazing’ (see http://trowelblazers.com/) pioneer in relation to the Final Palaeolithic (see Butrimas 2016) – had previously argued that all the material that may belong to the Final Palaeolithic in the present-day territory of Lithuania is so heterogeneous that truly diagnostic pieces and hence specific techno-complexes cannot be readily distinguished. Instead, she suggested a more generic category under the label ‘Baltic Magdalenian’. More recently, Kobusiewicz (2009b) presented similar reflections arguing that the ubiquitous occurrence of large tanged points and their consistent link to especially Federmessergruppen as well as later inventories invalidates their use as culturally specific diagnostic marker artefact. This paper attempts to resolve these opposing viewpoints through an in-depth research historical analysis and a critical review of the current archaeological and palaeoenvironmental evidence base for the Final Palaeolithic settlement in Lithuania. Our results indicate no secure evidence for the presence of the Hamburgian, and at best an ephemeral presence of foragers in the region during the Allerod Interstadial and, most likely centuries later at the very end of the Younger Dryas or first in the early Holocene, a more substantive settlement by groups of the Swiderian tradition. In concluding, we offer suggestions for future research.

**Research history**

The first Final Palaeolithic finds from the region of present-day Lithuania were registered in amateur collections at the end of the 19th and early in the 20th centuries (Szuikiewicz 1901). Yet, more systematic attempts to classify the lithic material and to place it into a chronological framework appeared only in the second half of the 20th century. The first synthesis of the Final Palaeolithic in Lithuania was published by Rimutė Rimantienė in 1971. In this seminal publication, she suggested a culture-historical framework for the Final Palaeolithic in the region that distinguishes only two main cultural units: 1) the Baltic Magdalenian and 2) the Swiderian. The latter had earlier been defined by Sawicki (1936) and had become widely used by eastern European archaeologists (e.g. Benet-Tygel 1944). Swiderian material culture shares many similarities with the Ahrensburgian of the Western Baltic, but is characterised by leaf-shaped and tanged points with basal retouch on their ventral face instead of small tanged points with ventral retouch only (Kobusiewicz 2002). In contrast, the term Baltic Magdalenian was devised by Rimantienė herself in order to capture the variability of candidate Final Palaeolithic material – various large and small tanged points, backed elements as well as scrapers, burins and borers – in Lithuania, and to reflect her unwillingness to further differentiate these.

In order to classify the existing lithic material, she drew far-reaching parallels to other and at that time better investigated regions to the west. While assemblages with projectile points containing characteristic invasive retouch on the ventral side of the tang were undoubtedly identified as Swiderian, other lithic assemblages with tanged projectile points were tentatively compared to Northern German and Southern Scandinavian tanged point technocomplexes. In this, Rimantienė (1971) drew on key publications that had earlier established the culture-historical framework for the Baltic region: Ekholm (1926), Brondsted (1938), Mathiassen (1946) and De Moly (1954) for the Lyngby culture (synonymous with the Brommean – see Brinch Petersen 1970), as well as the important syntheses of Schwabedissen (1954) and Taute (1968) for the Final Magdalenian/Federmessergruppen and Ahrensburgian respectively. In light of the evident typological and technological variability seen in the Lithuanian candidate assemblages, Rimantienė shied away from a classification as detailed as that suggested for the Western Baltic by Taute who distinguished not only between some of the major technocomplexes, but also between numerous sub-categories or groups within, for instance, the Ahrensburgian. Instead, she applied the label Baltic Magdalenian as a catch-all category for assemblages containing Lyngby/Bromme, Ahrensburgian and at times Hamburgian elements. The use of this ‘lumping’ rather than a ‘splitting’ classification (see Simpson 1945) was intended to stress both the heterogeneity of lithic assemblages from Lithuania as well as their similarities to the Magdalenian, as Rimantienė (1971) considered all these cultures to have evolved from the Late Magdalenian (stage VI). It reflects the general hypothesis that the re-colonisation of Eastern Baltic region took place from the south-west. Although the term did not enter widespread usage outside of Lithuania, Rimantienė (1996) herself never revised it substantially. She considered the Baltic Magdalenian to date to the end of Allerod and the Younger Dryas. According to her suggested chronology, the peopling of Lithuania began in the Allerod and was an uninterrupted process, reflected, she argued, in the way she saw as hybrid assemblages: an initial Baltic Magdalenian, later on with strong Swiderian influences.

The classification proposed by Rimantienė prevailed in the regional archaeological literature for 30 years until Šatavičius (2001) suggested a new and, he argued, more up-to-date chronology for the Final Palaeolithic in his doctoral dissertation. His cultural-historical framework
was comprised of five cultural units: the Hamburgian (both ‘classic’ and Havelte phases), Federmessergruppen, Brommean, Ahrensburgian, and Swiderian. This chronology suggested that the re-colonisation of Lithuania began already in the Bolling Interstadial (GI-1e) and it was seen as a continuous process (Šatavičius 2001; Šatavičius 2005b).

There is little doubt that the impetus for this new hypothesis for the Final Palaeolithic re-colonisation of Lithuania is to be sought in broadly contemporaneous developments in the Western Baltic. In the late 1980s and throughout the 1990s in particular a great number of new publications regarding the earliest settlement in the wider region became available (Burdukiwicz 1986; Burdukiwicz & Kobsiwickcz 1987; Barton, Roberts & Roe 1991; Larsson 1996; Kozłowski, Gurska & Zaliznyak 1999), along with new and significantly more highly-resolved climatic and environmental data for northern Europe (Björck 1995; Björck et al. 1998). New evidence for the earliest re-colonisation of the Western Baltic emerged in the form of definitive Hamburgian sites in Denmark (Holm & Rieck 1983; Holm & Rieck 1987; Holm & Rieck 1992) as well as perhaps in southern Sweden (Larsson 1991; Larsson 1994). Also, the Federmessergruppen were recognised in Denmark and a Final Palaeolithic culture-historical framework including the Hamburgian (Havelte phase only), Federmessergruppen, Brommean and Ahrensburgian became quickly established in this region (Eriksen 1999). Milestone regional syntheses effectively reached out with these new data to regions beyond the Western Baltic (e.g. Larsson 1996; Straus et al. 1996). It is in light of these developments that the establishment of a similar classification of and chronology for the Lithuanian material must be understood.

However, the chronology suggested by Šatavičius (2001) encountered strong critique from Ostrauskas (2002a) shortly after it was proposed; he argued that its empirical basis was rather weak. Still, the chronology proposed by Šatavičius soon became the new orthodoxy among Lithuanian Stone Age researchers (Girininkas 2009; Girininkas 2011) and now represents the textbook culture history of the Lithuanian Final Palaeolithic (Šatavičius 2016). In the following, we critically examine the palaeoenvironmental background for the Final Palaeolithic human colonisation of the Lithuanian territory as well as the available archaeological evidence. Given that the established framework of early and continuous settlement is being questioned for the Western Baltic, we here explore the implications of such revisions for the situation in the Eastern Baltic, specifically for Lithuania.

**Palaeoclimatic and palaeoenvironmental data**

Any consideration of the Final Palaeolithic colonisation of northern latitudes must be made in relation to contemporaneous climatic and environmental changes. Recent developments in palaeoclimatology have yielded important new and highly resolved datasets, coming primarily from the Greenland ice cores, that track hemisphere-wide climatic changes during the LGIT (Lowe et al. 2008; Rasmussen et al. 2014). This is supplemented by information on local or regional environmental changes gained from terrestrial archives through pollen analysis and associated techniques (chironomid studies, plant macrofossil analyses, isotopic measurements). The articulation of these large- and small-scale datasets remains challenging (Eriksen 2002), although isochronous tephra layers occurring in many archives over large parts of Europe assist in robustly assessing lead and lag effects in these dynamics (e.g. Litt et al. 2001; Lowe 2001; Lane et al. 2015).

Despite these recent developments, the framework based on the traditional Late Glacial chronozones suggested by Mangerud et al. (1974) remains in widespread use among Lithuanian archaeologists. Correlating local archaeological finds with these chronozones is problematic, however, as the classification was intended to be valid for the Nordic (i.e Western Baltic) region only. It has been shown that this chronzone succession is not readily transferable to more southern and continental regimes (de Klerk 2004). Thus, a one-to-one application of the chronozones to regions outside of Scandinavia leads to the perception that the palaeoenvironmental conditions in the wider Baltic region were homogeneous and that changes were strictly synchronous across this rather vast area. Models have long suggested that both latitudinal and oceanic-to-continental gradients have a significant modulating influence on local and regional climate (Renssen & Isarin 2001).

More recent empirical studies, too, reveal a more complicated scenario for environmental changes during the LGIT. Muschiello & Wohlfarth (2015), for instance, demonstrate that there are regional lead-lag differences in the transition from the Allerød to the Younger Dryas of nearly 300 years. Furthermore, Central and Eastern Europe, in particular, appear to have been characterised by strongly regionally specific environmental conditions during the LGIT, where especially the Greenland Stadial 1 (GS-1) cooling event were marked by cold winters (Feurdean et al. 2014). Although climatic changes and vegetation responses followed broadly similar trajectories in Western, Central and Eastern Europe, the differences were appreciable: In Central Poland and further to the south (e.g. Frenzel 1983), favourable environmental conditions were registered approximately 700 years earlier and climatic cooling events including GS-1 were not as harsh as in the Eastern Baltic (Table 1).

This recent evidence thus suggests possible time-transgressive changes in the palaeoenvironmental conditions across the Baltic region. New data on Late Glacial environmental developments in Lithuania (Stančikaite et al. 2008; Stančikaite et al. 2009; Gaidamavičius et al. 2011; Stančikaite et al. 2011; Stančikaite et al. 2015) allow tentative comparisons with well-investigated locales such as Slotseng in Denmark (Lemholt, Buckland & Mortensen 2014; Mortensen et al. 2014). Such preliminary comparison reveals a possible lag between the Western and Eastern Baltic of 200–300 years (Table 2). As hunter-gatherers are demographically sensitive to climatic variables such as effective temperature (Binford 2001; Kretschmer 2015; Tallavaara et al. 2015) as well as associated changes in plant and animal availability, even such short time lags may have important implications for our understanding of human settlement dynamics during this period.
The reconstructions of palaeovegetation based on the archaeobotanical analysis from Slotseng in southwest Denmark and Kašučiai in western Lithuania provide first insights into the ecological differences between these two regions. At Slotseng, Bølling warming was more pronounced than in western Lithuania, and vegetation started to develop earlier creating a landscape covered by open dwarf-shrub vegetation dominated by *Betula nana*, *Helianthemum oelandicum*, *Salix*, *Dryas octopetala* and *Poaceaee*. In contrast, palaeobotanical data from Kašučiai indicate open, tundra-like conditions with a dominance of herbs, grasses and shrubs. *Cyperaceae*, *Poaceaee* and *Artemisia* along with *Salix* and *Juniperus* are the most common plant species, although *Betula nana* L. and *Betula* sect. *Albae* have also immigrated at that time.

In south-western Denmark, during the Older Dryas drought-tolerant species such as *Campanula cf. rotundifolia*, *G. detonsa*, *Rumex acetosella*, *Lychinis alpina* increased suggesting a period of moisture restriction rather than a significant temperature decrease. Meanwhile, at Kašučiai the vegetation cover remained very sparse with a dominance of *Artemisia*, *Chenopodiaceae* and *Cyperaceae*. The subsequent Allerod is, in both regions, marked by an increase of arboreal vegetation. At the Slotseng catchment, *Betula* generally dominated these forest stands, although the amount of *Betula* pollen decreased significantly while *Pinus* reached its maximum during the colder Gerzensee oscillation. In contrast, at Kašučiai (like in other regions of Lithuania), *Pinus* dominated throughout the Allerod.

During the Younger Dryas, the expansion of species in favour of open habitats is recorded at Slotseng. At Kašučiai, a decrease in forest vegetation and attendant increase in non-arboreal species is registered. Although birch was present in the sparse local vegetation, open herb-grass cover dominated the landscape (Stančikaitė et al. 2008; Mortensen et al. 2011). In the following, we review the sites and assemblages known from the LGIT in Lithuania and attempt to correlate these with the current, albeit tentative, palaeoclimatic changes as sketched out here.

**Archaeological data**

The bulk of candidate Final Palaeolithic archaeological material from Lithuania is part of surface collections from the end of the 19th and the beginning of the 20th centuries (Szukiewicz 1901), field surveys conducted – with significant wartime interruptions – during the 1920s to the 1960s, and archaeological excavations carried out during the 1950s and 1960s (Rimantienė 1971). These lithic assemblages still form the empirical backbone for the Lithuanian Final Palaeolithic chronology today. Several new excavations have been conducted at the end of the 1990s, in the early years of the new millennium (Ostrauskas 1998; Ostrauskas 2000a; Ostrauskas 2000b; Šatavičius 2012; Šatavičius 2014) as well as during the last decade (Grigaliūnas 2013; Girininkas et al. 2016; Slah 2016; Girininkas et al. 2017), but these have failed to produce new robustly datable sites. More than half of all candidate
Lithuanian Final Palaeolithic assemblages derives from old surveys and collecting activities (Table 3).

Working with surface collections as the foundation for culture-historical classification is fraught with difficulties, however. While surface assemblages must and can be used as valid sources of information (Schwabedissen 1955; Veil 2006), they have usually been subject to a variety of difficult to account for transformations related to natural, anthropogenic and stochastic processes (Ammerman & Feldman 1974; Baker 1978; Odell & Cowan 1987; Boismier 1997) with the result that the relative composition of such assemblages cannot be seen as reflecting prehistoric reality. Furthermore, preservation of organic and hence datable material is generally low and stratigraphic resolution poor or non-existent (Vermeersch 1977; Crombé et al. 2013). Many major studies of the Final Palaeolithic in northern Europe have attempted to account for this reservation by assigning a quality ranking to all sites (e.g. Taute 1968; Burdukiewicz 1986).

All Lithuanian lithic assemblages share the difficulties outlined above. Rimantienë’s (1971) solution was to define the Baltic Magdalenian as a lumping category arguing that “every Baltic Magdalenian site shows a slight variation in tools and sometimes it might look accidental, however, that is one of the main characteristic features of this culture” (Rimantienë 1971: 30). Accordingly, it is defined by a broad and inclusive range of diagnostic tool types that cuts across the boundaries of techno-complexes as defined elsewhere (e.g. Ahrensburgian, Brommean, Federmessergruppen). These include (i) tanged points of different sizes and shapes/types, (ii) projectile points with complete retouch along one edge, (iii) lancet-shaped blades with retouch at the tip only, (iv) wide and short scrapers including so-called thumbnail scrapers, (v) concave end-scrapers, (vi) various types of burins, which occur almost in the same number as scrapers, (vii) combination tools with a burination on one end and a scraper on the other. Additional tool types are said to be very rare, but blades or flakes with retouch do occur (Figure 1). In 1971, there was no evidence for bone and antler tools but, according to Rimantienë, Lyngby-type reindeer axes and harpoons with large barbs should belong to the Baltic Magdalenian tool-kit (Rimantienë 1971; Rimantienë 1996).

Three decades later and in strong contrast to Rimantienë, Šatavičius (2001; 2005b; 2016) proposed an alternative splitting culture history and chronology for the Final Palaeolithic in Lithuania. Interestingly, he drew largely on the same assemblages as Rimantienë but saw these as reflecting Hamburgian – both the ‘classic’ and Havelte phases – Federmessergruppen, Brommean, and Ahrensburgian occupations. Lithic material from five sites was identified as Hamburgian, from one site as Federmessergruppen, 27 sites were attributed to the Brommean and 24 sites to the Ahrensburgian. Table 4 summarizes those currently known candidate Final Palaeolithic sites from Lithuania, which have figured most prominently in the taxonomic debate. Importantly, Table 4 lists how different workers have classified the same lithic material in different ways. Figure 2 shows these locales on a current topographic map.

Regrettably, the existing Final Palaeolithic chronology for Lithuania cannot be significantly supported by dated organic artefacts. At present, there is only one radiocarbon date, which falls within the Late Pleistocene, obtained on a reinder antler implement found in the village of Parupé (Biržai district, Lithuania) in 2014 (Table 5; Girininkas et al. 2016). This implement stands as the oldest known antler axe from the Eastern Baltic region. Its Allerød date falls squarely within the known corpus of dates for these objects, which, however, stretch from the early Allerød to the Holocene with cultural affiliations to the Federmessergruppen, the Brommean and the Ahrensburgian (Clausen 2004; Girininkas et al. 2016). Like the Parupé implement, most of these objects are not or only circumstantially found in association with lithics and hence provide little to no clues as to their cultural affiliation. At present, it seems most likely that reinder antler implements were in common use across all Final Palaeolithic techno-complexes.

It is worth noting further that it has been suggested for a long time that four paddle-shaped points and one bobbin-shaped bone point found in Kalniškiai (Lithuania) in 1865 could belong to the Final Palaeolithic (Rimantienë 1971; Rimantienë 1996; Girininkas 2009; Grigaliūnas 2013), yet the actual age of these bone points remains uncertain. Future radiocarbon dating of these and other relevant organic implements may yet allow us to better constrain and evaluate the Final Palaeolithic occupation in the Eastern Baltic region.

Discussion

While reviewing the existing chronology, it becomes evident that the current culture history and chronology for the Lithuanian Final Palaeolithic are constructed solely on a foundation of typology, in the absence of secure stratigraphies and absolute chronological fix-points, and in analogy with other regions, especially the Western Baltic. Given recent discussions about the robusticity of these reference sequences (Kobusiewicz 2009b; Kobusiewicz 2009a; Riede 2017; Sauer & Riede 2018), it is warranted to ask whether the Lithuanian data hold up against a critical assessment. One of the most controversial components of the current chronology is related to the possible Hamburgian presence in the territory during the Bølling/GI-1e. During GI-1e, significant climatic amelioration is registered in Western and Central Europe, yet the Eastern Baltic remains cold (see Table 1). These differing climatic conditions are likely a key factor for human occupation,
especially in this early phase when populations were low and environments fragile (Riede 2014a; Riede & Pedersen 2018). Today, the easternmost known site of the Hamburgian is Krągola 25 (Kabacinski & Kobusiewicz 2007; Kabacinski & Sobkowiak-Tabaka 2012). Secure evidence for the Hamburgian is absent in the area east of the River Vistula, which has led to suggestions that the eastern and north-eastern border of the Hamburgian expansion should be limited by the Rivers Noteć and Vistula respectively (Bobrowski & Sobkowiak-Tabaka 2006). This notion finds support in palaeoenvironmental datasets that indicate relatively favourable conditions in Western Poland but harsher conditions in the Eastern Baltic at this time (Feurdean et al. 2014). Moreover, extensive field surveys in the north-eastern extremes of Poland – here assumed to be the most probable route into the Eastern Baltic and into Lithuania – have not yielded material older than at most the Allerød/Gl-1c-a (Siemaszko 1999).

Taking into account this prima facie absence of evidence for the Hamburgian in the entire south-eastern and Eastern Baltic region, it is worth re-evaluating the archaeological evidence from Lithuania. The typological assessment of projectile points assigned to the Hamburgian (e.g. Figure 1:1) forms the basis for the argument in favour of very early human presence. Yet, these artefacts are interpreted differently by different workers: While some researchers see them as typical Hamburgian shouldered projectiles (Zaliznyak 1999; Šatavičius 2001; Šatavičius

![Figure 1: Selected lithics from 1) Kašėtos collection, 2) Ežerynas 11, 3) Ežerynas 16, 4) Vilnius defined as diagnostic tools for the Baltic Magdalenian by Rimantienė and divided by Šatavičius into four different cultural units: 1) Hamburgian, 2) Federmessergruppen, 3) Brommean, 4) Ahrensburgian. Based on Šatavičius (2002b; Figure 2:1,2), Girininkas (2009; Figure 30:3–8), Rimantienė (1971; Figures 6 and 11).]
Table 4: Candidate Final Palaeolithic sites in Lithuania and their lumping and splitting cultural taxonomic identification according to different archaeologists. Sites are listed alphabetically. H = Hamburgian, F = Federmessergruppen, B = Brommeian, A = Ahrensburgian, S = Swiderian, BM = Baltic Magdalenian, M = Mesolithic. LNM = National Museum of Lithuania, VDKM = Vytautas the Great War Museum, ŠAM = Šiauliai “Ausra” Museum, KšM = Kaišiadorys Museum, JKM = Jonava Area Museum, NM = Nalšia Museum. See also Figure 2.

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<td>Multiple</td>
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<td>Baltašiškės</td>
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<td>54.03</td>
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<td>Rimantienė (1999a); Šatavičius (2001); Šatavičius (2004)</td>
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<td>54.24</td>
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<td>Girininkas et al. (2017)</td>
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<td>A</td>
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<td>54.97</td>
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<td>60</td>
<td>Multiple</td>
<td>B B</td>
<td>Girininkas (2009); Šatavičius (2001); Šatavičius (2004)</td>
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In nearby Belarus, there are found a handful of possible shouldered points, but these too are finds from uninformative context and all lack secure dating (Vashanau 2010). All these observations amount to a cautious stance: The few candidate lithic objects may indicate a Hamburgian presence, but the lack of additional material such as cores and Zinken coupled with the lack of numeric dates indicating human presence at this early stage in the LGIT should lead to a careful interpretation of these collections.

The Federmessergruppen techno-complex, perceived as a more western and central European phenomenon, has traditionally attracted less interest from Lithuanian Final Palaeolithic researchers. Compared with other Final Palaeolithic cultures, the smallest number of artefacts are ascribed to this techno-complex. Only a small assemblage from Ežerynas 11 that contains Wehlen-type tanged scrapers, microburins, fragments of blades with retouch, and one special-purpose tool (Figure 1:2; Šatavičius 2001), as well as two backed pieces from Pypliai 1C and Skaruliai (Girininkas 2009) have been attributed to the Federmessergruppen. This paucity may in part relate to the fact that in the Western Baltic, finds of Federmessergruppen artefacts and associated sites have been underreported until the 1970s (Riede 2017). During the last few decades, however, much new knowledge about the distribution, typology,

Table 5: Results of radiocarbon dating of Parupė antler axe. After Girininkas et al. (2016), re-calibrated using OxCal 4.3 (Bronk Ramsey 2009) and the IntCal13 calibration curve (Reimer et al. 2013).

<table>
<thead>
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<th>Laboratory number</th>
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<th>Calibrated age (cal BP), 95.4 % CI</th>
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<td>BETA-403383</td>
<td>11,170 ± 40</td>
<td>13,130–12,930</td>
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and technology of the Federmessergruppen has been gained. Its boundaries have been expanded, including eastwards into Poland. In Poland, more and more sites are ascribed to the Federmessergruppen (Sobkowiak-Tabaka 2014). Yet, substantial uncertainty regarding the Federmessergruppen remains: This is in part driven by the much lower degree of technological standardisation that results in a rather varied and often hard to recognise archaeological signature. Federmessergruppen flint-knappers adapted their technological strategies to the available raw materials using flexible \textit{chaînes opératoires} (De Bie & Vermeersch 1998; Loew 2005), making Federmessergruppen single finds and assemblage components easy to overlook or to falsely ascribe them to other cultural units – a problem further confounded when working with surface collections (Riede, Laursen & Hertz 2011a; Riede 2013).

The number of sites attributed to the Brommean increases significantly in comparison to the Hamburgian and Federmessergruppen. This presumed presence of the Brommean is, however, based almost exclusively on the presence of large tanged points, which by many are assumed to be a diagnostic tool for said culture. Yet, large tanged points are found within Federmessergruppen, Ahrensburgian, Swiderian and other Eastern European Final Palaeolithic cultures (Kobusiewicz 2009b; Kobusiewicz 2009a). Both in their shape (Serwatka & Riede 2016) and their technology (Fischer 1985) large tanged points from different contexts cannot readily be distinguished – an issue almost certainly due to convergent cultural evolutionary trajectories shaped by similar functional constraints (cf. O’Brien, Buchanan & Eren 2018).

While some researchers want to extend the territory of the Bromme culture both far to the west as well as to the east (Andersson et al. 2004), the lithic evidence from Lithuania cannot be harnessed for such arguments. While the antler axe from Parupė clearly indicates human presence in the territory of present-day Lithuania in the Allerød, this artefact class lacks cultural diagnostic value (Claussen 2004) and hence cannot resolve to which technological tradition these colonists may belong. Given the current uncertainties regarding the Final Palaeolithic cultural taxonomy (Sauer & Riede 2018), it may be best not to ascribe these finds to a specific techno-complex at this point.

Similar to the Brommean, a significant number of Lithuanian assemblages are attributed to the Ahrensburgian. These are characterised by the presence of small tanged points without retouch on the ventral side of the tang and other lithic material which could possibly be attributed to this culture. The absence of retouch on the ventral side of the tang is, however, not a strong argument for the presence of the Ahrensburgian in Lithuania, since most Swiderian assemblages contain at least some projectile points that conform to this description. Indeed, the lithic assemblages of the two cultures are both typologically and technologically very similar (Kobusiewicz 2002; Gałiński & Suligostowska 2010). Thus, the identification of the Ahrensburgian in Lithuania during the Final Palaeolithic should be considered with utmost caution.

In contrast to the other cultural entities discussed above, the evidence for a Swiderian presence in present-day Lithuania is derived from more secure contexts. Radiocarbon dates from Kabeliai-2 (Ostrauskas 2002b) obtained from charred wood found in the lower cultural level C indicates an age of occupation at the end of the Younger Dryas/GS-1 or the beginning of the Holocene (Table 6). It should also be noted that – much like the bulk of dates for the Ahrensburgian – most Swiderian sites should probably be dated to the very end of the Younger Dryas or even the early Holocene (Weber, Grimm & Baales 2011).

In summary, the review of the available evidence for the Final Palaeolithic culture history of present-day Lithuania leaves us compelled to side with the earlier and less detailed chronology suggested by Rimantienė. A question remains with regard to the Baltic Magdalenian, its chronology and its place with the contemporaneous landscape of Final Palaeolithic taxonomic units. Tentatively, the similarity of the candidate assemblages to the Final Magdalenian combined with the lack of standardization in the flint technology, the presence of thumbnail scrapers and large tanged points suggests an affiliation with the Federmessergruppen. In light of research conducted since Rimantienė’s definition of the Baltic Magdalenian, it is tempting to advocate a collapse of the taxonomic unit Baltic Magdalenian into the Federmessergruppen. Given the high level of variability within lithic assemblages of the Federmessergruppen and their wide chronological and geographic occurrence, this techno-complex constitutes the most conservative ‘jumping’ taxonomic unit for this period. However, Sauer & Riede (2018) have recently shown that uncertainties in the construction of archaeological taxonomic units in the Final Palaeolithic of Europe may be so acute as to warrant a more radical rejection of such traditional frameworks (see also Otte & Keeley 1990; Barton & Neely 1996; Houtsma et al. 1996). New methods (e.g. geometric morphometrics) that couple technological analyses with transparent data-driven classifications may yet come to offer alternative avenues to unit construction and classification (e.g. cultural phylogenetics).

Regarding the chronology and the process of re-colonisation, we conclude that the suggestion that Lithuania was re-inhabited by \textit{Hamburgian foragers} already during GI-1e does not, we argue, have enough supporting evidence at present. Recolonisation during the Allerød/GI-1c, b, a may be supported by the environmental data indicating moderate climatic conditions and the AMS radiocarbon date from the Parupė implement. However, as yet, there

<table>
<thead>
<tr>
<th>Laboratory number</th>
<th>Δ^14C age (BP)</th>
<th>Calibrated age (cal BP), 95.4 % CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ta-2606</td>
<td>9910 ± 100</td>
<td>11,770–11,170</td>
</tr>
<tr>
<td>Ta-2601</td>
<td>9820 ± 220</td>
<td>12,050–10,650</td>
</tr>
</tbody>
</table>

Table 6: Radiocarbon dates from the Kabeliai-2 site obtained on charred wood. After Ostrauskas (2002b), re-calibrated using OxCal 4.3 (Bronk Ramsey 2009) and the IntCal13 calibration curve (Reimer et al. 2013).
is no robust archaeological evidence indicating human presence during the warmer early GI-1c, nor during the cold Gerzensee oscillation (GI-1b). Palaeoenvironmental data suggest rather large climate fluctuations during the entire Late Glacial and, independently of the precise date for an initial human presence in the region, we favour a model of punctuated human colonisation in accordance with these frame-setting fluctuations. At present, a basic model for the Final Palaeolithic human re-colonisation of Lithuania would postulate a periodic, perhaps seasonal but at any rate ephemeral presence of foragers during the GI-1c, b, a, followed by a longer period of depopulation during the first half of GS-1, followed again by re-colonisation at the very end of GS-1 and the Early Holocene.

Concluding remarks and future perspectives

The Lithuanian Final Palaeolithic culture history and palaeoenvironmental data critically reviewed in this paper serves as a cautionary example of the excessive application of typology and of supposedly diagnostic tool types as cultural markers. We suggest that a model with a colonisation sequence much like the Western Baltic is not supported by the data currently at hand. Typology has been heavily criticised as an outmoded tool for constructing cultural taxonomies in the Palaeolithic (Houtsma et al. 1996; Newell & Constandse-Westermar 1996; Bisson 2000; Shea 2014) and regionally specific taxonomies are argued to often obscure rather than reveal important cross-regional similarities and differences (Otte & Keeley 1990; Sauer & Riede 2018). The existing chronology which suggests the presence of Hamburgian, Federmessergruppen, Brommean and Ahrensburgian technological units in Lithuania during the Final Palaeolithic, mirroring the Western Baltic situation, is found unsupported by the evidence currently available. The older culture-historical framework suggested by Rimantiene (1971) including only two cultural entities – the Baltic Magdaleniens and the Swiderian – is considered more appropriate, although we further suggest collapsing the Baltic Magdaleniens into the Federmessergruppen, or alternatively rejecting these traditional classifications in favour of new more uniformly constructed classifications (cf. Gamble et al. 2005). Based on the existing evidence, the timing of re-colonisation should be placed not into GI-1e but rather into GI-1c-a when the amelioration of climatic condition is registered in the Eastern Baltic. It is likely, however, that the subsequent cooling of GS-1/Younger Dryas again led to a decolonisation of the region. In our view, the Final Palaeolithic in Lithuania is in need of both more critical re-assessments of the available evidence as well as new data. Only preliminary conclusions vis-à-vis cultural affiliations, chronology and relations to contemporaneous environmental changes can be offered – there is a clear need for excavations to be carried out according to contemporary standards, further absolute dates and robust stratigraphic observations. In addition, dating organic artefacts – even stray finds – from Lithuania and surrounding regions should be given priority in researching the Final Palaeolithic in Lithuania, and the candidate lithic material should be submitted to detailed technological recording and analysis. Increasing the number of radiocarbon dates on clearly humanly modified organic objects is the most straightforward way of falsifying the hypothesis of a more curtailed colonisation suggested here. Yet, even if new and secure numeric dates can be obtained, these must still be brought into robust contextual association with the lithic material in order to further inform our understanding of the cultural taxonomic relations and trajectories in this period. In parallel, the acquisition of high-resolution palaeoenvironmental information for the LGIT, ideally time-constrained by key marker tephras, would be desirable. All of these efforts will require substantial investments into research, but as long as such data are not available, we caution against models outlining all too detailed colonisation chronologies and culture-historical connections.

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Competing Interests

The authors have no competing interests to declare.

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