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Michał Adamczyk*, Marta Chmiel-Chrzanowska**

USELESS STONES? THE POTENTIAL OF LITHICS IN PALAEODEMOGRAPHIC RESEARCH

ABSTRACT

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The following paper will pose a number of questions concerning the usefulness and potential of lithics in palaeodemographic research. Lithic material is the most common find among Stone Age sites in Central and Northern Europe. Osteological material is extremely rare and can therefore not form the basis for demographic analysis. However, previous studies have shown that in some cases a detailed analysis of lithics can provide information concerning group size and structure, as well as territory size and mobility in prehistory. We will use case studies from Central and Northern Europe from the Palaeolithic and Mesolithic periods to describe this issue.

Keywords: Lithics, Palaeolithic and Mesolithic of Central and Northern Europe, Palaeodemography
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INTRODUCTION

In palaeodemographic research human osteological remains usually forms the basis for analysis. However, the properties of this source material may cause serious limitations for the purposes of a research (Chmiel-Chrzanowska and Fetner 2016). We do not always have access to bones to use in our research. This situation is caused not only by environ-

* Department of Archaeology, National Museum in Szczecin, Staromłyńska 27, 70-561 Szczecin; m.adamczyk@muzeum.szczecin.pl
** Chair of Archaeology, University of Szczecin, Krakowska 71-79, 71-017 Szczecin; marta.chmiel-chrzanowska@usz.edu.pl

mental conditions, but also because of the eschatological concepts of some cultures which preferred burial types that leave no trace. Our question, therefore, is that is it possible in such cases to conduct studies on size and the dynamics of a population based on lithic material alone?

Palaeolithic and Mesolithic societies travelled vast areas to gain access to basic resources and rarely stayed in one place for long. Stone Age people were constantly on the move, their settlements were temporary, but often revisited or set in close proximity to each other. Drawing conclusions concerning the size of the population on the basis of their settlements may therefore be problematic.

Nonetheless, Stone Age scholars have from the outset tried to estimate group size using the number of finds from a site. This kind of research often causes numerous theoretical and methodological problems, but the efforts may result in interesting conclusions on Palaeolithic and Mesolithic societies.

In this paper we have used case studies from Central and Northern Europe dating to the Final Palaeolithic and Mesolithic. Human osteological remains are an uncommon find on sites from this area and age. An alternative approach is therefore required to research group structure and number of inhabitants on these archaeological sites.

Archaeologists have tried to solve this problem for many years by developing alternative solutions to the lack of osteological material. In the following article we would like to present some of our ideas and rarely used research methods. Primarily, we would like to demonstrate the usefulness of lithics from the point of view of palaeodemographic research.

In recent years there have been major developments in lithic material analysis. Besides obvious increase of numbers due to new field projects, there has been a significant development in terms of quality, mostly thanks to the common use of technological and use-wear analysis. At the same time, we can observe a somewhat disturbing tendency to withdraw from the main goal of archaeology, namely the study of humans. Demographic issues are in particular falling by the wayside, a result of the overdevelopment of the technical side of analysis. Lithics are increasingly being downgraded to a taxonomic determinant or a source for technological behaviour analysis.

We would like to present some examples which in our opinion may be useful for different levels of demographic research. They are focused on group size, the tracing of individuals and mobility. Those issues are the most complete examples that can be illustrated by lithics.

We are well aware that this task will not be an easy one. Even classic palaeodemographic research based on osteological remains is methodically demanding. In most cases palaedemographic research is based on life tables which require an assumption of non-Malthusian and stagnant population. In this scenario, the rate of births is equal to the rate of deaths and the migration level is nonexistent. In addition, this type of research requires a precise description of sex/gender and age of deceased and in many cases it is not possible due to the bad state of preservation of the osteological remains (cf. Chmiel-Chrzanowska and Fetner 2016). For Palaeolithic and Mesolithic research, it is practically impossible to determine a population's size and structure based on osteological remains. The reason is unitary nature of the burials as well as the culture. Therefore, if there are attempts at population estimation, the data is supplemented with ethnological analogies (e.g. Kobusiewicz 1999, 63).

On the other hand, our solutions require vast experience with lithics. The examples used in this paper are based on technological and experimental research, and those are very demanding and a certain level of highly specialised knowledge is needed. It seems, however, that they are useful for the purpose of searching for answers concerning the size and structure of Palaeolithic and Mesolithic societies.

HOW MANY WERE THERE? LITHICS AND THE NUMBER OF INHABITANTS

For the purposes of palaeodemographic analysis, small, or single occupation sites, seem to be the most appropriate to use. A good example is Dąbrowa Biskupia 71 in Kuyavia, a Stone Age site in Northern Poland (Domańska and Wąs 2007; Domańska and Wąs 2010). It is probable that Middle Maglemosian hunters stayed in this place to repair their hunting gear. This interpretation is based on the inventory's composition, as well as use-wear analysis that suggests the main activity on the site was replacing used microliths in arrows with new ones (Winiarska-Kabacińska 2007; Domańska and Wąs 2010, 267) (Fig. 1). It is, however, still unclear if the occupants of the site consisted of a single nuclear family (parents + children), or a number of hunters from different families.

We need to consider two possibilities. First, if it was the single family, or part of the family, this site should be interpreted as a satellite hunting camp. In that case there should be a base camp situated nearby that was inhabited for a longer period of time and used for a set of activities. This is the currently prevailing interpretation of the material recovered at Dąbrowa Biskupia (Domańska and Wąs 2010, 267), but we should also consider a second possibility. It seems probable that the site represents the remains left by a hunting party consisting of members of a few different families. In Dąbrowa Biskupia the number of microliths found was 189 while the total number of lithics was 482 (Domańska and Wąs 2010, 262). In comparison, a typical Middle and Late Maglemosian site like Szczecin-Jezierzyce 19 in West Pomerania, North Western Poland, had 128 microliths and fragments among a total of ca. 6,600 flint artefacts (Czarnecki 1981; Czarnecki 1983; Galiński 1992; Adamczyk 2010, 85). Most of the known examples of Mesolithic arrows were fitted with 2 or 3 microliths (e.g. Rozoy 1989). If we assume that the full set of microliths was changed from every arrow, the estimated number repaired in Dąbrowa Biskupia must have been approximately 60-90 arrows. Of course, we have to keep in mind that probably

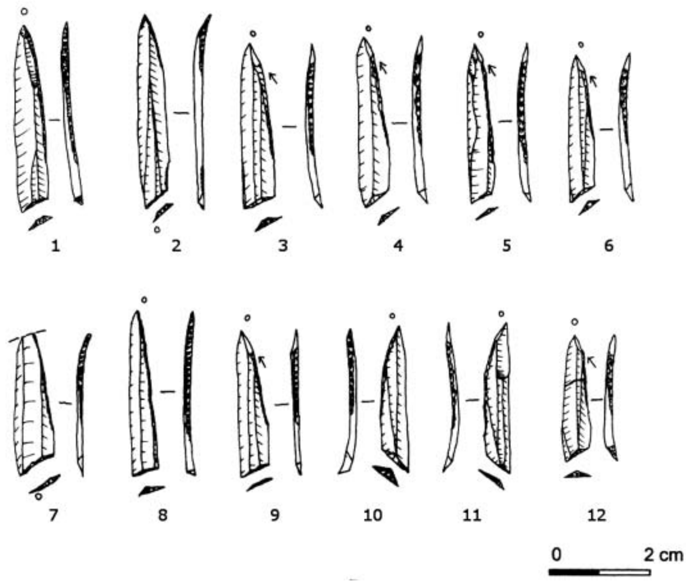

Fig. 1. Example of microliths from Dąbrowa Biskupia 71 site. 1-2, 7-8, 10 – Microliths with retouched tips; 3-6, 9, 11-12 – Microliths with microburin technique tips. After: Domańska and Wąs 2010, 263, fig. 40.4

not all the arrows were repaired. It is also possible that only one or two microliths were replaced in some cases. Even if we make the simplest assumption (that all the microliths in every arrow was were changed), it still seems that the amount of arrows is too high for a single hunter. It seems reasonable to assume that every hunter had ca 15-20 arrows, which is a likely maximum amount of arrows for one hunter, due to their inherent limitations of weight and volume. It may therefore be estimated that the number of hunters at Dąbrowa Biskupia was between 3-6.

The presented interpretation has one more outcome which is important from a demographic point of view. If we assume that we truly can trace the stay of a group consisting of hunters from different families, then probably we can also assume they were somehow related or bonded. This bond could be based e.g. on sharing a common territory, and it is almost certain that they were not random or unfamiliar people. A sense of community and dividing "us" from "them" is one of the basic traits of humanity. It is related to identity, both external and internal, and therefore it is a question of some general values and sharing the knowledge, e.g. about tools, their preferred form and technology of production, etc. For humans, the group has always been the most important and thus all, or almost all, of his or her choices were made because of the bond to the community (Benedict 2001, 7).

It is worth mentioning that the archaeological data suggests a high degree of territoriality among Mesolithic societies. The evidence for this hypothesis are traces of violence

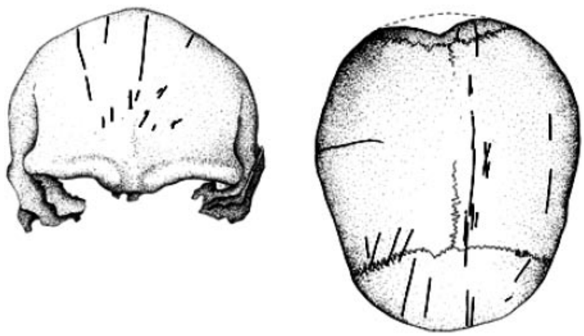

Fig. 2. Human calvaria from Drigge with scalping marks. After: Terberger 2006, 138, fig. 32

registered on bone materials. Although they are few in number, some of them contain traces that are typical for primitive warfare. The increase of violent acts has been correlated to dramatic environmental changes, when environmental stress is rising and forces harder competition on scant resources. A good example is Drigge 7002 site on Rügen Island, North Eastern Germany. One of the distinctive finds from this site is a human calvaria with traces of scalping, radiocarbon dated to 5188±106 cal BC (Gramsch 1973; Lübke and Terberger 2002; Terberger 2006, 137-138) (Fig. 2).

HAND OF A CHILD, LEFT HAND. LITHICS AND INDIVIDUAL KNAPPERS

In some cases, the analysis of lithics creates opportunities to make more detailed observations concerning their makers. Modern research methods allow us to find individual traits among prehistoric knappers. A very good example is searching for products made by inexperienced knappers, who most likely often were children or juveniles (e.g. Sternke and Sørensen 2010; Orzyłowska and Adamczyk in prep.). This phenomenon is important also because it allows us to draw conclusions on the process of socialization, which is the basis of society's reproduction and ensures its structural continuation. In this process a child learns to copy the behaviour of adults. Children gain knowledge by means of secondary socialization, mainly by observing and copying the behaviour of others (Kamp 2001, 13; Baxter 2008, 177). Secondary socialization is typical for older children but it is also important in an individual's adult life. This activity usually takes place within institutions other than family, such as equal age groups, working environment, etc. Because of secondary socialization, the individual gets used to social rules, cultural codes and others (Giddens 2012, 284, 288). Thanks to socialization and its outcomes, we are able to spot and recognize the products made by children.

Children's lithic products are characterized by a certain set of features that imply the knapper had little or no experience. Therefore, the artefacts made by apprentices are quite distinctive, compared to artefact produced by experienced knappers and masters. For example, the continuous repetition of the same mistakes by apprentices is very typical, while masters usually tried to correct their mistakes. Moreover, novice knappers often have problems with motility, the result being products of low quality. These are phenomena that have been confirmed during experimental research (Sternke and Sørensen 2010; Orzyłowska and Adamczyk in prep.).

A very good example that shows the mentioned phenomena is one of the Ahrensburgian cores from Buniewice 7 on Chrząszczewska Island, in North-Western Poland (Adamczyk 2013, 65; Adamczyk 2014, 168; Adamczyk 2016). This artefact is covered by the negatives of numerous strikes, however the detached debitage does not fit the metrical definitions of a blade. What is more, there are signs of other common novice mistakes on the artefact, such as hinged blade termination, numerous initial cones suggesting weak strikes and strike marks too far from the edge. On the other hand, what is interesting is that this core fulfils all the criteria of the Ahrensburgian prismatic core method (e.g. Migal 2007, 191-197; Sobkowiak-Tabaka 2011, 109-110; Adamczyk 2016, 163) (Fig. 3, Fig. 4). The most likely explanation is that a novice knapper had tried to detach the blades, but lacked the skills to do so. At the same time, he or she must have been instructed by a more advanced knapper, who advised the novice on where to strike, what should be the correct sequence of the operation and what the major principles of toolmaking or craftsmanship were in their culture. What is also important is that this is not a lone example, because products made by novices are often found. It should be pointed out, however, that to date this issue has not been often discussed and seems to be rather underestimated (Högberg 1999; Stapert 2007; Sternke and Sørensen 2010; Orzyłowska and Adamczyk in prep.).

It is worth mentioning that the presence of children can also be indicated by tools that are so small that they would be very impractical for an adult to use. It is possible that these tools are small imitations of larger tools, and that the size was designed to fit into children's hands. If so, the context e.g. the presence of small imitation tools and large standard tools in the same assemblage is crucial. Examples of such tools are most commonly known from Neanderthal sites (Stapert 2007, 33) (Fig. 5). On the other hand, one should keep in mind that small tools are not clear proof of the presence of children, as in some periods and cultures small flint artefacts were the basis of the technology used, or they might have a different function. Nevertheless, their presence does not fit the pattern in case of many Middle Palaeolithic sites, which in general contain large amounts of fairly big tools, stopped being used and abandoned rather quickly instead of being repaired "to the limit".

It is therefore possible, with some care, to conclude as to the presence of children (or: the artefacts made by/for children) on archaeological sites. It is also possible to distinguish between the flintknapping of novice and masters, and the presence of those products in the same assemblage confirms the presence of at least two knappers. Of course, more precise

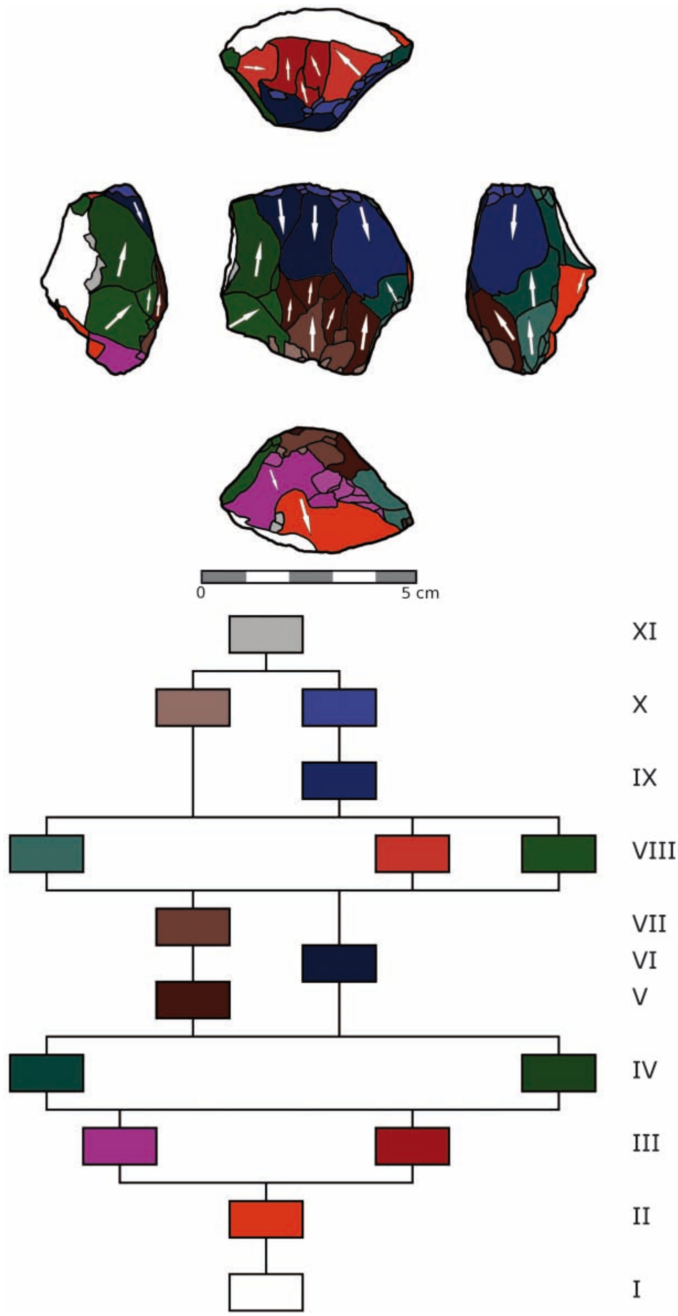

Fig. 3. Ahrensburgian prismatic core from Buniewice 7 made by novice knapper and its technological analysis. Note use of the same method as in case of cores made by master knappers.
After: Adamczyk 2016, 165, fig. 144

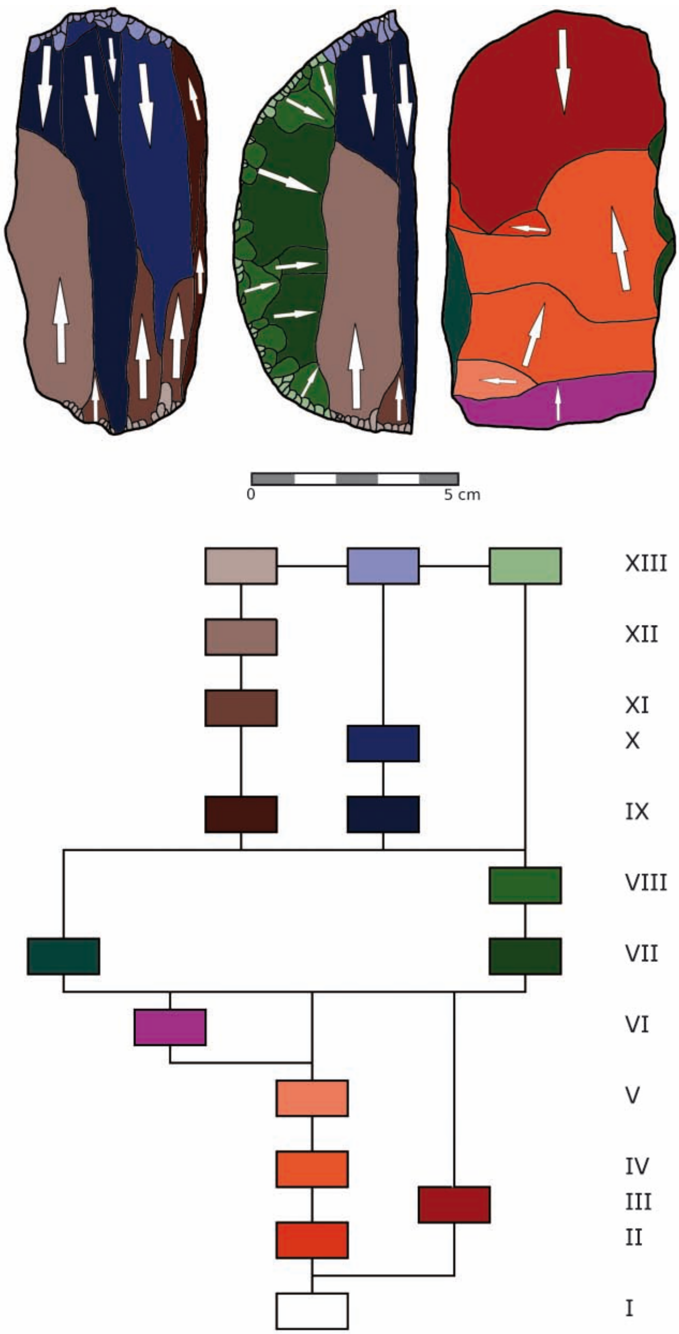

Fig. 4. Ahrensburgian prismatic core from Kocierz 3 made by master knapper and its technological analysis. After: Adamczyk 2016, 166, fig. 145

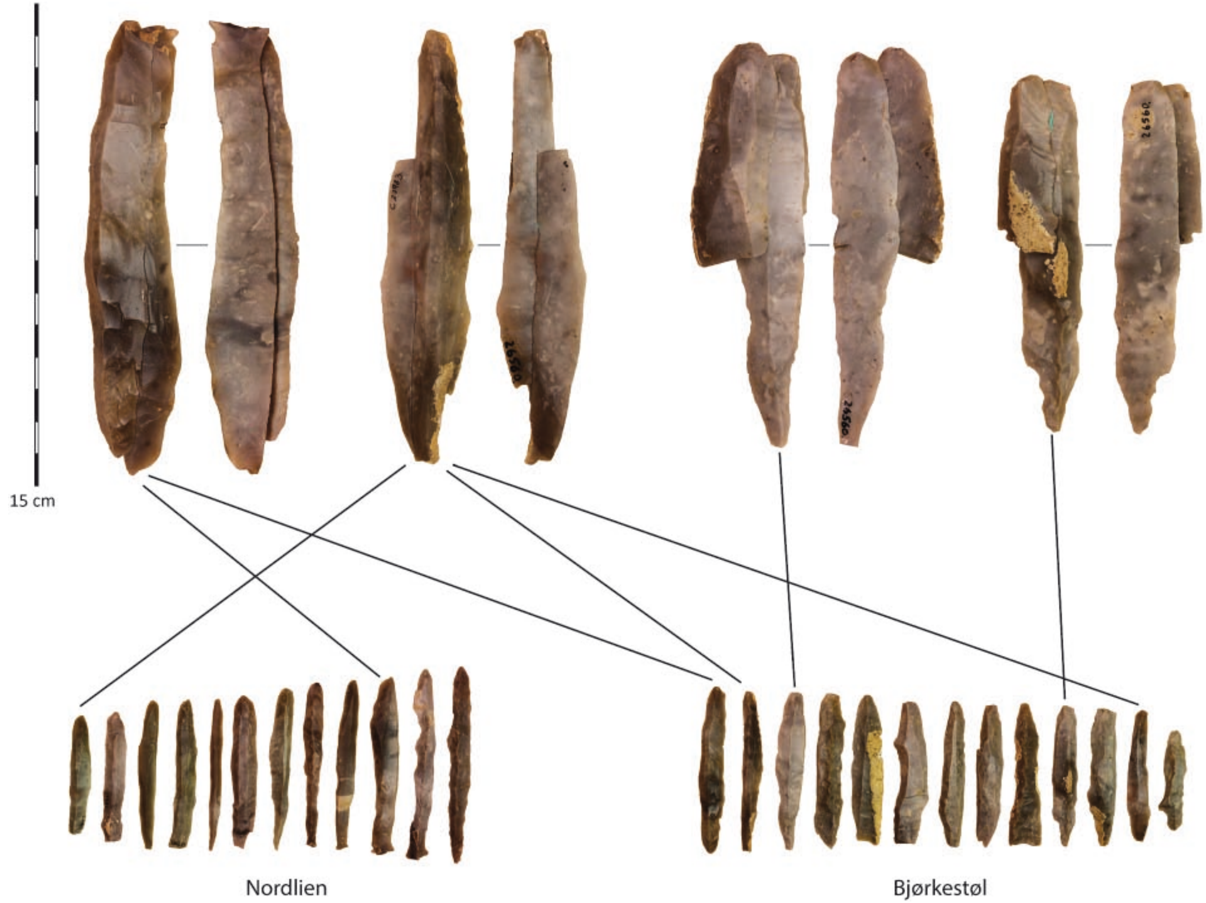

Fig. 9. Refits of blades from Bjørkestøl and Nordlien. After: Nielsen 2017, 6, fig. 2

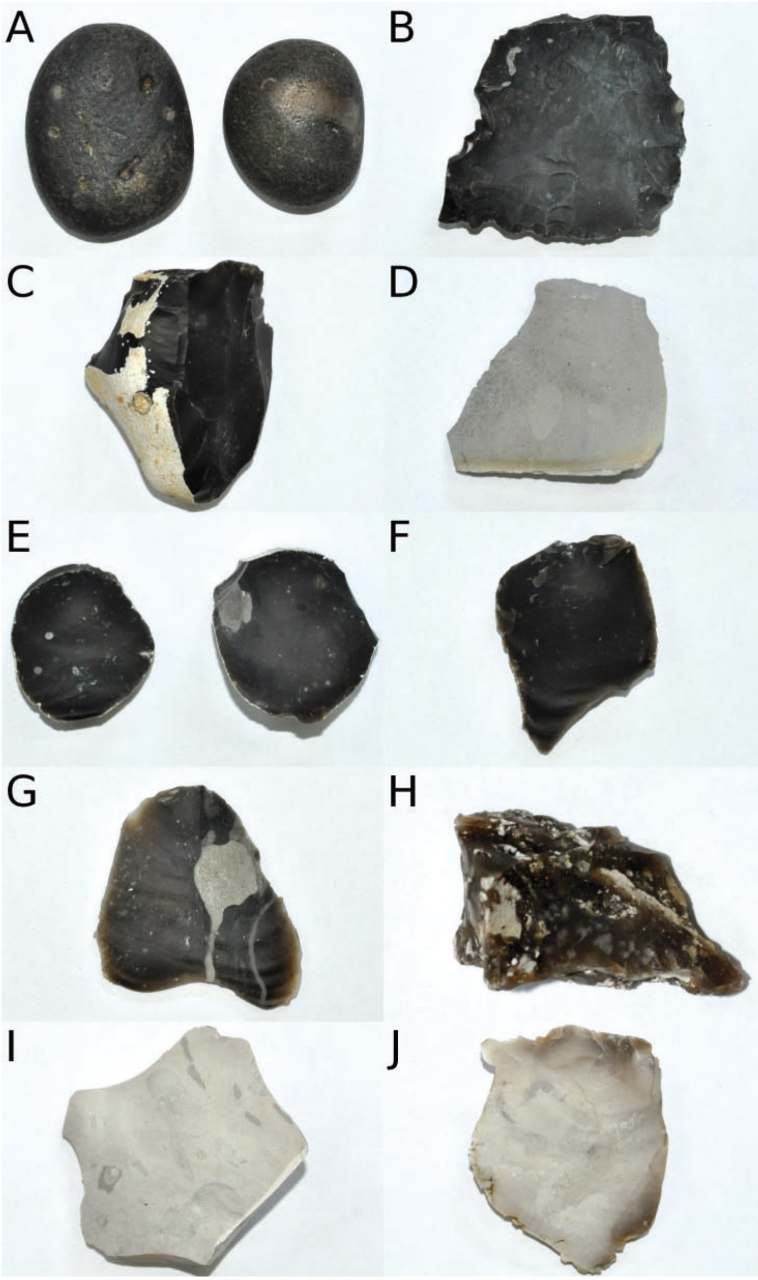

Fig. 10. Raw material samples from Wolin and Chrząszczewska Islands: Danian Flint (A); Campanian: Kristianstad Flint (B), 'Rügen-like' Flint (C), White Chert (D); Santonian Flint (E); Coniacian Flint (F); Upper Turonian: Baltic Erratic Flint (G), Wapnica Spotted Flint (H), Wapnica White Flint (I); Middle Turonian Flint (J). After: Adamczyk 2018a, fig. 3

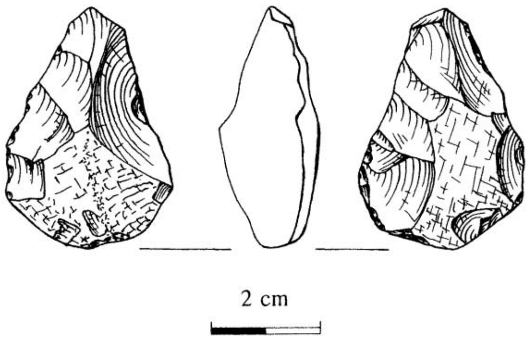

Fig. 5. A "micro-handaxe" from Rhenen, Netherlands. After: Stapert 2007, 30, fig. 15

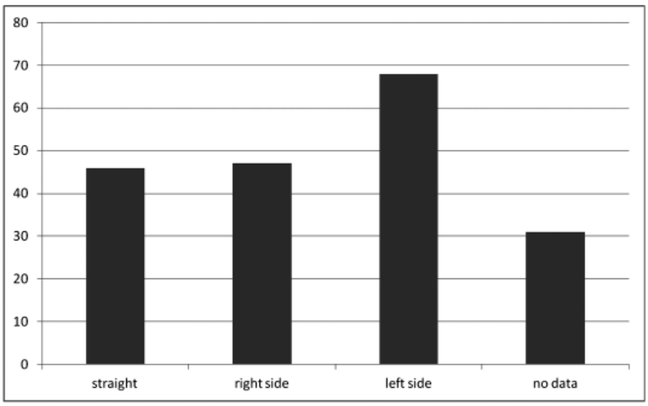

Fig. 6. Blade twist for experimental sequences. 192 blades from 5 experimental sequences were measured in total. After: Adamczyk 2013, 92, graph 6

distinctions are not possible, but the child needs to reach a certain motility level to be able to learn the complete process of crafting. Flintknapping training takes a few years and should begin before the age of 15. Children at this age are sufficiently developed both physically and mentally to replace adults in most daily chores. By beginning the training early, therefore, most parents may be sure that their children will posses all necessary, essential skills and have time to develop these to a high level.

Another example of tracking an individual knapper is defining which was the dominant hand of the knapper. The easiest way of doing this is to observe the twistation on pressure blades. As long as the blades were made using free-hand mode, without supporting the core on the ground, it is possible to compare large assemblages of microblades. The statistical analysis of experimental blade assemblages suggests that right handed knappers will get a left side twist more often than a right sided twist (Adamczyk 2013, 92) (Fig. 6). It should be mentioned, however, that the results suggest that right handed knappers can also get a right side twist. The following analytical method should therefore only be applied to large assemblages of blades. The ideal situation for analysis is studying a number of blades detached from the same core. The results could then be verified e.g. by refitting.

Pressure technology has been applied for the mass production of blades in Middle and Late Mesolithic (ca. 7500-5200 BC) in Central and Northern Europe (Sørensen 2012). This analytical approach could therefore potentially bring very interesting results, starting from the identification of individual left handed knappers to the large-scale analysis of entire Middle and Late Mesolithic populations.

WHERE DID THEY COME FROM? LITHICS AND MOBILITY

Besides drawing some conclusions on the number and composition of inhabitants on a site, lithics also allows us to investigate the aspects of migration and mobility. One example is Sujala, a post-Sviderian site in Lapland, Northern Finland (Rankama and Kankaanpää 2011) (Fig. 7, Fig. 8). A series of radiocarbon dates from the site suggests it represents a short occupation period ca. 8250 cal BC (Rankama and Kankaanpää 2011, 186-187; Kankaanpää and Rankama 2014, 150). What is important is that this site is not the only example of post-Sviderian (or similar) activity in the North, other sites include e.g. Fálle-

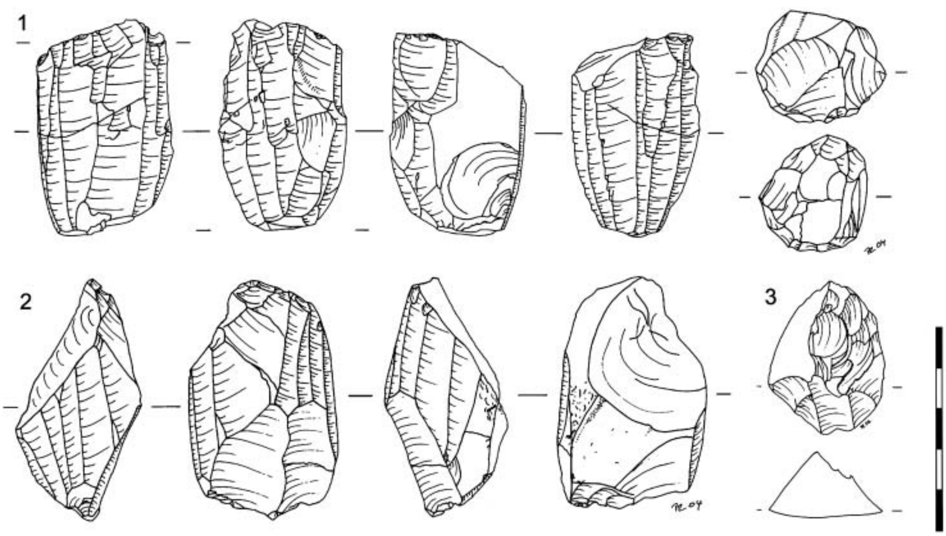

Fig. 7. Typical cores from Sujala. In technological categories, they represent post-Sviderian method use. 1 – Conical blade core with prepared (rejuvenated) platform; 2 – Re-oriented subconical core with two opposing platforms; 3 – Frost fragment of blade core base. After: Rankama and Kankaanpää 2011, 188, fig. 7

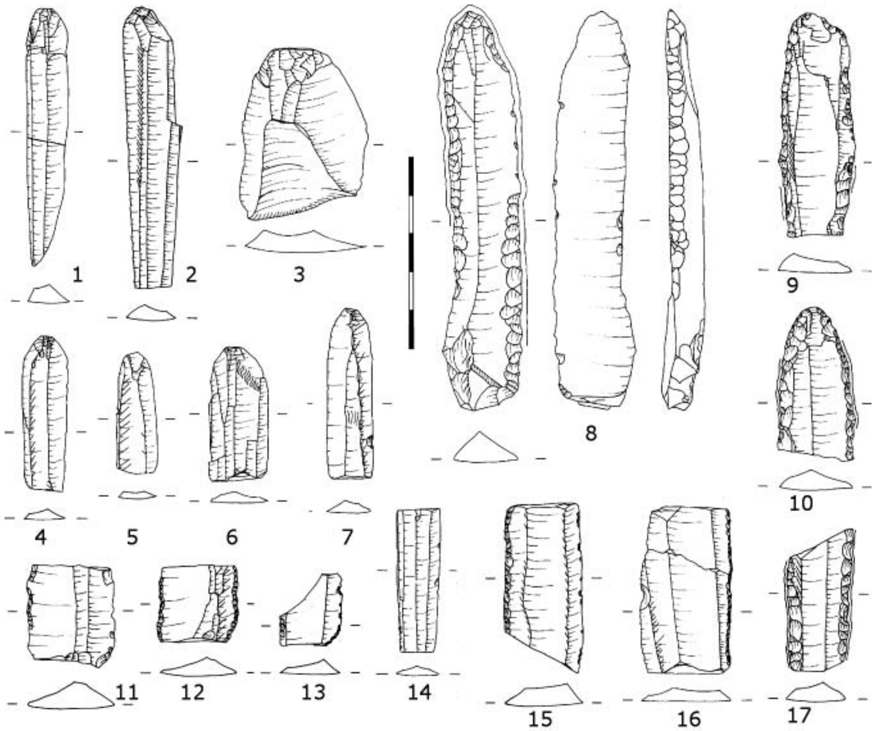

Fig. 8. Typical blades from Sujala, detached with use of pressure technique. 1-2 – Complete blades; 3 – Blade with *languette* break; 4-7 – Blade fragments; 8-10, 17 – Blade tools and fragments; 11-16 – Inserts. After: Rankama and Kankaanpää 2011, 190, fig. 11

goahtesajeguolbba (Rankama, Kankaanpää 2011) and Sæleneshøgda (Olsen 1994; Anttiroiko 2015) in the Varangerfjord Area, in Finmark, Northern Norway. Those sites are all interpreted as being the result of migration from areas nearly 1000 km to the south. J. Kankaanpää and T. Rankama (2014, 156) suggests, that this distance had to be traversed in one go. This interpretation is supported by technological arguments: there is a Fennoscandian Shield between Sujala and Varangerfjord and the southern sites of post-Sviderian. It is a vast area where there are no flints and other siliceous rock materials that can be used for pressure flaking. In spite of this, the lithic technology on northern sites is the same as classic post-Sviderian sites from Western Russia, Estonia and Latvia. This indicates that Sujala, Fállegoahtesajeguolbba and Sæleneshøgda were inhabited by people that learned the principles of flintknapping in the flint-rich areas of the South (Sørensen *et al.* 2013).

The raw materials used for crafting can also be a source for research on migrations. Because of the features of mineral raw materials, we are often able to describe the type and their geological age, and in some cases even the outcrop from which it was extracted.

Large scale, raw material analysis allows us to conduct research on long distance contacts and migrations. This issue is well illustrated by the distribution of some flint types, such as Świeciechów Flint and Chocolate Flint, and has been researched by Polish scholars in the past (e.g. Cyrek 1983; Sulgostowska 2005). This is because the mentioned flint types are naturally available only within a very limited area, as such they are a good source material for the purpose of migration research. An example of this is the lithic assemblage recovered from Salaspils Laukskola, a site in the Riga District, Latvia, classified as Final Palaeolithic Sviderian (Sulgostowska 2005, 220-223; Adamczyk *et al.* 2013). Some of the artefacts found on the site were made of Chocolate Flint, whose outcrops are known to stem from the Holy Cross Mountains in Central Poland. The distance between the mountains and Salaspils Laukskola is approximately 700 km. The assemblage has never been refitted and it is therefore unclear if they are knapped from one transported block of Chocolate Flint, or if they were ready made tools brought from other sites. The composition of the assemblage suggests the latter, but that some were further worked on site (Adamczyk *et al.* 2013, 2-3).

Raw material distribution analysis also allows for small scale mobility studies. In many cases it is possible to find out where the local deposits of flint are located and as such what their spatial relation is to a specific site. Thanks to this it is possible to define the distance to the site and therefore to describe the territory occupied by the group. Again, a good example is Salaspils Laukskola. A fortunate consequence of using an exotic and very specific raw material is that it enables us to look for the same type of flint in other Sviderian assemblages from Latvia and Estonia and refit these. If it was shown that they were made from the same block of flint, it could serve as proof that the same group have inhabited several different sites.

An interesting example of this research is the analysis of two Middle Neolithic blade deposits conducted by S. V. Nielsen (2017). The artefacts were found in two locations: Bjørkestøl in Vest-Agder and Nordlien in Aust-Agder, Southern Norway (Fig. 9). Both assemblages were discovered accidentally in the first half of the 20th century. Based on the technological similarities and use of the same raw material, the Author hypothesized as to their origin from the same core (Nielsen 2017, 3). It is worth mentioning the distance between two sites is 85 km in a straight line (115 km travelling by the coast) and the artefacts were made of high quality Senonian Flint, originating from three possible locations in Denmark:

- Thisted in Northern Jutland, 133 km from the Norwegian Coast;
- Stevns Klint in Eastern Zealand, 405 km from the Norwegian Coast;
- Møns Klint in Eastern Møn, 440 km from the Norwegian Coast.

The next step for the following hypothesis was its verification using the refitting method which proved both assemblages were detached from the very same core.

The example shown above is worth mentioning for two reasons. First, attempts at refitting materials from different sites are extremely rare, as a consequence of the major rule of archaeology to not mix the different assemblages. Second, it is direct evidence of long distance mobility, or at least the existence of networking in Stone Age Scandinavia.

There are more examples of raw material analysis with similar results as the above. One such example are the many sites from the Middle Mesolithic situated on Wolin Island, North Western Poland. Because of the geological history and structure of Wolin, there are numerous deposits of various flint types on the island (Alexandrowicz 1966) (Fig. 10). Analysis of the various assemblages suggests the Maglemosian hunter-gatherers on the island generally exploited deposits located up to 300 m from the camps (Adamczyk 2016, 181-182; Adamczyk 2018a). There are of course some exceptions. One of them is Lubin, a site comprising a small assemblage, situated in the South Western corner of Wolin Island. Among the raw materials used at this site were flints that are only found in Trzciągowo Valley, about 2 km north of the site (Adamczyk 2016; Adamczyk 2018b).

A similar situation was noted in the case of the aforementioned Szczecin-Jezierzyce 19 site, North Western Poland, where approximately 10% of the raw material was collected from areas located ca. 10 km away from the site (Adamczyk 2010). Both examples correlate well with Middle Range Theory, which suggests that hunter-gatherers societies exploit an area 10 km in radius from the base camp (cf. Kobyliński 1986).

It is worth mentioning, that palaeoenvironmental research may also bring some new data on Palaeolithic and Mesolithic societies. By searching for natural resources (and raw materials is one of the essential resources for hunter-gatherers), mapping them and looking for analogies in the functioning of hunter-gatherer societies, we are able to estimate the maximum size of the population which exploited a specific area. Of course, these attempts are possible for medium and large scale population research and the results are more an approximation of numbers than solid data. There are also some doubts connected to chronology and function, which again leads to problems with interpretations concerning networks at Palaeolithic and Mesolithic sites and the size of the population. This kind of analysis is possible, however, and has good potential for gaining new and promising results.

CONCLUSIONS

The main goal of this article was to initiate a discussion on the potential of lithics for the purpose of palaeodemographic analysis. New possibilities of demographic research based on material culture are a fact. In this article we have presented only some of the methods we deem the most promising for sites from the Palaeolithic and Mesolithic in Central and Northern Europe. In our opinion, the potential of the presented methods is huge and could also be adapted for use on sites from other periods. This kind of research should be developed, because in most cases we do not have any osteological material which prohibits research on Palaeolithic and Mesolithic palaeodemography. Even if the results cannot fully reassemble a detailed social structure comprising sex, gender and/or age, they are still valuable when researching ancient populations.

Advanced technological analysis could be a basic method for researching material culture. As we have presented above, they allow us not only to answer the most obvious question "How it was made?", but also "Who made this?" and even "How many of them were there?". In many cases we are able to obtain data about the producer of various artefacts. Of course, this task is not easy, and never will be, but it is possible.

For the purpose of palaeodemographic research, analysis based on the number of artefacts may also be potentially useful. However, while the methods are still limited at this point, it is nevertheless surprising that in most cases archaeologists do not attempt to answer demographic questions. Most limit their observations to trivial statements such as "single family".

In our opinion, more studies concerning the possibilities of lithic material in palaeodemographic research is required. It is a serious problem since it constitutes a large hole in our knowledge of Stone Age societies. The archaeological material comprises only partial data and the source material as such is of low scientific value. It challenges us to develop new methods, theoretical approaches and technological possibilities. In the case of palaeodemographic research, creating new research possibilities should be a common task for both archaeologists and demographers alike.

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References

Adamczyk M. 2010. *Badania reinterpretacyjne późnomezolitycznego inwentarza krzemiennego ze Szczecina-Jezierzyc, stan. 19 (AZP 32/7/2/19)*. Szczecin (unpublished MA Thesis in the archive of the Cathedral of Archaeology University of Szczecin).

Adamczyk M. 2013. *Buniewice, stan. 7. Stanowisko paleolityczne i mezolityczne na tle archeologii i paleośrodowiska Wyspy Wolin i Wyspy Chrząszczewskiej*. Szczecin (unpublished MA Thesis in the archive of the Cathedral of Archaeology University of Szczecin).

Adamczyk M. 2014. Buniewice, site 7: A collection of Tanged Points Technocomplex on the background of the Final Palaeolithic Settlement of Pomeranian Bay. *Sprawozdania Archeologiczne* 66, 177-220.

Adamczyk M. 2016. *Paleolit i mezolit na wyspach Zatoki Pomorskiej*. Warszawa (unpublished PhD Thesis in the archive of IAE PAN).

Adamczyk M. 2018a. Raw Material and Blade Technology Variability. Case Study of Mesolithic Pressure Blade Methods on Wolin Island Region (NW Poland) – an Experimental Approach.

In K. Knutsson, H. Knutsson, J. Apel and H. Glørstad (eds.), *The early settlement of Northern Europe – Technology and Communications*. Sheffield: Equinox, 139-172.

Adamczyk M. 2018b. Lithics. In M. Rębkowski (ed.), *Lubin. High medieval stronghold at the mouth of the Oder*. Szczecin: Polska Akademia Nauk, Instytut Archeologii i Etnologii, 229-238.

Adamczyk M., Anttiroiko N., Ekholm T. and Berg-Hansen I.-M. 2013. *Study of collections in Riga, Latvia, 7-9th of March 2013*. Riga (unpublished report in the archive of National Museum of Latvia).

Alexandrowicz Z. 1966. *Utwory kredowe w krach glacjalnych na wyspie Wolin i w okolicy Kamienia Pomorskiego*. Warszawa: Wydawnictwa Geologiczne.

Anttiroiko N. 2015. *Sæleneshøgda, a re-analysis of a classical Mesolithic Phase II assemblage in northern Norway*. Helsinki (unpublished MA Thesis in the archive of the Department of Archaeology University of Helsinki).

Baxter J. E. 2008. Archaeology of Childhood. *Annual Review of Anthropology* 37, 159-175.

Benedict R. 2001. *Wzory kultury*. Warszawa: Muza.

Chmiel-Chrzanowska M. and Fetner R. 2016. Problemy i perspektywy badań paleodemograficznych nad kulturą wielbarską na przykładzie cmentarzyska w Kowalewku, *Przeszłość Demograficzna Polski* 38(3), 7-29.

Cyrek K. 1983. Surowce krzemienne w mezolicie dorzeczy Wisły i Górnej Warty. In J. K. Kozłowski and S. K. Kozłowski (eds.), *Człowiek i środowisko w pradziejach*. Warszawa: Wydawnictwo PWN, 106-113.

Czarnecki M. 1981. The Mesolithic in the Szczecin Lowland. In B. Gramsch (ed.), *Mesolithikum in Europa*. Potsdam: Deutscher Verlag der Wissenschaften, 345-354.

Czarnecki M. 1983. Początki zasiedlenia w paleolicie i mezolicie. In W. Filipowiak and G. Labuda (eds.), *Dzieje Szczecina vol. 1. Pradzieje Szczecina*. Szczecin: Państwowe Wydawnictwo Naukowe, 60-101.

Domańska L. and Wąs M. 2007. Dąbrowa Biskupia, site 71. New data for evidence of the Mesolithic specialized camps. In M. Masojć, T. Płonka, B. Ginter and S. K. Kozłowski (eds.), *Contributions to the Central European Stone Age*. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 141-152.

Domańska L. and Wąs M. 2010. Dąbrowa Biskupia 71: a specialized camp from the Maglemose culture. In S. McCartan, R. Schulting, G. Warren and P. Woodman (eds.), *Mesolithic Horizons. Papers presented at the seventh International Conference on the Mesolithic in Europe, Belfast 2005*. Oxford: Oxbow Books, 261-268.

Galiński T. 1992. *Mezolit Pomorza*. Szczecin: Muzeum Narodowe w Szczecinie.

Giddens A. 2012. *Socjologia*. Warszawa: PWN.

Gramsch B. 1973. *Das Mesolithikum im Flachland zwischen Elbe und Oder*. Berlin: Deutscher Verlag der Wissenschaften.

Högberg A. 1999. Child and Adult in the Knapping Area. A technological Flake Analysis of the Manufacture of a Neolithic Square Section Axe and a Child's Flintknapping Activities on an Assemblage Excavated as Part of the Öresund Fixed Link Project. *Acta Archeologica* 70, 79-106.

Kamp K. A. 2001. Where have all the children gone? *Journal of Archaeological methods and theory* 8 (1), 1-34.

Kankaanpää J. and Rankama T. 2014. Fast or slow Pioneers? A View from Northern Lapland. In F. Riede, and M. Tallaavaara (eds.), *Lateglacial and Postglacial Pioneers in Northern Europe*. Oxford: Oxbow Books, 147-159.

Kobusiewicz M. 1999. *Ludy zbieracko-łowieckie północno-zachodniej Polski*. Poznań: Poznańskie Towarzystwo Przyjaciół Nauk.

Kobyliński Z. 1986. Koncepcja „Terytorium eksploatowanego przez osadę" w archeologii brytyjskiej i jej implikacje badawcze. *Archeologia Polski* 31 (1), 7-30.

Lübke H. and Terberger T. 2002. New evidence on the Ertebølle Culture on Rügen and neighbouring areas. In R. Lampe (ed.), *Holocene Evolution of the South-Western Baltic Coast – Geological, Archaeological and Palaeo-environmental Aspects* (= *Greifswalder Geographische Arbeiten* 27). Greifswald: Ernst-Moritz-Arndt-Univrsität Greifswald, 47-53.

Migal W. 2007. On preferential points of the Final Paleolithic in the Central European Lowland. In M. Kobusiewicz and J. Kabaciński (eds.), *Studies in Final Paleolithic of the Great European Plain*. Poznań: Institute of Archaeology and Ethnology Polish Academy of Sciences, Poznań Branch, Poznań Prehistoric Society, 185-200.

Nielsen S. V. 2017. Long blades and Phantom Cores: A Case of Long-Distance Stone Tool Refitting (Southern Norway). Lithic Technology, http://dx.doi.org/10.1080/01977261.2016.1268994.

Olsen B. 1994. *Bosetning og samfunn i Finnmarks forhistorie*, Oslo: Universitetsforlaget.

Orzyłowska K. and Adamczyk M. Learning the Method in Flintknapping. Two Controlled Experiments and Their Results. Szczecin. In preparation.

Rankama T. and Kankaanpää J. 2011. First evidence of eastern Preboreal pioneers in arctic Finland and Norway. *Quartär* 58, 183-209.

Rozoy J. G. 1989. The Revolution of the Bowmen in Europe. In C. Bonsall (ed.), *The Mesolithic in Europe*. Edinburgh: John Donald Publishers LTD, 13-28.

Sobkowiak-Tabaka I. 2011. *Społeczności późnego paleolitu w dorzeczu Odry*. Poznań: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Sørensen M. 2012. The Arrival and Development of Pressure Blade Technology in Southern Scandinavia. In P. M. Desrosiers (ed.), *The Emergence of Pressure Blade Making. From Origin to Modern Experimentation*. New York – Dordrecht – Heidelberg – London: Springer, 237-259.

Sørensen M., Rankama T., Kankaanpää J., Knutsson K., Knutsson H., Melvold S., Eriksen B. V. and Glørstad H. 2013. The First Eastern Migrations of People and Knowledge into Scandinavia: Evidence from Studies of Mesolithic Technology, 9th-8th Millennium BC. *Norwegian Archaeological Review* 2013, 19-56.

Stapert N. 2007. Neanderthal children and their flints. *PalArch's Journal of Archaeology of Northwest Europe* 1 (2), 16-39.

Sternke F. and Sørensen M. 2010. The identification of children's flint knapping products in Mesolithic Scandinavia. In S. McCartan, R. Schulting, G. Warren and P. Woodman (eds.), *Meso-*

lithic Horizons. Papers presented at the seventh International Conference on the Mesolithic in Europe, Belfast 2005. Oxford: Oxbow Books, 720-726.

Sulgostowska Z. 2005. *Kontakty społeczności późnopaleolitycznych i mezolitycznych między Odrą, Dźwiną i Górnym Dniestrem*, Warszawa: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Terberger T. 2006. The Mesolithic Hunter-Fisher-Gatherers on Northern German Plain. In K. Møller Hansen and K. Buck Pedersen (eds.), *Across the Western Baltic*. Odense: Sydsjællands Museum, 111-184.

Winiarska-Kabacińska M. 2007. Dąbrowa Biskupia 71: Mesolithic hunter's camp? In M. Masojć, T. Płonka, B. Ginter and S. K. Kozłowski (eds.), *Contributions to the Central European Stone Age*. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 153-160.