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Exchange of Lithics Seen from the Perspective of Flint Material Refitting : case study on the Final Paleolithic Site Krzeczów 9 in Zakole Załęczańskie

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Introduction

This article discusses selected results of lithic analysis seen from the perspective of refitting of a small flint concentration at the Palaeolithic site Krzeczów 9 in Zakole Załęczańskie. This region has one of the highest densities of excavated and surface collected sites from the Final Palaeolithic in Poland. All surveys were carried out by archaeologists from the Museum of Archaeology and Ethnography in Łódź from the middle 1970s. All sites were excavated by Krzysztof Cyrek and his team and then were gradually published (Cyrek 1996).

One of the published sites was Krzeczów 9 which contained a relatively small number of flint materials. Around 930 pieces were registered excluding natural nodules and the smallest chunks. This particular factor substantially helped me with the process of fitting flints together.

General information

The region of Zakole Załęczańskie is located at the north-western border of the Jurassic Upland spreading from Kraków to Wieluń. The workshop at Krzeczów 9 was settled in the sandy, western bank of the River Warta (**Fig. 1**). Excavation was carried out in the summer of 1981 by K. Cyrek and M. Cyrek (Cyrkowie 1987; Cyrek 1996).

During the excavation campaign, an area of 50 m^2 was excavated (Cyrkowie 1987: 7) and several hundreds of flint artefacts were discovered (**Fig. 2**). Additionally, a large number of flint artefacts was collected during earlier surface prospection. Most of the flints from the surface collection are typical for the Final Palaeolithic from this area. Therefore, I decided to use all the material in the following analysis. A substantial part of those surface collected lithics was conjoined onto different blocks and simple refittings.

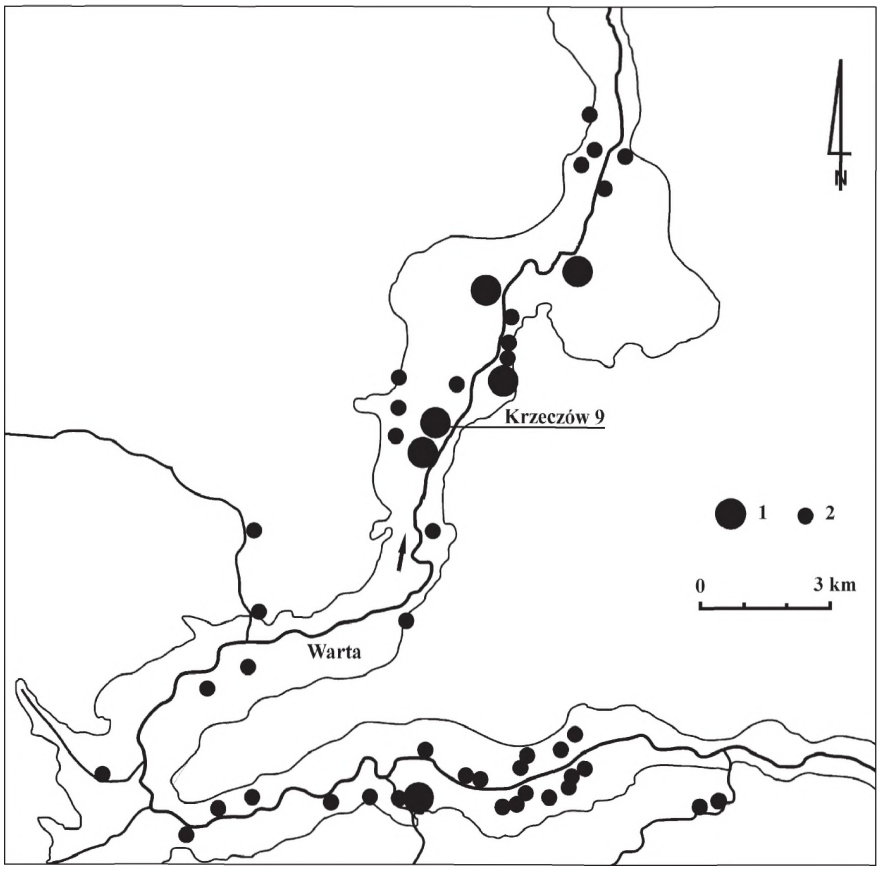


Fig. 1. Area of Krzeczów, Site 9, with: 1 – excavated sites; 2 – sites located during field survey in the region of Zakole Załęczańskie (after Cyrek 1996: 12, with modification).

Ryc. 1. Okolica stanowiska 9 w Krzeczowie: 1 – stanowiska badane wykopaliskowo; 2 – stanowiska znane z badań powierzchniowych w regionie Zakola Załęczańskiego.

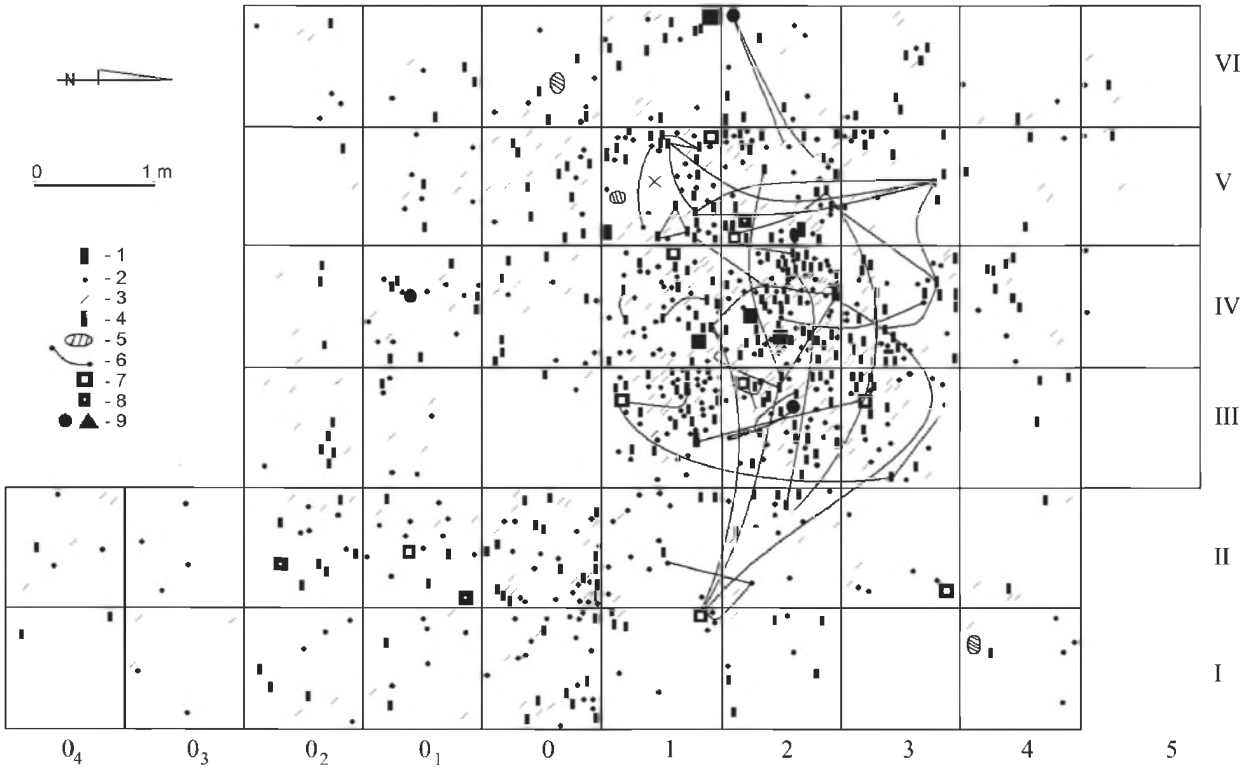


Fig. 2. Spatial distribution of lithics and a network of refitting lines: 1 – blades; 2 – flakes; 3 – unspecified pieces; 4 – retouched blades (prefabricates of tanged points); 5 – flint nodules; 6 – refitting lines; 7 – double platform cores; 8 – single platform cores; 9 – tools.

Ryc. 2. Planigrafia zabytków krzemiennych wraz z siecią składanek: 1 – wióry; 2 – odłupki; 3 – okruchy i odpadki; 4 – wióry retuszowane (półprodukty liściaków); 5 – bryły krzemienia; 6 – linie składanek; 7 – rdzenie dwupiętowe; 8 – rdzenie jednopiętrowe; 9 – narzędzia.

This small and precisely documented flint concentration gave important information about the life and regional features of Late Palaeolithic hunters from this particular area. One of more important aspects was the existence of single platform cores, prefabricates of Ahrensburgian points together with typical Swiderian prismatic cores within the same flint concentration. This particular complex of different finds supports the hypothesis proposed by M. and K. Cyrek which interprets material of these two cultures (Swiderian and Ahrensburgian) into one group. During the first examination some refittings were conducted which indicated homogeneity of material connected to the Late Palaeolithic inhabitants at the site. Moreover, the authors, in the first publication, presented methods of production of Ahrensburgian points and defined a possible number of cores and blades which were exploited at this "point workshop" (CYRKOWIE 1987: 17; CYREK 1996: 129).

However, in this article I would like to discuss on the problems of Jurassic flint economy seen through a comparison of the results of qualitative statistical analysis with a few refitted blocks.

First step: refitting

The site consists of about 1000 flint artefacts, therein: 14 cores, 256 blades, 209 flakes, 47 retouched tools (CYRKOWIE 1987: 10–15). The rest of 471 artefacts includes: unspecified pieces, chunks, natural nodules and all the surface collected material. Most of mentioned artefacts, excluding chunks, were tested with the conjoining method. In 61 of artefact joinings 231 flint pieces were fitted together (PŁAZA 2012: 140).

Most of refittings, in amount of 50, are simple joinings of several blades or flakes. That kind of refitting documented a single procedure and short sequences of debitage. Fortunately, it was possible to reach 11 refitted blocks (PŁAZA 2012: 141) which provided impressively large information on technology, flint economy and behaviour of knappers (FIEDORCZUK 1995: 60).

In the following I would like to make a brief characteristic of three selected blocks.

Example 1 and 2 (**Figs. 3, 4**) are very similar and represent an identical stage of the *chaîne opératoire*. It is the last step in the preparation sequence of the flaking surface and the very early stage of exploitation. The first block includes 17 pieces (**Fig. 3**) and the second consists of 21 artefacts (**Fig. 4**). Both blocks include: partly cortical or fully negative massive blades and flakes which have been detached for shaping a flaking surface, crested blades and several fully negative blades from plain debitage (INIZAN ET AL. 1999: 40). The blocks also consist of several preparation and rejuvenation flakes. Micromorphological features of these two blocks are also very similar. It is possible to observe evidences of use of a direct mineral or soft hammer

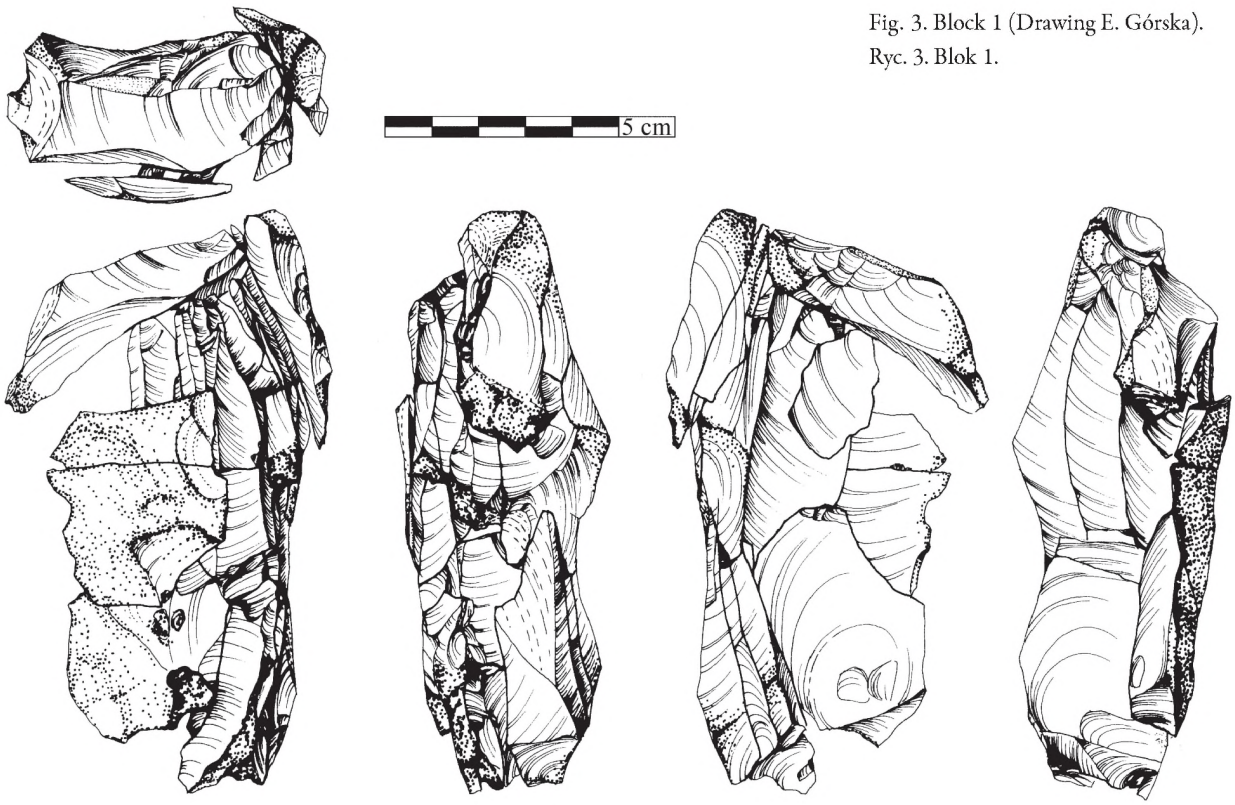


Fig. 3. Block 1 (Drawing E. Górska).
Ryc. 3. Blok 1.

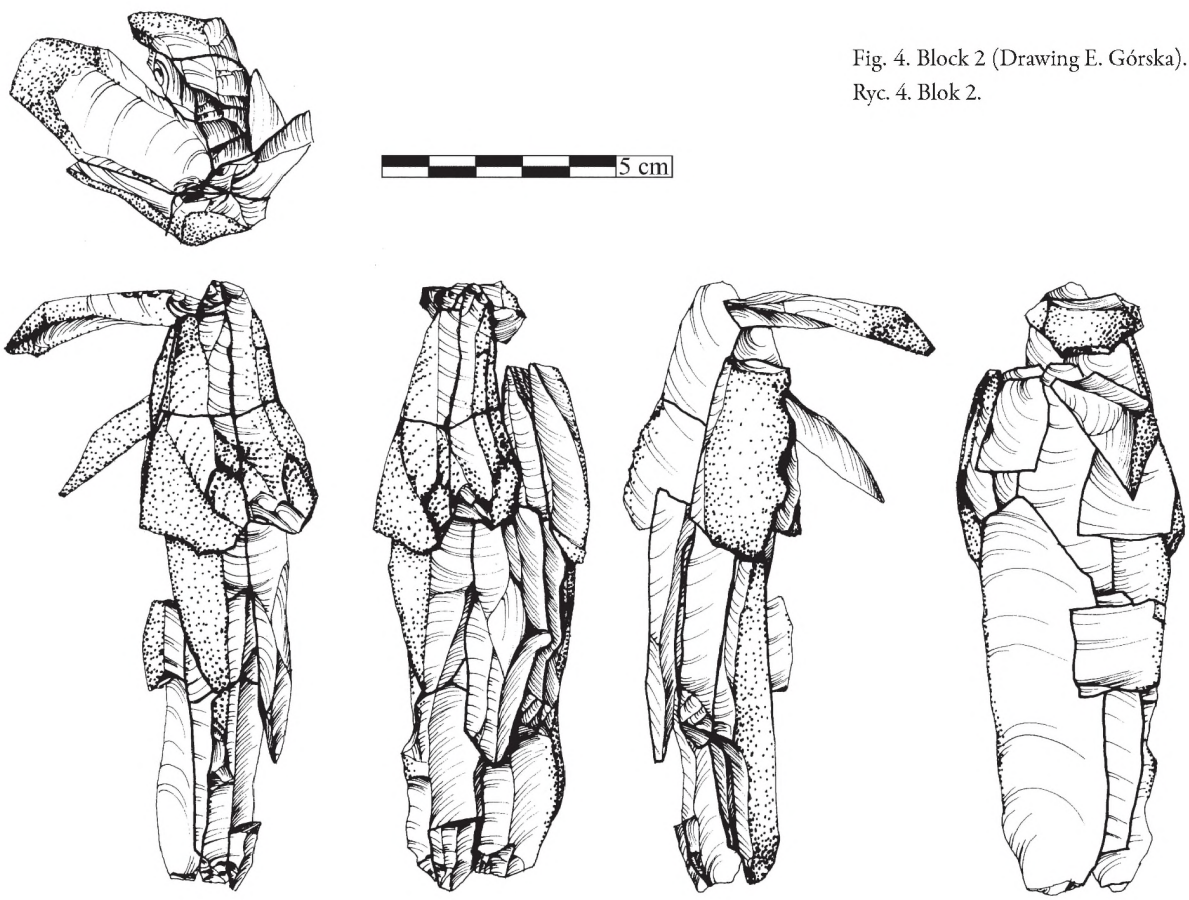


Fig. 4. Block 2 (Drawing E. Górska).
Ryc. 4. Blok 2.

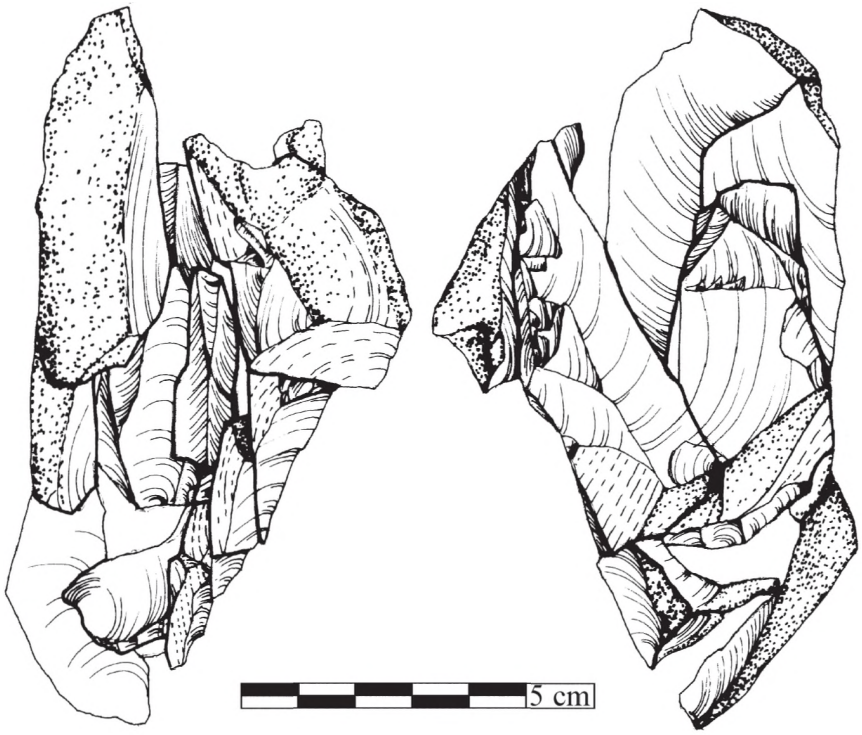
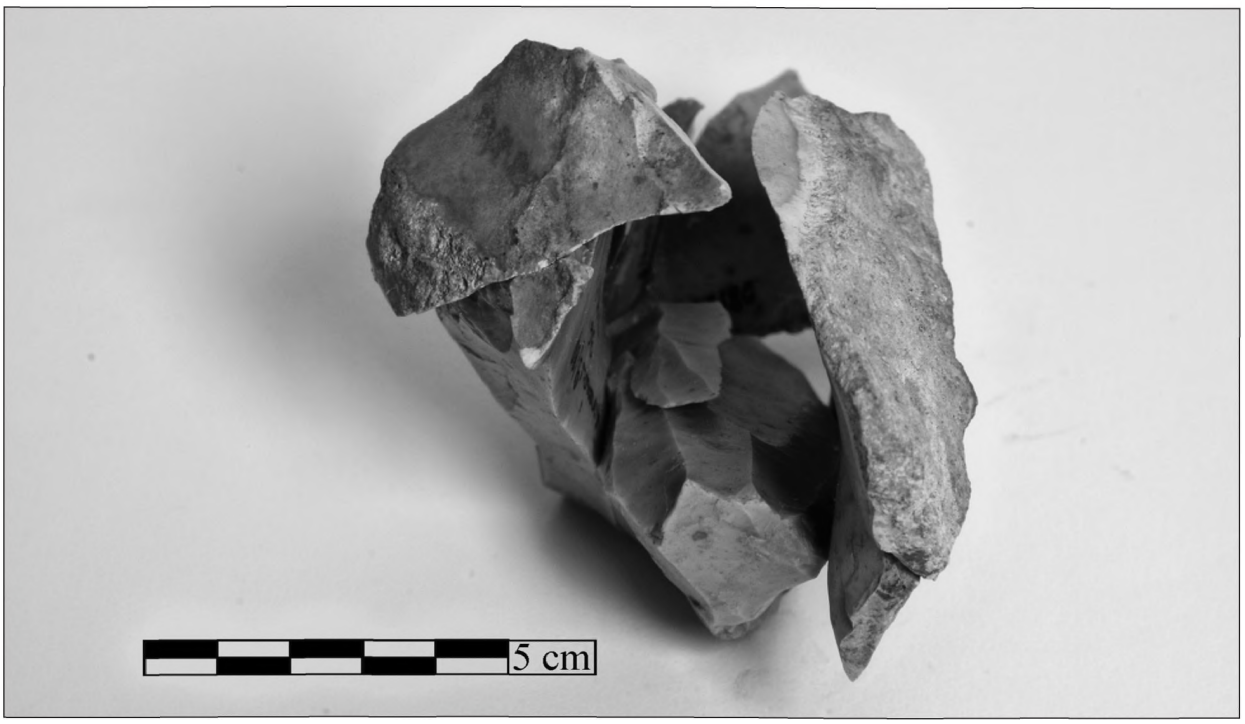


Fig. 5. Block 3 (Drawing E. Górska).
Ryc. 5. Blok 3.

Fig. 6. Block 3 (Photo W. Pohorecki).
Ryc. 6. Blok 3.



technique in more advanced part of these sequences. In the earlier stage there are features of a harder and more direct blow, especially in the case of disposal of irregularities (hinged negatives) registered on the flaking surface.

All the pieces from these two blocks were very distinctive in regard to the colour of the flint. Furthermore, the structure quality is exceptional so I am sure that all artefacts from those nodules were fitted together. I am confident that at this site Palaeolithic people brought with them precores which were already prepared in the nodules collecting area. In the following workshop, Krzeczów 9, a prehistoric knapper carried out the next step of the process which included preparation of a perfect core or production of a core intended for export. It may have been used during a hunting expedition or in the main base camp. It had to satisfy future expectancy, parameters of shape and propor-

tions (Dziewanowski 2006: 150). The last blades detached from this core are more narrow in width, and more proper in thickness (**Fig. 4**). These blades also had more visible evidence of trimming and are trapezoid in their cross-section.

It is possible that both cores were shaped out by the same person at the spot and then taken away outside the workshop space.

Example 3 (**Figs. 5, 6**) represents a different behaviour. The abandoned core was left at the site. The refitted block includes: a residual core, large preparation cortical flakes from both sides of the nodule, two fragments of blades, a small tabular flake and a rejuvenation one. During the study of the material it was not possible to find evidences of several quite massive cortical or semicortical blades from preparation of the flaking surface. However, at the site were prepared: sides of the core by forming a crested back, striking platforms of the core and one or two initial frontal crests. Then plain debitage started (Inizan et al. 1999: 40), with at least two crested blades (**Fig. 7:2,3**). During the blade production striking platforms were rejuvenated several times. At the end of the production sequence the core was abandoned. I identify some blades and fragments of blanks which I could not fit together with the nodule. There were at least 25 blanks, fragments of blanks and flakes and special blades for preparation of the point of impact (Dziewanowski 2006: 154) which were left at the site as discarded material (**Figs. 7, 8**). It was possible to observe delicate trimming and sometimes polishing of the edge on the striking platform and on the blades. Most of

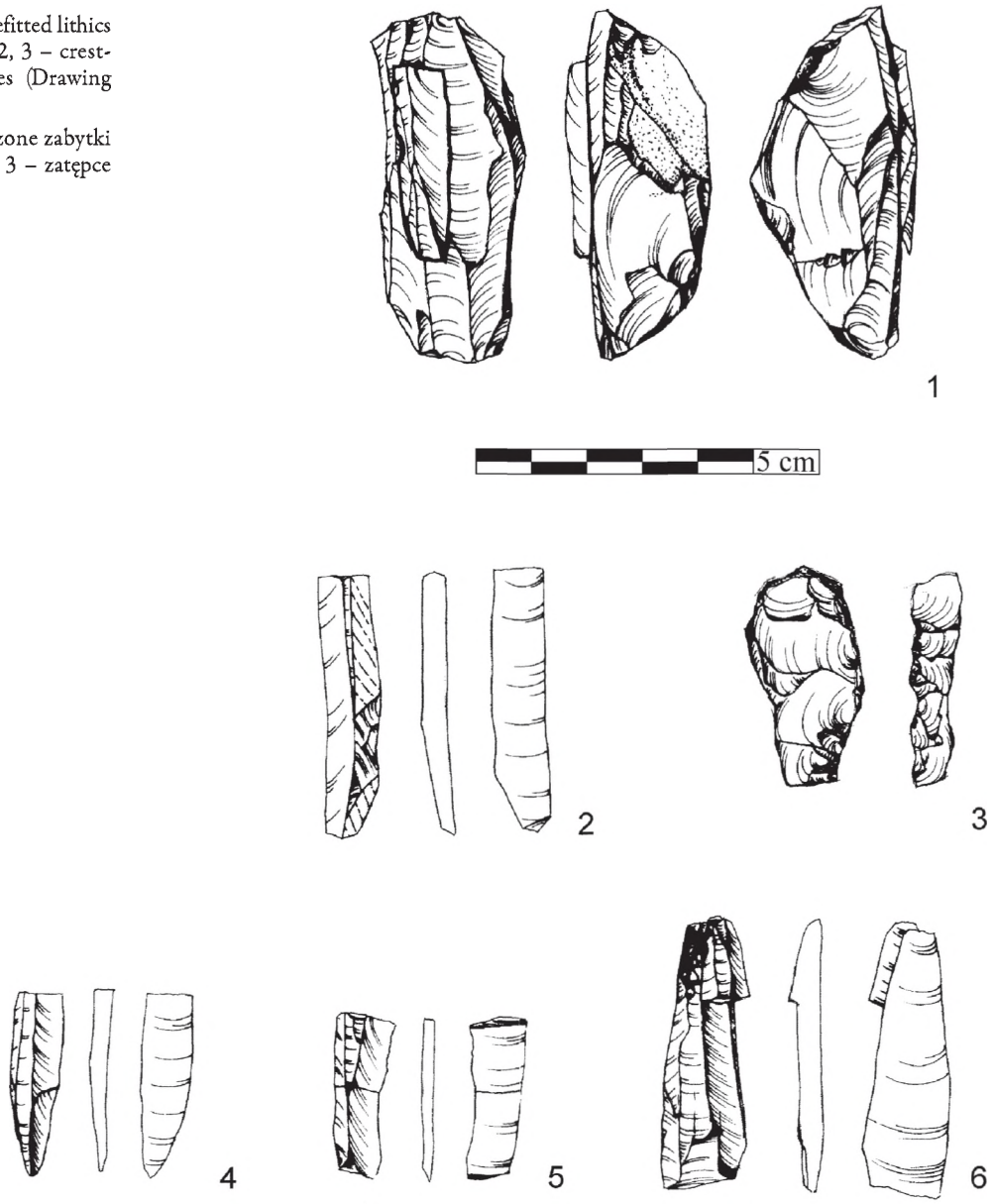


Fig. 7. Refitted and not refitted lithics from Block 3: 1 – core; 2, 3 – crested blades; 4–6 – blades (Drawing E. Górska).

Ryc. 7. Złożone i niezłożone zabytki z bloku 3: 1 – rdzeń; 2, 3 – zatępce i podtępce; 4–6 – wióry.

the flat butts are small and linear in shape. Furthermore, all of not refitted materials have typical technological features associated with the Swiderian method.

It is very difficult to estimate the possible number of selected and exported blades, but there must have been a significant amount of blades which were taken away from the site. We have similar data for other raw materials like chocolate flint (Fiedorczuk 1995: 59–69; 2006) and just a hypothesis about Jurassic flint from the Zakole area (Klimek 2006: 106–108). Finally it is still necessary to make detailed studies in refitting containing material from other kinds of sites, not only from the isolated workshop.

Second step: bi-economy of flint material

So far two different ways of flint economy can be tested together with a detailed comparison of measurements of some exploited nodules.

Precore 1 (**Fig. 3**) had a length of 12.5 cm when it was brought to the workshop. The estimated size of the "exported" core after the preparation procedure is 9.8 cm. This measurement indicates that this core was big enough for the production of long blades which were processed into points or tools.

Precore 2 (**Fig. 4**) was brought to the site at the same stage as Core 1. Its length was at least 13.6 cm. It was probably exported from the site when it had a length of 10.5 cm.

The length of Core 3 (**Figs. 5, 6**) at the beginning of exploitation could be estimated at around 10 to 10.5 cm, and at the end of the debitage stage the residual core had a length of 6 cm (**Fig. 7:1**). The first measurement is similar to the sizes of the two previous cores which were exported from the presented site. This nodule was probably shaped at another workshop and arrived to the Krzeczów, Site 9 as an average core, which could be used for a blade debitage. It is certain that in other Final Palaeolithic sites it would be possible to find a refitted block including several quite massive preparation blades with rejuvenation flakes, which may have originated from the striking platform preparation of Core 3. This also indicates the mobility pattern of the Palaeolithic hunters and their flint material.

This aspect could be verified with a detailed study of other lithics from the site. In my opinion most of the cores from Krzeczów 9 were brought to the site as precores. Here we can observe the use and mending of particular cores, which is very similar to the production sequences observed on Core 3. Most of the cores were abandoned, and their measurements were not less than 5 cm. This observation supports a maximum size of the abandoned core between 6 and 5 cm which was the lowest possible value for a continuous blade production.

We can also try to characterise the shape of Jurassic flint nodules exploited at our workshop. It seems that all three described pieces were rather oval in shape and quite narrow. Shorter sides of the stone were used for a striking platform. On one wider and longer side, the common flaking surface was placed.

Interesting is also the lack of 2 or 3 massive preparation semicortical blades from Precores 1 and 2 (**Figs. 3, 4**). We did not find them at the site so they were probably selected and then worked into tools. Frequently in such a situation artefacts were treated as casual workshop tools and were discarded after short usage (Fiedorczuk 1995: 61). At Krzeczów 9 we can observe a totally different situation. Raw blades or tools were probably used somewhere else outside this workshop.

Materials from the site of Krzeczów 9 are very similar to those from other well known sites. On many of them the refitting method confirmed the circulation of flints and thus the Palaeolithic inhabitants. A close example is offered by the discovery from Gojść, Site I/81 from where A. Klimek (2006: 105–126) presented materials from an excavation directed by B. Ginter (1999: 164–168).

Unfortunately at this huge site (14 835 flint artefacts) there were not too many artefacts to be refitted. As the author wrote "... great part of blades must have been moved outside the workshop" (Klimek 2006: 109). This suggests the possibility that at Gojść we could identify an identical way of preparation and exploitation to Krzeczów 9. This could be another proof for probable circulation of precores, cores, tools and people inside and outside their living area.

Long or short distance mobility?

Chocolate flint is famous for its long distance exchange (300–400 km, even over 700 km) (Fiedorczuk 1995: 59–69; Sulgostowska 2005: 64–65). Due to the important survey made by Jan Fiedorczuk (2006), a distinctive camp organisation connected with chocolate flint was discovered. However, the Jurassic flint distribution did not provide clear evidence of such a long distance mobility. Of course we know some cores, blades and points from that kind of Jurassic flint from the middle part of Poland (Niesiołowska-Śreniowska et al. 2011: 76; Sobkowiak-Tabaka 2011: 130), although we still need to conduct some new surveys in that area.

Worked materials from Krzeczów 9 together with refitted blocks could confirm the short distance exchange within one huge camp site/workshop similar to Kochlew 1 (Cyrek 1996: 59–71) or Gojść I/81 (Ginter 1999: 164–168; Klimek 2006: 105–126). On the other hand it could also show microregional movements proving seasonal (summer or winter) migration in or outside the study area along the rivers. It could represent short staying of a group of hunters searching for flints and/or for big game.

So far it has been difficult to distinguish them. For now both hypotheses of mobility could be true.

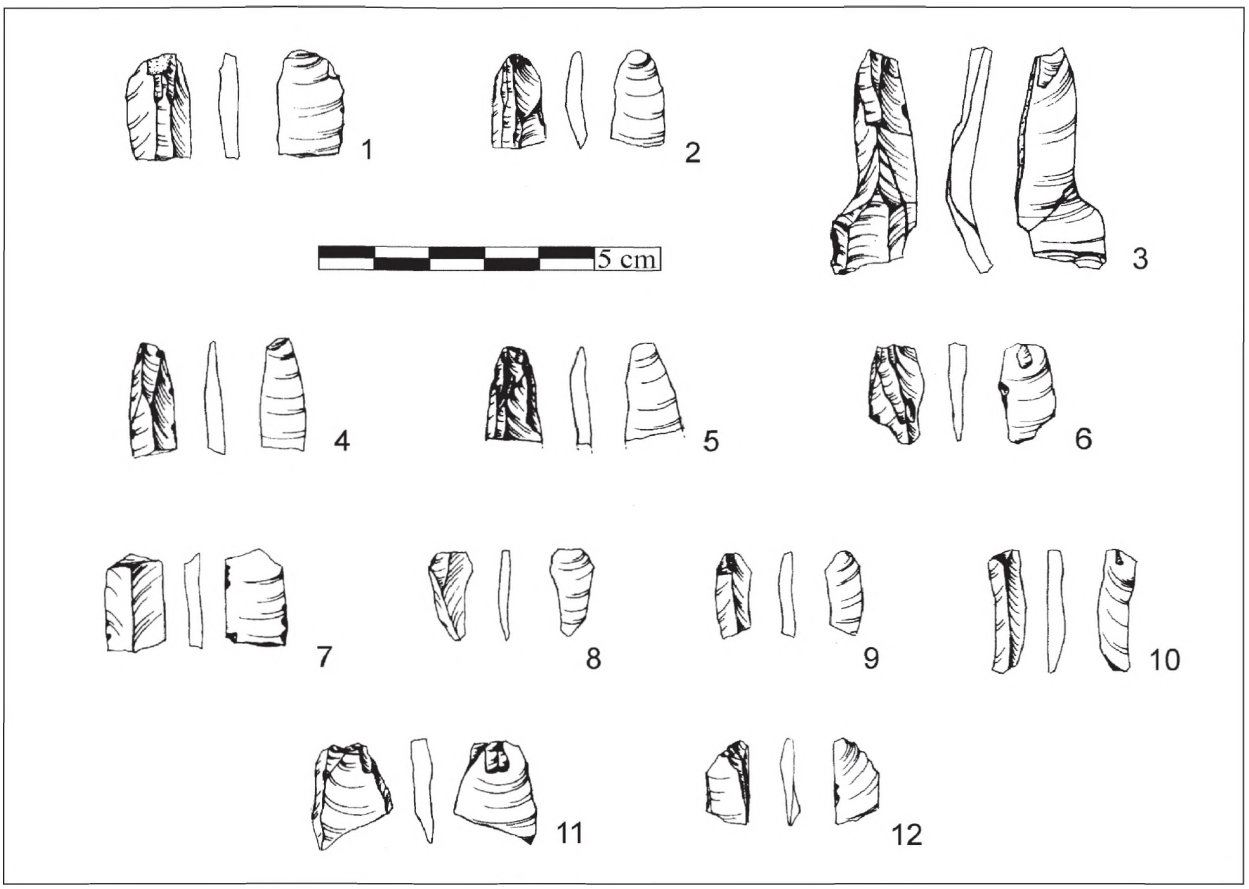


Fig. 8. Not refitted lithics from Block 3: 1–5, 7 – fragments of blades; 6, 8–10, 12 – blades or flakes for the preparation of the point of impact; 11 – rejuvenation flake (Drawing E. Górska).

Ryc. 8. Niezłożone zabytki z bloku 3: 1–5, 7 – fragmenty wiórów; 6, 8–10, 12 – wióry i odłupki związane z przygotowaniem miejsca pod przyłożenie siły; 11 – świeżak.

Conclusion

In this article I have tried to discuss some aspects of Late Palaeolithic flint and people mobility. I have argued that it is highly probable that some materials approached the workshop at the Krzeczów, Site 9 as cores and they were further exploited until they were exhausted and finally discarded. Other nodules were brought to the site as precores and just some procedures were carried out at this workshop. In these cases the only process I registered was shaping of the flaking surface, which was made for the removal of irregularities at that area of the cores. Afterwards cores prepared like that were exported further to other sites. Together with these cores some number of blades and tools were moved.

Another aspect which could be discussed after the refitting procedure is a homogeneity of this site.

If the Krzeczów, Site 9 represents a single occupation episode (Fiedorczuk 2006: 157–159) then the last knapped cores were two examples prepared for the future and further use outside the workshop (**Figs. 3, 4**). This observation is confirmed by the lack of some preparation blades which should rather stay at the workshop. They were probably worked into tools and then taken away with cores. We could also suppose that at this site more than one person was knapping and that explains "knapping manner" diversity. However, we could interpret this site as an accumulation of at least two episodes. One episode could be connected with all cores which were abandoned at the site and the other with "shaped out cores" which were exported.

Despite that the Krzeczów, Site 9 contained a very limited flint assemblage, many other aspects of the technology and techniques could still be discussed.

Acknowledgement

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Wymiana krzemieni w świetle zastosowania metody składanek. Przykład ze stanowiska schyłkowopaleolitycznego nr 9 w Krzeczowie, z rejonu Zakola Załęczańskiego

W artykule zaprezentowano wybrane aspekty cyrkulacji krzemieni w oparciu o wyniki metody składanek, zastosowanej w przypadku materiałów krzemiennych ze stanowiska nr 9 w Krzeczowie, z rejonu Zakola Załęczańskiego nad Wartą (**Ryc. 1**).

Stanowisko 9 w Krzeczowie było badane w 1981 roku przez Krzysztofa i Marię Cyrek z Muzeum Archeologicznego i Etnograficznego w Łodzi. Na stanowisku, z obszaru 50 m^2, pozyskano prawie 1000 zabytków krzemiennych, które tworzyły niewielką koncentrację (**Ryc. 2**) (Cyrkowie 1987: 5–7).

W 2006 roku autor podjął próbę kompleksowego składania tego niewielkiego inwentarza. Uzyskane rezultaty dały asumpt do podjęcia dyskusji na szereg tematów, w tym np. kwestie pozyskiwania, wytwarzania i przemieszczania się obłupni, rdzeni oraz półsurowca (Fiedorczuk 1995).

Uzyskane bloki (**Ryc. 3–6**) oraz materiały niezłożone z bloku nr 3 (**Ryc. 7, 8**) pozwoliły ustalić, w jakiej postaci krzemienie trafiły na omawiane stanowisko. W dwóch pierwszych przypadkach (bloki 1 i 2) były to obłupnie o zbliżonych parametrach, które następnie zostały doprowadzone do podobnego etapu, tzn. rdzenia przygotowanego do właściwej eksploatacji. W trakcie eksploracji stanowiska nie pozyskano rdzeni szczątkowych z żadnego z tych bloków, co wskazuje, że zostały one wyniesione poza teren objęty badaniami. Wydaje się, że trzeci blok znalazł się w obrębie stanowiska właśnie na etapie przygotowanego rdzenia, bezpośrednio przed rozpoczęciem właściwej jego eksploatacji. Uzyskana składanka, tzn. blok 3 (**Ryc. 5, 6**), oraz dopasowany surowcowo i technologicznie półsurowiec i formy techniczne (**Ryc. 7, 8**) wskazują na pełne wyeksploatowanie rdzenia, aż do porzucenia jego formy szczątkowej (**Ryc. 7:1**) w obrębie pracowni. Co ważne, jak pokazują wyniki składania, poza teren objęty badaniami wyniesiono także większość wiórów (**Ryc. 6**).

Szereg kwestii pozostaje otwartych, np. ile osób łupało krzemienie na stanowisku? Czy większość zabytków ze stanowiska reprezentuje pojedyncze zdarzenie, związane z zaprawieniem dwóch obłupni i eksploatacją kilku rdzeni wcześniej przygotowanych w innym obozowisku? Czy może jednak każdy z rdzeni reprezentuje osobne, niezależne zdarzenie, których ślady zalegają razem, tworząc typową dla stanowisk piaskowych „mieszaninę"? Kwestii tych nie można na obecnym etapie badań jednoznacznie rozstrzygnąć.