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MICRO-REGIONAL VARIANTS OF THE FLINT KNAPPING TRADITIONS IN THE LATE NEOLITHIC FROM THE PERSPECTIVE OF PROKOPIAK'S MOUNT

ABSTRACT

Domańska L. 2022. Micro-regional variants of the flint knapping traditions in the Late Neolithic from the perspective of Prokopiak's Mount. *Sprawozdania Archeologiczne* 74/1, 205-220.

The distinctive sandy structure of Prokopiak's Mount in Opatowice stands out from the surrounding black soils of the Kujawy Upland, and therefore attracted the interest among the Late Neolithic communities of the region. A program of comprehensive archaeological research was conducted here in 1985-1998, eleven sites were investigated and the materials obtained from five of them were published. These sites all produced rich flint assemblages. Three of these assemblages, being relatively homogeneous, (Opatowice 33, 36 and 42), were selected for research on the formation of local traditions of flint production in the Late Neolithic in Kujawy. The presented assemblages cover the entire chronological span from 3650 BC to 2600 BC. And chronologically correspond to the classic Wiórek horizon (Opatowice 33), the Luboń-Radziejów horizon (Opatowice 42) and the classic GAC horizon (Opatowice 36).

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Prokopiak's Mount in Opatowice, Radziejów commune in Kuyavian-Pomeranian Voivodeship is part of the range of Radziejów Hills. Due to its sandy structure, it is a vividly distinctive element against the surrounding black soils of the Kujawy Upland. This particular feature aroused keen interest among the Late Neolithic communities. That interest resulted in numerous, often multiphase, sites dated to that period. They testify to the extensive economic use of the Mount in the Late Neolithic (Szmyt 2013).

The area of the Mount was included in the program of comprehensive archaeological research conducted in the years 1985-1998 (Kośko and Szmyt 1993). The field work was carried out at eleven sites and the materials obtained from five of them were published (Kośko and Szmyt 2006; 2007; 2007a; 2014; 2015).

All the mentioned sites provided rich flint assemblages (Domańska 2013). The following three of them, being relatively homogeneous, were selected for the research on the formation of local traditions of flint production in the Late Neolithic in Kujawy: Opatowice 33, 36 and 42.

THE SITES

Opatowice 33

Traces of the TRB population settlement prevail at the site. The beginnings of it date back to around 3650 BC. The shape of the oldest settlement is very poorly readable due to the subsequent acts of devastation. Far more data was provided by the later settlement, which was established after 3400 BC. Two farmsteads are dated to this period, one of which was almost entirely explored. The vast majority of the artefacts discovered at the site are associated with the younger phase of the TRB settlement (Kośko and Szmyt 2006; Szmyt 2013).

A few single GAC finds can also be linked with the Late Neolithic (Kośko and Szmyt 2006). Three multi-platform flake cores, single flakes, splintered pieces and a burin were recorded in a small concentration of pottery representing that culture. They were all made of Baltic flint.

A small group of several items which are not related to the Late Neolithic may be assigned to the Mesolithic. They are represented by, among other things, four microliths.

Taking into account the above observations, the assemblage of 277 flint artefacts from Opatowice 33 can be considered relatively homogeneous and the vast majority of it can be associated with the classic Wiórek horizon of the TRB (Domańska 2013).

The dominant raw material discovered at the site was Baltic flint. 155 specimens of this material were registered, and its percentage share in the structure of the analysed assemblage was 55.9%. The second place in terms of quantity is taken by chocolate flint with 90 specimens singled out, which constitutes 32.5% of all the found artefacts. Among

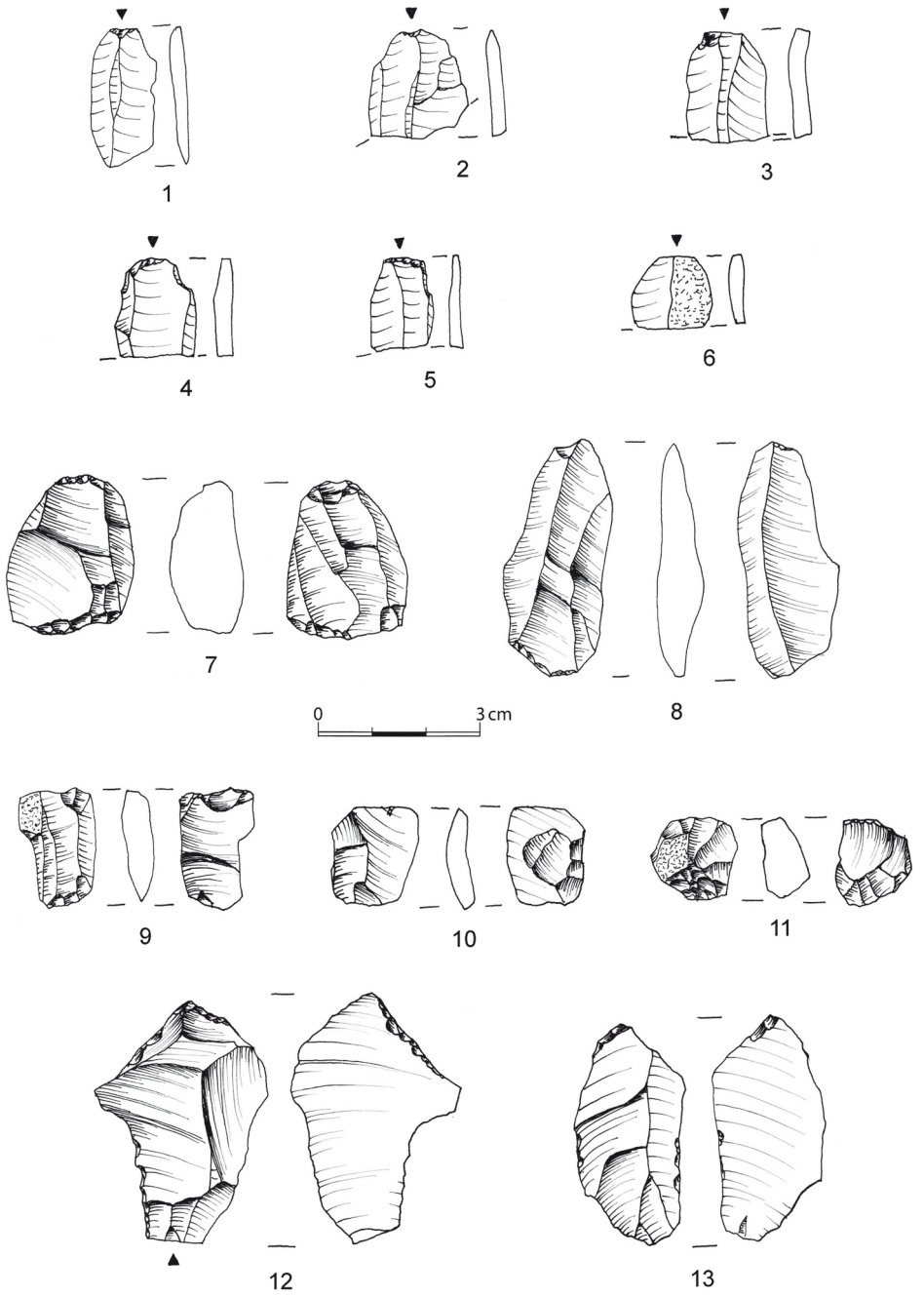

Fig. 1. Opatowice 33, Radziejów Kujawski community. Blades (1-6), splintered pieces (7-11), borers (12-13)

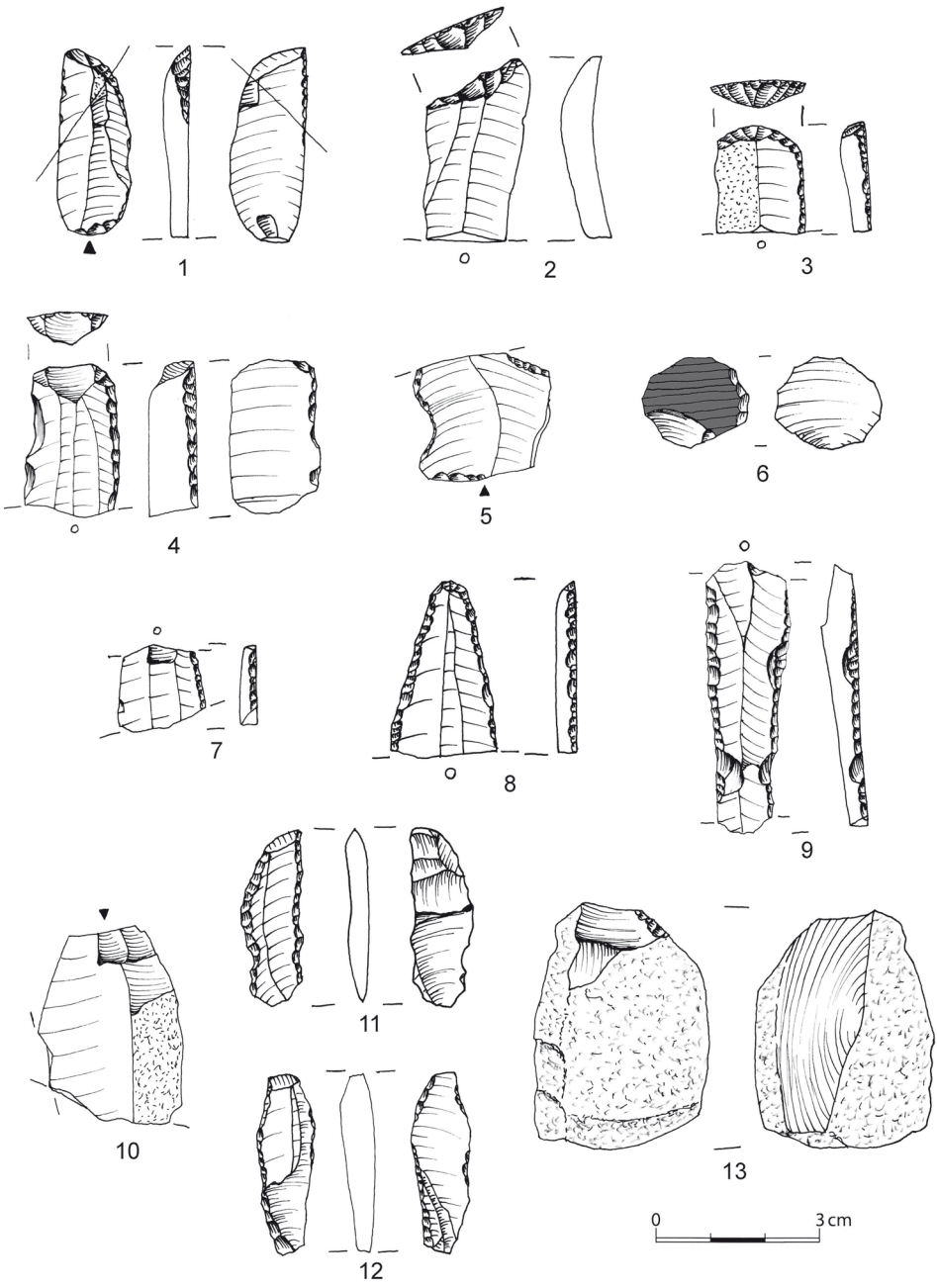

Fig. 2. Opatowice 33, Radziejów Kujawski community. Truncated blade (1), endscrapers (2-4), retouched flake (5), flake from polished axe (6), micro-retouched blade (7), blade with continuous retouch (8), retouched blade (9), blade (10), splintered pieces retouched (11-13)

other southern raw materials, one specimen of Volhynian flint and one specimen made of Świeciechów flint were recorded. This assemblage is complemented by 30 specimens of intensely burnt flint.

Most of the products are technologically connected with two techniques of exploitation: flaking and splintering. The quantitatively dominant group are products of the splintering technique, 21 splintered pieces (Fig. 1: 7-11) and 60 splintered piece flakes were recorded. Their share was 29.2% of the total assemblage. The group of flake exploitation products included eight cores and 57 flakes (23.4% of the whole assemblage).

The group of blade exploitation included two microlithic cores and 32 blades (12.3% of the whole assemblage). The aforementioned cores and blades with widths ranging from 5 to 9 mm can be associated with the Mesolithic. The assumption that Mesolithic hunters were present at the site is also confirmed by the discovered microliths (a triangle, a trapeze, a rhombus and a fragment of a truncated blade). The blades, which range from 11 to 17 mm in width, can be linked to the settlement of the TRB population (Fig. 1: 1-6). Most of the analysed blades were made of chocolate flint.

The group of tools included 28 specimens. A flake from polished axe made from chocolate flint was also distinguished.

The tool group can be divided into three subgroups. The first subgroup consists of tools which are, most likely, unrelated to the TRB. They include four microliths and a burin recorded in the GAC pottery concentration.

Among the remaining 23 specimens, eight conventional tools were discovered: three endscrapers (Fig. 2: 2-4), two borers, one truncated blade (Fig. 2: 1), one blade with continuous retouch (Fig. 2: 8), one projectile point. The blade with continuous retouch is the only product made of Volhynian flint discovered at the analysed site. It belongs to the category of convergent pieces.

The group of atypical tools consists of 15 pieces and prevails in the discussed assemblage. The atypical tools were divided into groups according to the type of blank from which they were made, i.e. blade tools – eight pieces, flake tools – four pieces and splintered-based tools – three pieces. The majority of them are products made of Baltic flint – eight pieces, six are made of chocolate flint, and one piece is intensely burned. The retouched pieces and pieces with use retouch constitute the most numerous part among atypical tools (Fig. 2: 5, 7, 9, 11-13).

Opatowice 36

At the site Opatowice 36, traces of a TRB settlement dating from 3700-3500 BC and clearly dominant remains of the GAC population settlement from 2900-2600 BC were recorded (Kośko and Szmyt 2015). The collection of artefacts related to the exploitation and use of flint, obtained in the course of archaeological research, includes 1,369 pieces (Domańska 2013; 2015).

The dominant raw material in the assemblage from Opatowice 36 is the local Baltic flint. Its share is 85.5% of the total material (1,169 pieces) whereas the products made of exotic flint are of marginal importance in terms of quantity. Among them, there is chocolate flint, from which 109 specimens (8%) were made. The remaining species are present in trace quantities; these include: 10 artefacts made of Świeciechów flint, nine from banded flint and seven of Volhynian flint.

Most of the recorded pieces are technologically related to two techniques of exploitation: splintering and flaking. In addition to the blade tools, only 14 other pieces are products of blade exploitation.

The group which definitely prevails in terms of quantity are the products of the splintering technique. Together, they constitute nearly half of the assemblage (almost 49%). The characterised assemblage consists of: splintered piece flakes – which are the most numerous artefacts in the entire assemblage (533 pieces, *i.e.*, 38.8% of the total assemblage) and splintered pieces (139 pieces, *i.e.*, 10.1% of the total assemblage). The percentage contribution of this group increases even more after taking into account the tools made of splintered piece flakes.

The distinguished group of flake exploitation includes mainly flakes (243 items). Only one flake core is genetically linked to this group. Overall, this group accounts for c. 18% of the total assemblage. The group of blade exploitation, which consists of 13 blades and one blade core, accounts for only 1% of the total assemblage.

A significant part of the assemblage – comparable to the number of flakes – are the pieces classified as chunks (19.3%); this category consists of burned chunks and chunks with flake negatives. Micro-debitage in the form of chips (*i.e.* flakes smaller than 5 mm) comprises just over 2.3% of the entire assemblage (31 pieces).

The presented assemblage also contained a group of polished axes (one piece) and flakes removed from axes (18 flakes) – they were singled out to a separate group.

A total of 124 tools were recorded, which made up 9.1% of the whole assemblage. The group was divided into two subgroups. The first one is composed of conventional tools. The other group consists of atypical tools, i.e. flakes and blades with traces of use in the form of the utility retouching and use gloss.

The group of conventional tools is composed of 30 pieces, among which two types quantitatively prevail: endscrapers (19 pieces) and truncated blades (eight pieces). In addition, two projectile points and one convergent blade with continuous retouch were registered. The latter piece should be associated with traces of settlement of the TRB population from the period 3700-3500 BC (Domańska 2015).

The remaining part is made up of atypical tools, which are quantitatively dominant – with 94 pieces distinguished (75.9% of all the tools). These pieces were grouped into three subsets according to the type of blank used. The most numerous are the pieces made of blades (54 pieces in total). This group includes 43 blades with use retouch, four retouched blades and seven micro-retouched blades. The share of the atypical flake tools is perceptibly

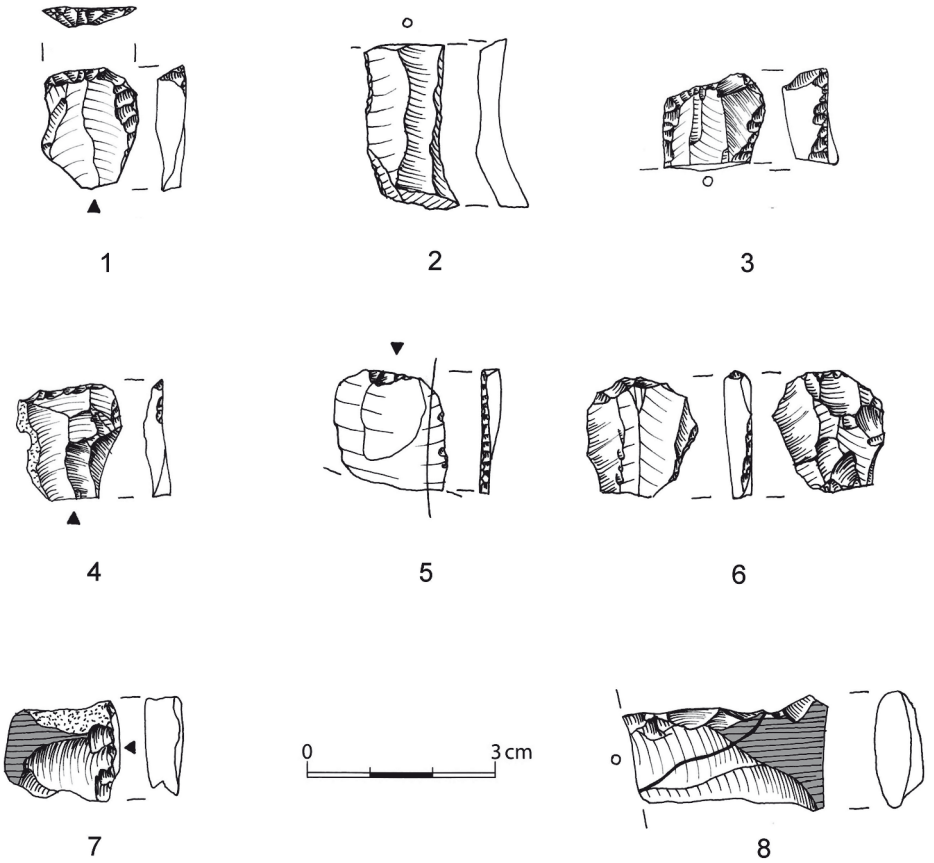

Fig. 3. Opatowice 36, Radziejów Kujawski community. Flint artefacts from the concentration of GAC pottery: Endscraper (1), blade with use retouch (2), retouched flakes (3-4), flake with polish on the lateral edge (5), splinterd piece (6), flakes from axes (7-8)

lower. Among them, the following were distinguished: flakes with use retouch (15 pieces), retouched and micro-retouched pieces (20 in total). The collection of atypical tools is supplemented by pieces that are technologically connected with the splintering technique. Only five splintered-based tools were identified in the assemblage.

In the central part of the site a concentration of GAC pottery and flint artefacts was registered; it is related to the alleged house of this population (Kośko and Szmyt 2015). A total of 161 flint products were recorded in the above-mentioned concentration (Fig. 3).

The vast majority of them were made of Baltic flint: 137 pieces – which accounts for 85.1% of all the products. There were also 12 pieces made of chocolate flint (7.5% of the collection), one piece made of banded flint (0.6%) and 11 intensely burned flint pieces (6.8%).

The most numerous group are products of the splintering technique, which includes 31 splintered pieces and 41 splintered piece flakes, which together constitute 44.7% of the entire collection. The next most common are: chunks – 44 examples (27.3%), flakes – 34 (21.1%), tools – seven items (4.4%) and four flakes removed from axes (2.5%). The group of tools includes two endscrapers (Fig. 3: 1), one blade with use retouch (Fig. 3: 2), two retouched flakes (Fig. 3: 3, 4), one micro-retouched flake and one flake with polish on the lateral edge (Fig. 3: 5).

A comparative analysis of the flint pieces from the above-described cluster recorded in the central part of the site as well as the entire assemblage confirms the far-reaching similarities linking the two assemblages. This observation seems to be just another piece of evidence of the relationship between the vast majority of the flint assemblage and the settlement of the GAC population at the presented site.

Opatowice 42

During the excavations conducted at the Opatowice 42 site, a particularly large collection of the TRB pottery was obtained. On its basis, several phases of settlement of the site occupied by the TRB communities were identified. The artefacts representing the respective phases co-occurred in almost the entire excavated area, but in some parts of the site they formed relatively homogeneous systems (Kośko and Szmyt 2007a; Szmyt 2013).

A house (feature 21) and 'yard' (trenches surrounding the house) seems to be one of such systems. It functioned (most probably) in the period between 3350 and 3100 BC. The vast majority of ceramic and lithic artefacts discovered at the site come from its context (Kośko and Szmyt 2007a).

The excavation of the site provided 473 flint products (Domańska 2007a). Of these, 62 were recorded in the aforementioned house (Feature 21) and 139 pieces were recorded on the surface of the postulated 'yard'.

CHARACTERISTIC OF THE ASSEMBLAGE FROM FEATURE 21 (HOUSE)

A total of 62 artefacts were recorded in Feature 21. The prevailing raw material in this assemblage is Baltic flint. Its share is 75.8% of the total material (47 pieces). On the other hand, the products made of flint which, from the perspective of this site, can be classified as exotic, are in vast minority. Seven pieces of chocolate flint (11.3% of the total structure of the assemblage), a fragment of an axe made of banded flint and a tool made of Volhynian flint were identified. Also, six intensely burned pieces (9.7% of the whole assemblage) were recorded.

The majority of the products from this feature are technologically connected with the splintering technique of exploitation. 12 splintered pieces and 13 splintered piece flakes

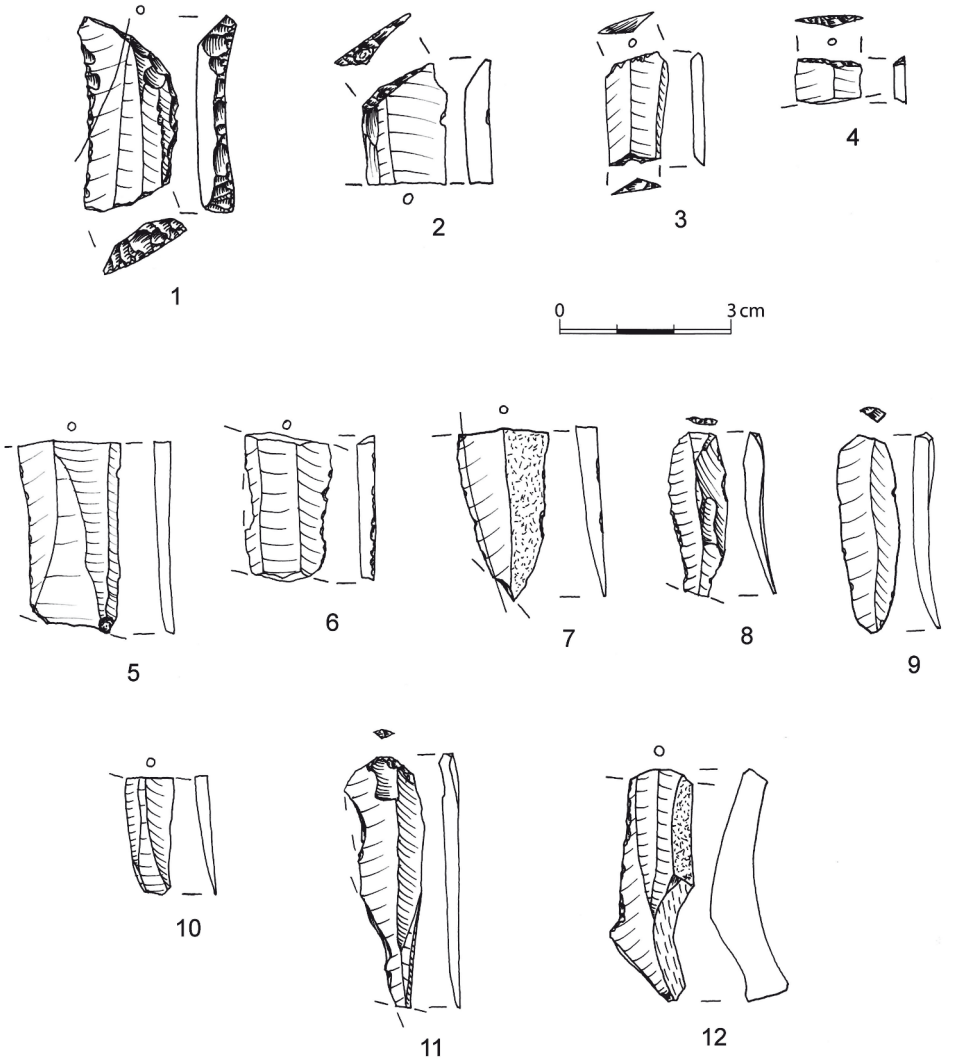

Fig. 4. Opatowice 42, Radziejów Kujawski community. Flint artefacts from Feature 21: Truncated blades (1-4), blades with use retouch (5-9), blades (10-11), micro-retouched blade (12)

were recorded. Collectively, they represent 40.3% of the whole assemblage. The groups of products of the flake and blade exploitation show a similar quantitative share in the quantitative and qualitative structure of the analysed materials. The assemblage yielded five flakes and four blades.

Tools are the dominant group among the artefacts derived from the house, 16 specimens were recorded, which constitutes 25.8% of the entire assemblage structure. Of these, four

were made of chocolate flint, one of Volhynian flint and nine of Baltic flint. In the case of two pieces, the high degree of burning precluded the possibility of identifying the raw material.

The group of tools was divided into two subgroups: conventional tools and atypical tools. The latter subgroup prevailed. A separate group is composed of flakes from axes.

Only four specimens (truncated blades) were included in the first group (Fig. 4: 1-4). Among them, two double truncated blades and two single pieces were discovered. It should be noted, however, that single truncated blades are just fragments, and their classification may be incorrect. Three truncated blades were made of Baltic flint, and one was an intensely burned piece. Only one truncated blade has clear polish arranged diagonally to the axis of the blank.

The group of atypical tools consisted of 12 specimens. They included one micro-retouched blade (Fig. 4: 12), five blades with use retouch (Fig. 4: 5-9), one retouched flake, three flakes with use retouch, one retouched splintered piece and one splintered piece flake with use retouch. Tools made of Baltic flint prevail (six), but there were also four tools made of chocolate flint, one from Volhynian flint and one is an intensely burned piece.

CHARACTERISTIC OF THE ASSEMBLAGE FROM THE TRENCHES SURROUNDING THE HOUSE ('YARD')

A total of 139 artefacts were recorded in the area of the house's 'yard'. The ones made of Baltic flint were by far the most numerous pieces in the assemblage, 115 specimens were identified, which accounts for 82.8% of the total assemblage structure. Southern raw materials constitute a total of 12.9% of the raw material structure of the presented assemblage. The most numerous among them were products made of chocolate flint (16 pieces) but also some products made of Volhynian and Świeciechów flint (one piece of each) were recorded. Only 4.3% of the raw material structure of the assemblage consisted of burned pieces.

The assemblage generally consist of products classified into eight categories. Most of them are technologically related to the splintering technique. Negative chunks made of Baltic flint (33.8% of the total structure of the assemblage) are very numerous in the assemblage. Also, three chips were identified, two of which were made of chocolate flint.

The group of products of the splintering technique includes 22 splintered pieces and 36 splintered piece flakes. They constitute 41.9% of the entire assemblage. Except for one splintered piece made of Świeciechów flint and one burned piece, the remaining splintered pieces were made of Baltic flint. Bipolar bifacial pieces dominate among them. The analysed assemblage included six flakes (4.3% of all the materials) and five blades (3.6% of the assemblage) (Fig. 5: 12-13).

There were 18 specimens classifiable as tools, which constitutes 12.9% of the total assemblage. Two flakes removed from polished axes were singled out for as a separate group, one of which is made of Baltic flint and the other is a burned specimen.

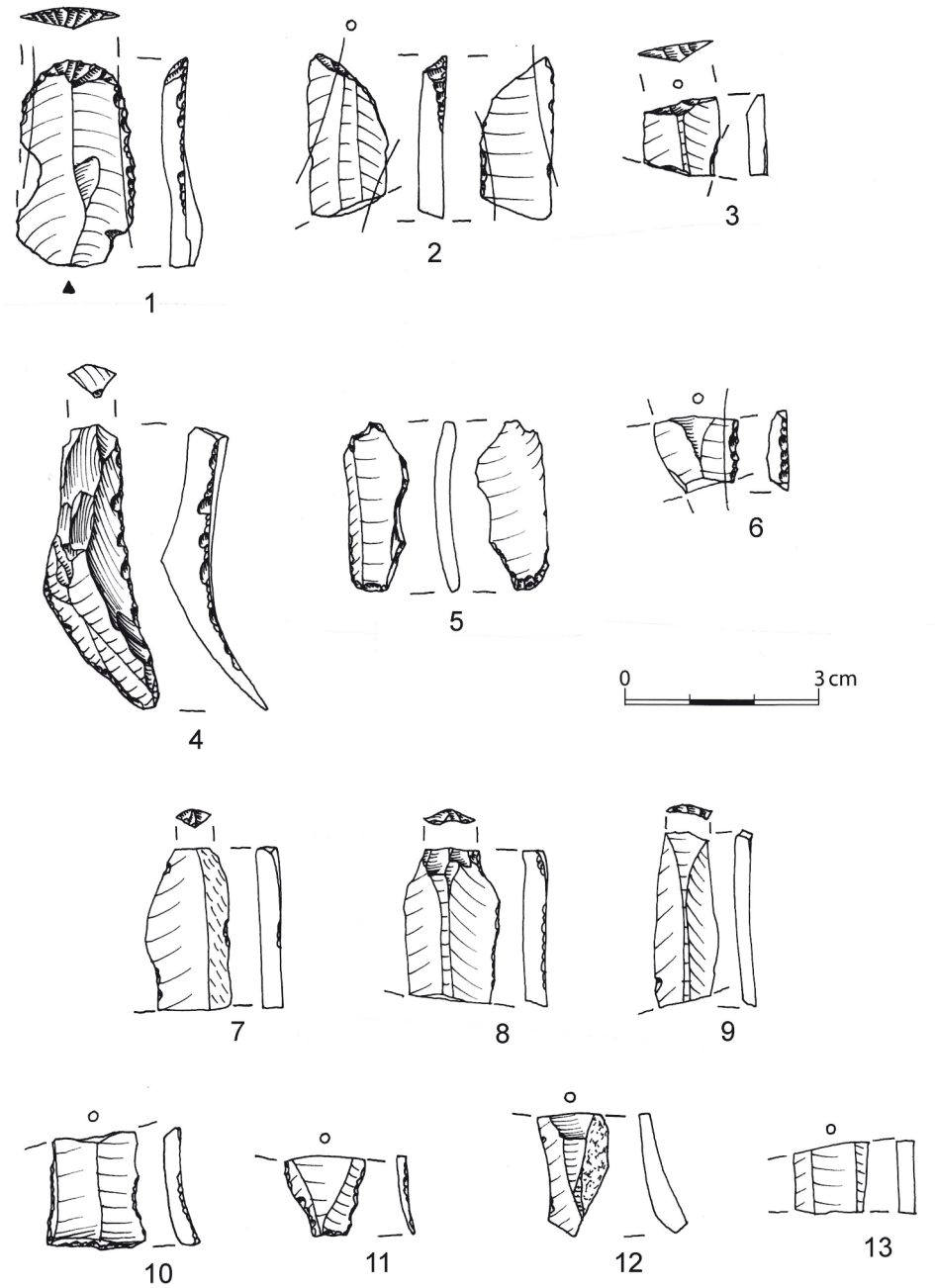

Fig. 5. Opatowice 42, Radziejów Kujawski community. Flint artetacts from the trenches surrounding the house ('yard'): endscraper (1), truncated blades (2-3), retouched blades (4, 6), micro-retouched blades (5, 10-11), blades with use retouch (7-9), blades (12-13)

The group of tools was divided into two subgroups: conventional tools and atypical tools. The first subgroup included three specimens, and the other – 15 tools.

The first subgroup was composed of one endscraper (Fig. 5: 1) and two truncated blades (Fig. 5: 2, 3). The distinguished endscraper was made of Baltic flint; it is a unilateral retouched blade, arcuate with unilateral retouch and bilateral polish. The group of truncated blades included a double piece made of Baltic flint and a fragment of a truncated blade made of chocolate flint.

The group of atypical tools contains retouched blades (Fig. 5: 4, 6), micro-retouched blades (Fig. 5: 5, 10, 11), blades with use retouch (Fig. 5: 7-9), retouched flake, micro-retouched flakes and retouched splintered flakes. In the discussed group of tools, blades dominate (eight pieces); there are also five splintered tools and two other tools made on splintered piece flakes. Tools made of Baltic flint (seven pieces) are slightly more numerous; there are also six pieces made of chocolate flint, one of Volhynian flint and one intensely burned piece.

A COMPARATIVE ANALYSIS OF THE ASSEMBLAGES

The presented assemblages chronologically correspond to the classic Wiórek horizon (Opatowice 33), the Luboń-Radziejów horizon (Opatowice 42) and the classic GAC horizon (phases IIb-IIIa). They cover the entire chronological span from 3650 BC to 2600 BC (Kośko and Szmyt 2006; 2007a; 2015). Their comparison leads to several conclusions:

1. The major raw material in all three sites is the local Baltic flint; the level of its use varies as follows: Opatowice 33 – 55.9%, Opatowice 42: house – 75.8%, 'yard' – 82.8%, Opatowice 36 – the share of the raw material in all materials is – 85.5%, for a separated cluster inside the alleged GAC house – 85.1%.

2. In the group of southern raw materials, chocolate flint occurs most abundantly. For Opatowice 33, the ratio of this raw material is 32.5%. Chocolate flint is also dominant in the group of imports in the house assemblage and in the trenches surrounding Feature 21 (house) at the site Opatowice 42 (11.3% and 11.5%, respectively). The share of chocolate flint calculated for the entire assemblage from Opatowice 36 is 8% and for the alleged GAC house – 7.5%.

3. The assemblages from Opatowice 36 and 42 are composed mainly of splintered pieces. For Opatowice 42, the indexes for this group are as follows: house (Feature 21) – 40.3%, trenches around the house ('yard') – 41.9%, while in the case of materials from Opatowice 36 the indexes for the group are as follows: for the entire assemblage – 48.9%, inside the alleged GAC house – 44.7%. A slightly different situation was recorded for the site Opatowice 33. The group of products of the splintering technique does not exceed 30% of the assemblage.

4. The quantitative share of the group of flakes in the presented assemblages is different. The highest index for this group is achieved in the materials from Opatowice 33 where it

amounts to 23.4% of all products and is close to the quantitative share index in this assemblage of splintered piece and splintered piece flakes. For the site Opatowice 36, the quantitative share index of the group of products of flake exploitation is 18% of the total assemblage – for the GAC ceramic cluster in the central part of the site it is 21.1%. Only five flakes were recorded in the house at the site Opatowice 42, and the trenches surrounding the house – six pieces were recorded.

5. In all three sites, blades which were not transformed into tools were rare finds and occurred as follows: Opatowice 33 – 19 pieces of chocolate flint; Opatowice 36 – 10 blades made of Baltic flint and three blades of chocolate flint; Opatowice 42 – four blades were recorded in the house (two made of chocolate flint and two of Baltic flint) and in the trenches surrounding the house – five pieces (one made of chocolate flint, one of Baltic flint and three intensely burned pieces). It should be emphasized, though, that the group of products made of chocolate flint derived from the presented site did not contain any technical forms, which would indicate that the blade exploitation was performed locally.

6. Atypical tools strongly prevail in the analysed assemblages. At the site Opatowice 33, they account for over 53% of all tools, while at the remaining sites their percentage varies between 75% and 83%. The presented group of tools is dominated by blade pieces, while blades with use retouch and micro-retouched blades predominate.

7. The group of conventional tools is dominated by endscrapers and truncated blades: Opatowice 33 – three endscrapers and one truncated blade; Opatowice 36 – 19 endscrapers and eight truncated blades were recorded at the site, while two endscrapers were discovered within the cluster of flints inside the alleged GAC house; Opatowice 42 – four truncated blades were identified inside the house and on the surface of the 'yard' – one endscraper and two truncated blades.

CONCLUSIONS

The above comparison clearly shows a far-reaching convergence between the analysed assemblages in terms of their quantitative and qualitative structures. This is mainly confirmed thanks to the analysis of the flint materials from Opatowice 36 and 42. These groups are characterised by similar indexes in terms of the raw material structure (quantitative indexes for Baltic flint range from 75 to 85%, and for chocolate flint: 7.5-11%). At both sites, the groups of products of the splintering technique are clearly dominant (40-50%), and in the group of tools – atypical tools prevail with a quantitative share in this group of products ranging between 75 and 83%.

The assemblage from Opatowice 33 differs slightly from the other two presented groups. The most important difference is marked by an occurrence in these materials of convergent retouched blades made of Volhynian flint. They comprise quite a characteristic element of the classic Wiórek assemblages in Kujawy, however, they were not recorded in

the context of Luboń-Radziejów materials (Domańska 2013; 2016). The presented assemblage is also distinguished by a relatively high quantitative index for specimens of chocolate flint (32.5% of the total raw material structure) and a similar quantitative share of the products of the splintering technique as well as the classical methods of core exploitation.

It should be emphasized that the perceived differences are purely quantitative. No significant qualitative differences related to the technology or the general structure of the tool group were noted. This observation comes as a surprise, taking into account the 'ceramic' cultural attributes of the individual assemblages.

Very complex systems of sources have been recorded at the presented sites related to the asynchronous occupation episodes of the late Neolithic population (Kośko and Szmyt 2006; 2007a; 2015). This fact calls for a certain degree of caution in formulating explicit opinions. The observed similarities between the methods of flint production of the classic Wiórek, the Luboń-Radziejów and the Globular Amphora populations at sites Opatowice 33, 36 and 42 cannot be interpreted only as a source-related issue resulting from the mixed nature of the flint assemblages recorded at the presented sites. Therefore, it appears that the idea of the possibility of continuation of the previously developed models of making flint tools by subsequent Late Neolithic communities should be allowed (Domańska 2016).

This may be indicated by the results of the comparative analyses of two GAC flint assemblages from Kujawy, which come from the following sites: Kołuda Wielka 13 and Opatowice 36. The first group is dated to phase IIa, the other – to phase IIb-IIIa (Szmyt 2013; Kośko and Szmyt 2015).

The collection of artefacts obtained at the site Kołuda Wielka 13 consists of 99 pieces (Domańska and Wąs 2021). The local Baltic flint is clearly the dominant material at the site. Its share is 75.8% of all materials. Chocolate flint takes second place in terms of quantity – 17.2%. The products of the splintering technique are definitely the dominant group – 47.5% of the entire assemblage. In turn, 16 specimens were included in the group of products of flake exploitation, which accounts for 16.2% of the total assemblage. There were no products found at the site that could be associated with blade exploitation. Indirectly, only a fragment of a truncated blade and a fragment of a tool with use gloss bear some characteristics of blade debitage. The group of tools includes 21 specimens, 17 of which are atypical pieces.

As a result of comparing this assemblage to the materials from Opatowice 36, it needs to be reiterated that the discovered differences are only quantitative. No significant qualitative differences related to the technology or the general structure of the group of tools were recorded. Both collections of flints contain elements that testify to their local, simple production focused on immediate needs. These materials also contain remnants of bigger tools, such as axes and products made of chocolate flint. Importantly, the said artefacts were not produced locally but their occurrence at the sites was a result of interregional contacts.

Interesting conclusions also arise from the comparison between the flint materials from site Opatowice 42 and the flint assemblage from site Mrowino 3 located in Greater Poland, representing the TRB Luboń phase (Szmyt 2018). The vast majority of products from the latter site (98.2% of all the pieces) were made of local Baltic flint. The raw material used at the site was excellent quality – the average concretion measured 20 cm. It was most probably derived from the area of the Warta River gorge near Poznań. The quality of the raw material seems to be related to the dominance of the classical methods of core exploitation as the products of this technique represent 82.7% of the total assemblage (Kabaciński and Winiarska-Kabacińska 2018). To compare – in the assemblage from Opatowice 42, the group of products of the splintering technique dominates, and the size of products in this group does not exceed 3 cm. This difference between the analysed assemblages of the TRB Luboń phase is most likely due to the type of the raw material available. Thus the inhabitants of the settlement in Opatowice used small lumps of low-quality flint.

In summary, the flint industry of the Late Neolithic communities in the area of Prokopiak's Mount is an example of specific local solutions focused on the current needs. The production was intended to satisfy utilitarian exigency. Therefore, it was based on simple manufacturing operations that did not require any complicated procedures.

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