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Witold Migal[1]

OBVIOUS NON-OBVIOUSNESS. BIFACIAL SICKLES OF BANDED FLINT

ABSTRACT

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The article presents results of refittings of two half-products of bifacial sickles made from banded flint. These items are typical for the Mierzanowice culture but usually had been made from different kind of raw material. Banded flint was extracted in the Borownia mine and used mainly for the production of bifacial axes. Nine kilometers away from site is Ożarów where production was focused on sickles made from Turonian flint. Banded flint is very difficult to work with and is unlikely to be suitable for the production of thin bifaces. To deal with that and make more elaborate product such as sickles, the flintknappers in Borownia used only a certain part of raw material just underneath the cortex layer. Although the presented sickles seem to by something extraordinary when it comes to selection of raw material they don't contradict the relation between the physical properties of flints and the types of tools known from Mierzanowice culture.

Keywords: Early Bronze Age, Mierzanowice culture, flint technology, bifacial sickles, banded flint, refitting flint

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1 State Archaeological Museum in Warsaw, Długa 52, 00-241 Warsaw, Poland; awmigal@gmail.com; ORCID: 0000-0002-5803-5965

INTRODUCTION

In 2022, over twenty years have passed since Jerzy Libera published a work summarizing the knowledge related to the production of bifacial forms in Poland and Western Ukraine (Libera 2001). Although some interesting works related to the topic have been published since then (*e.g.*, Czebreszuk and Kozłowska-Skoczka 2008; Frieman and Ericsen ed. 2015), most of the conclusions from Jerzy Libera's work still hold. When assessing the current situation, it can be stated that there is a return to an interest in the issues of Early Bronze Age bifacial production studies. An example is both the monograph devoted to the mines and workshops of bifacial sickles in Ożarów (Brzeziński 2020) and the publication of site in Czerniczyn (Hyrchała 2017).

In recent years, the mines in Borownia have been subjected to several reconnaissance investigations (*cf.* Mieszkowski *et al.* 2014; Lech 2020; *cf.* Budziszewski 1980). An extremely important project was to clarify the chronology of banded flint mining in the area of the site. The goals, history and assumptions of these studies have recently been exhaustively presented by Jacek Lech (2020). These works, subordinated to the tasks related to entering the mines in Borownia into the UNESCO World Heritage List, had various goals.

Fig. 1. Borownia. The flint workshop in Trench I.
This is the location of the production of axe blades. In the lower part of the picture, the filling of the mining shaft with limestone rubble is visible. In the upper part of the picture is a cross section of the mining heap with a layer of flint waste. Among the waste here, the two refitted sickles were found. Photo by E. Marek

First of all, it was about specifying the chronology of flint exploitation and the cultural attribution of the workshop remains. The result of the research was the determination of the exploitation period as having taken place between 2300 and 1600/1500 BCE), *i.e.,* for the duration of the Mierzanowice culture (Lech 2020, 226-228). At present, it seems that the entire area of the exploitation field was related to the activity of the Mierzanowice population. However an episode related to the Funnel Beaker Culture, the traces of which were found in the fields surrounding the mines (Lech 2020, 231; Zalewski and Borkowski 1996), should not be ruled out.

The opportunity to write the following text was the rescue excavations carried out in the summer of 2020 by the company "Arkadia", and related to the renovation of the local road 0678T in Ruda Kościelna, Ćmielów commune, turning it into an asphalt-surfaced road. This passed almost crosswise through the complex of mines called in the archaeological literature "Borownia mine" (AZP 84-70/18). Without going into the discussions related to the purposefulness and circumstances of archaeological research, suffice to say that at present the flint collection obtained by researchers are being studied by the writer of these words.

According to the research program, the trench was 60 meters long and 5 meters wide marked out linearly along the district road (Marek and Wasowski 2020). It cut across the entire mining field. The remains of at least six mines and adjacent flint workshops were exposed. Two mining features related to the extraction of banded flint were partially examined. In addition, the remains of two more mining shafts and at least three flint workshops were uncovered and explored (Fig. 1). In one of the flint workshops located under the limestone heaps (section W14 workshop 1, Marek and Wąsowski 2020), the two items that are the subject of this analysis were found. In total, about 6,200 artefacts were acquired, including 407 half-products of axes. These materials are currently being analyzed.

ARTEFACTS

The results from previous research have shown that in the Małopolska Upland there was a clear connection between the type of tools found in burials of the Mierzanowice culture and the raw material from which they were made (Bąbel 2013a, 122, 123). Sickles were most often made of Ożarów flint, axe blades of banded flint, and heart-shaped arrow points of chocolate flint. In some graves (Bąbel 2013b), single tools made of chocolate (sickle) and Świeciechów (axe) flint were found. Nevertheless, the correlation between raw material and tool types is conspicuous. Each of these varieties of raw material seems predisposed to produce a particular type of tool:

– Flint from Ożarów appeared in large nodules, from which massive flakes could be easily detached and then process into bifacial sickles. This flint was homogeneous and cleavable, which facilitated the processing of a skilled craftsman (Brzeziński 2020).

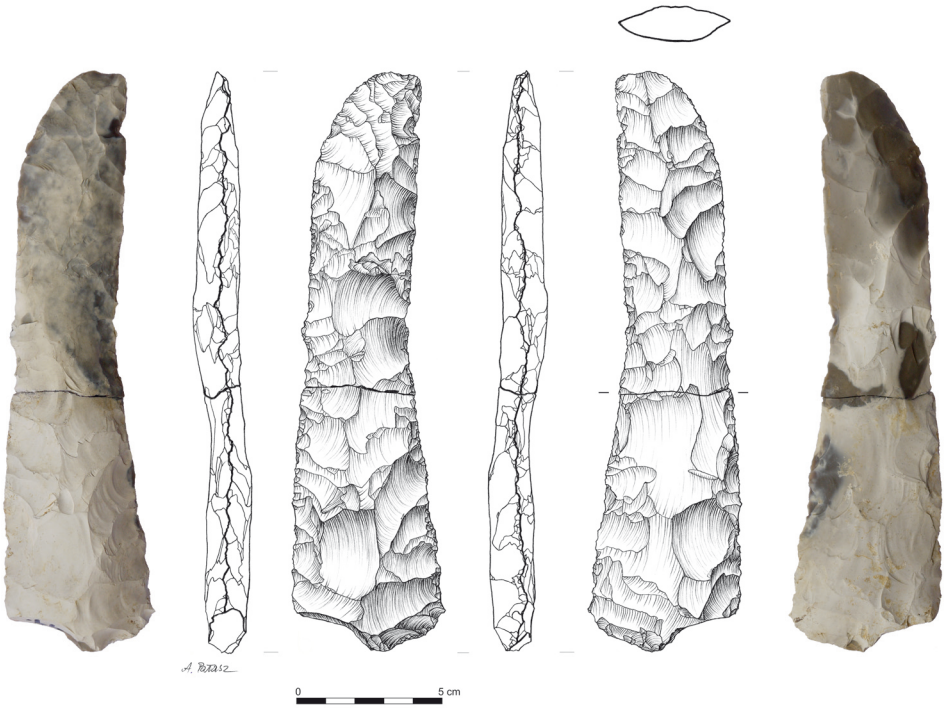

Fig. 2. Borownia. Refitting of almost finished sickle of banded flint.
The form was broken during the final thinning of the item as the result of a mistake.
Illustrated by A. Pałasz

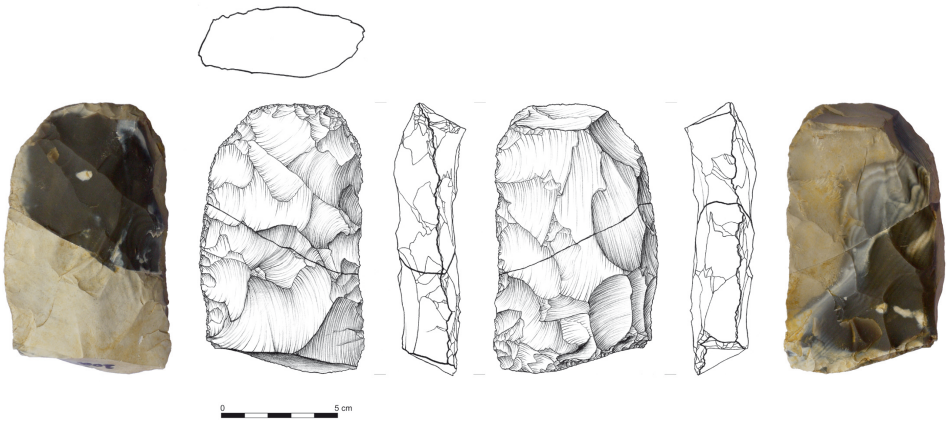

Fig. 3. Borownia. Refitting of a broken sickle preform of banded flint.
On one of the faces, the inner part of the flint with no bands was removed. Illustrated by A. Pałasz

– Chocolate flint, present in smaller chunks or larger, but cracked concretions, due to its excellent cleavage and fine crystals, was perfect for making tools with sharp edges, such as blade knives or arrowheads.

– Banded flint, very difficult to split, seemed to be ideal for making axes resistant to cracks during use (Budziszewski 1991; Bąbel 2013a; 2013b).

The presented short text is devoted to considerations on two refittings of bifacial sickles.

The old collection from Borownia that was obtained from the surface during the interwar period consists of advanced half-products of various bifacial axes. These forms date to the Early Bronze Age and are associated with the Mierzanowice culture (Budziszewski and Michniak 1983). There are also known bifacial (or semi-triangular in cross-section) mining tools called pickaxes (Krakowska 1996). So far, no mention has been made of the remains of the making of bifacial sickles from banded flint. Meanwhile, in both cases described below, we are without doubt dealing with half-products of just such tools. Both of them were found in the workshop within the layer of waste products where most of other preforms are bifacial axes known to us from the graves of the Mierzanowice culture. The first type were massive, quite thick specimens with a cushion-like cross-section and an ellipse-like shape (see Bąbel 2013b, fig. 56). The second type were flat smaller axes that divide into ellipsoidal and sub-triangular ones (Bąbel 2013b, fig. 122, 245).

The first of the items presented here is a bifacial sickle consisting of two parts. Its dimensions: length 198.7 mm, width at the base 50.8 mm, and at the top 34.1 mm (Fig. 2). This gives a thickness to width ratio of 1: 3.5 in the lower part and 1: 2 in the upper part. This specimen is half transversely cracked, shows advanced treatment and is almost completely finished. It is covered with careful, surface retouching and has no natural and cortical areas. The shape of the half-product resembles a similar one, known from the cemeteries in Mierzanowice and Wojciechowice (Serwatka 2020). The analysed form was damaged during the process of final thinning of the surface with larger flakes. This is well shown in the illustration. The flintknapper started to work from the base with three flakes, now visible in the form of negatives. During the next stage, the specimen broke and was abandoned in this condition on the site. Observing the profile of the half-product, we can easily see its "helical" shape, which has not been improved. This specimen can definitely be classified as a product of the Mierzanowice culture (Libera 2001, 57; Bąbel 2013b).

The second refitting is a damaged semi-finished sickle from an earlier processing stage. It was possible to find only two elements forming the apex fragment (Fig. 3). This specimen can be distinguished from the half-products of axes from the same workshop, despite the rather preliminary stage of processing. This is mainly evidenced by the asymmetry of the specimen, typical for the Mierzanowice sickles, already visible in the early stages of shaping (Grużdź 2020). Although many of the early bronze axes have an asymmetrical shape, their edges are never concave, as is the case with sickle half-products known to us, for example, from the workshops in Ożarów (*cf.* Bąbel 2013b; Grużdź 2020). Judging by the nature of the fracture surfaces, the specimen was damaged by a phenomenon known

as “end shock”. It’s a wrong hit, too close to one of the endings. As a result, it causes a strong vibration that sometimes separates the specimen into several parts - as we can see in the above case (Flintknapping Vocabulary 2022). The specimen has a length of 108.1 mm and a width of 61.4 to 72.6 mm. With a thickness of 22.7 mm, this gives a thickness to width ratio of about 1:3.

RAW MATERIAL AND PROCESSING TECHNIQUE

Both analyzed sickles were made of flint extracted from the mines in Borownia. The nature of this raw material differs significantly from that known to us from Krzemionki or from the modern quarries in Śródborze. The features of banded flints from various exposures and exploitation sites have been quite well described in the literature by Michniak and Budziszewski (1986). It is worth mentioning at this point that the authors, rightly observed the specific nature of the raw material from Borownia. The features that are visible at first glance are:

– a light beige subcortical part up to 15 millimeters thick much thicker than in the case of other banded flints, (Fig. 4), which is easy to work with,

– bands in the form of thick, twisted, non-parallel streaks (Fig. 4), more resistant and hard to work with during reduction

– core made of non-banded homogeneous material, as it turns out, occupying even 70% of the volume (Fig. 4), which is very hard to knap.

These features correspond to the physical properties that determine the susceptibility to processing with flint techniques (Migal 2020). The non-banded core of the nodule is extremely difficult to process and its deliberate reduction is visible in the materials from the workshop. This was done in such a way that in the half-products of large axes, the mass from the non-banded flint was residual, preferably located in the near-cutting edge part (Michniak and Budziszewski 1986). This provided the additional advantage of greater fracture resistance of the finished product (an axe blade or a mining pickaxe). This effect was also noticed earlier by Michniak and Budziszewski. Although the most common part of flint to work with was banded part. It was achieved by knapping large flakes that were later shaped into small axes.

From the above description of production in flint workshops, an internally contradictory picture emerges. The raw material from Borownia appears to be extremely difficult to process (and it is indeed so) due to the high content of a non-banded, homogeneous, pale concretion core. At the same time, to make bifacial, slender sickles with a rather thin cross-section and good proportions, a flint with different properties was needed. It had to be homogeneous and easily cleavable (brittle). Thus, the dark, banded layer was too hard to produce thinner and slender bifacial products.

Fig. 4. Borownia. Two varieties of flint from the mine.
The first variant (on the bottom of picture) was flint with no banded core and with a thick grey layer below the cortex – the first sickle preform was produced from this kind of raw material. The second variant (upper part of the picture) has a lot of grey bands that are difficult to knap – the second sickle was produced from this kind of material. Illustrated by A. Pałasz

When we look at both half-products, we can easily see that the first sickle is made entirely of a subcortical, light-beige layer surrounding the concretion. On the other hand, the second – from the subcortex and dark banded parts, intensively reduced on one of the surfaces so that only the part from the more cleavable subcortex was subjected to further processing. The reduction of bifacial tools from less cleavable raw material is quite obvious. Working in this way, the craftsman wanted to deal with the raw material that could be processed as best as possible. There was no such need in the workshops in Ożarów, known to us, where bifacial sickles were made – there was a homogeneous flint of good quality (Grużdź 2020).

In the workshop from which the objects in question come, an interesting way of getting rid of fragments difficult for further processing was used in the production of axes. In the first phase of processing the cushion axe, large flakes reducing the non-banded mass were knapped from both ends of the specimen. At this stage, we usually cannot yet determine where the working edge was planned. Such a procedure was not used in the case of the sickles from Ożarów (Grużdź 2020). The second of the specimens (despite its initial processing stage) also shows that the reduction of the form was performed from both edges to both sides, as in the workshops in Ożarów. This fact seems to confirm that the second item is a sickle half-product. An interesting technological observation is that the first of the sickles does not have places well prepared with smaller flakes and grinding places for applying force (Migal 2020). Perhaps this is why it was difficult for flintknappers of the Mierzanowice culture to achieve ready-made products with a high ratio of thickness to width. This appears later, for example, in the case of Czerniczyn-Torczyn daggers (Libera 2001), where this ratio reaches 1:8.

CONCLUSIONS AND DISCUSSION

The presence of sickle half-products in the workshops discovered in Borownia is a big surprise. The general picture of the flint-making of the Mierzanowice culture shows the preferences of raw material related to the production of individual flint tools. Axes were usually made of banded flint, arrowheads and flake knives were made of chocolate flint, and sickles were made of Ożarów flint (Budziszewski 1991).

Half-products of 407 axes come from the examined bifacial axe workshop. The two refittings of sickles are therefore an interesting example of mining and processing habits. They show that:

1. Both the exploitation of banded flint in Borownia and Ożarów were carried out by the same group of specialized miners – flintknappers,

2. They were very well versed in the physical properties of the raw materials, choosing the appropriate varieties and even parts of one nodule for different processing purposes; easily cleavable subcortex for sickles and less cleavable for axes,

3. They used a flexible strategy when it comes to choosing the target form. That is, they were ready to change manufacturing decisions according to the properties of the raw material.

4. The sickles left the workshops in ready form. This is evidenced by the damage to one of the products in the last phase of thinning.

5. Edges and striking platforms were not as well prepared as in later bifacial products, for example, Czerniczyn-Torczyn type daggers. Therefore, the sickles were more thick in cross-section.

I hope that the further studies of the material from Borownia will bring further interesting results related to the processing of flint in the Early Bronze Age in Poland. The pres-

ence of banded flint sickles together with half-products of bifacial axes contradicts the notion of so-called "assortment specialization". It is a hypothesis that assumes a very narrow specialization of the flintknappers groups limited to the type of product and the raw material from which it was made (Bąbel 2013a, 122-123 and 227).

The discovery of two bifacial sickles in the axe workshops of Borownia does not change the image of Early Bronze Age flint-making in Małopolska. It is only an interesting aspect of production process. It also shows the way the raw material was perceived by flint workers of the Mierzanowice culture. It proves that both the tool types – sickles and axes were made by the same craftsmen. The relationships between the raw materials and the types of tools visible in the funerary complexes depended on the physical properties of individual types of flints. Therefore, there was probably no monopoly on access to the flint outcrops within that time period.

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