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## A FLINT DAGGER FROM BRZOZA, NOWA WIEŚ WIELKA COM., BYDGOSZCZ DIST., KUYAVIAN-POMERANIAN VOIVODESHIP

### ABSTRACT

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At the beginning of the 1980s, a single find of a flint dagger was made in Brzoza (northern Kuyavia, Poland). The dagger was investigated in terms of raw material profile, typological, technological and use-wear analyses. It was established that it was made of Scandinavian Cretaceous flint and may be classified into the subtype VIA (acc. Lomborg) or subvariant BBII2a (acc. Libera). The chronology of the dagger tends to be placed towards the end of the Early Bronze Age or the beginning of the Older Bronze Age in Poland (ca 1700-1500 cal BC). By means of use-wear analysis, diversified and well-developed usage traces were recognized on the surface of the dagger. Some of them resulted in an obverse and inverse retouch indicative of secondary treatment.

Here it appears that the dagger from Brzoza may be considered as an import from the western-Baltic production centre. Before deposition, the dagger had also been frequently used as a strike-a-light.

Keywords: flint dagger, Bronze Age, use-wear analysis, strike-a-light, Kuyavia

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## 1. INTRODUCTION

The flint dagger was found accidentally in the early 1980s, as a single find during house-building works in Brzoza, Nowa Wieś Wielka com., Bydgoszcz dist., Kuyavian-Pomeranian Voivodeship (Fig. 1). Presently, the location of its discovery is within a built-up area.

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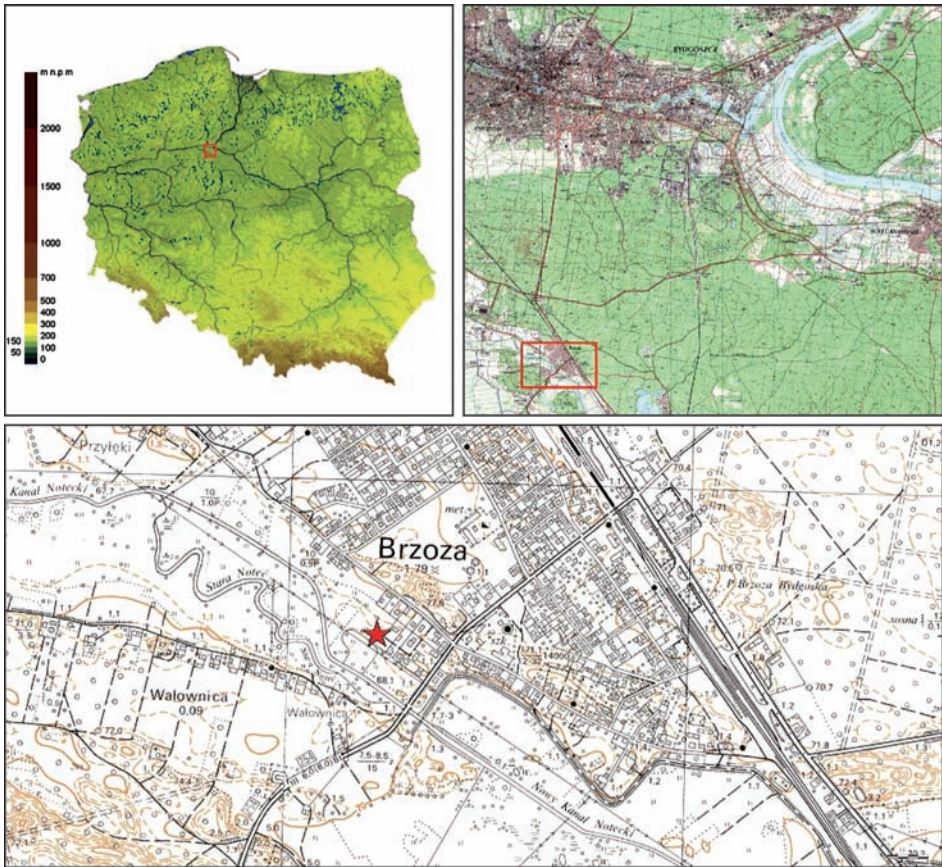
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The dagger was found on the right bank of the Nowonotecki Channel. It is noteworthy that the Nowonotecki Channel was built in the 19<sup>th</sup> century, during long-lasting melioration works carried out in the Upper Noteć Valley. Before 1772 the non-channelled Noteć River flowed from Łabiszyn, through Brzoza, up to Rynarzewo, forming a vast arch and meandering amongst peaty meadows (Woźniak-Hlebionek 2002). At a close distance to the channel, numerous cut-off meanders and oxbows can be encountered, i.a. the Old Noteć River near Brzoza (Fig. 1). Hydrographical conditions of this microregion provide strong premises for further considerations upon the state of preservation of the dagger, resulting from its deposition in wetland.

Flint daggers are occasional finds in the territory of Poland, though their representation in the existing literature should be considered satisfactory. A history of studies on flint daggers from Poland was included in a monograph by J. Libera (2001). Certain topics addressed in this publication were discussed in greater detail by J. Czebreszuk and D. Kozłowska-Skoczka (2008). Catalogues of those artefacts enclose nearly 700 specimens (Libera 2001, 25, 137-152; Czebreszuk and Kozłowska-Skoczka 2008, 44-66). All of them were subject to typological classification, raw material determination, as well as chronological and cultural studies. Moreover, they were generally characterised in terms of the technology of their production, manners of utilisation and social significance in the Late Neolithic and the Early Bronze Age (Libera 2001, 37-42, 101-117, Czebreszuk and Kozłowska-Skoczka 2008, 9-43).

As a result of comparative studies of traditions of bifacial tool production in younger periods of European prehistory, flint daggers from Polish territories were affiliated to two provinces: the Volhynian-Little Poland zone (the so-called zone A acc. to J. Libera 2001) and the western-Baltic zone (zone B). The borderline between these two provinces is basically consistent with the boundary between the basins of the Vistula and Oder Rivers. The western-Baltic zone encloses Pomerania as well (see also: Wyszomirski 1974; Wojciechowski 1976; Czebreszuk and Kozłowska-Skoczka 2008). In the Volhynian-Little Poland province production of daggers was based on the Volhynian flint, while in the western-Baltic zone high-quality siliceous rocks were used, extracted in northern Jutland, Danish Islands, Mecklenburg and Rügen Island, and most likely, in the Lower Oder basin (Apel 2001, 31-33, fig. 2.2; Libera 2001, 101-114, fig. 36; Czebreszuk and Kozłowska-Skoczka 2008, 14-19, fig. 3).

Until now, studies on flint daggers from Poland have not included use-wear analysis or examination of residues that preserved on their surface. Such analyses, employing various research methods, have been successfully performed for artefacts in Western Europe (e.g. Barrowclough and Lister 2004; Gijn van 2010, 189-193; 2015). Their results provided an insight into the sequences of operational chains of production and the utilisation of daggers, which gave new premises for further functional and symbolic interpretations. The dagger from Brzoza was subject to use-wear analysis (comp. chapter 4).



**Fig. 1.** Brzoza, Nowa Wieś Wielka com. Location of the dagger discovery.  
Source: <http://mapy.geoportal.gov.pl>, with modifications made by M. Sudol-Procyk



Fig. 2. Brzoza, Nowa Wieś Wielka com. Flint dagger.  
Photo by M. Sudół-Procyk

## 2. TYPOLOGICAL AND TECHNOLOGICAL ANALYSES

A typological analysis of the dagger was based on distinctive markers and a classification system developed by E. Lomborg (1973), employed in studies on Polish finds of this sort since 1976 (Wojciechowski 1976). This system has been commonly used for identification of numerous daggers from the North European Plain and other regions, associated with the western-Baltic zone of the flint dagger production centre (e.g. Wyszomirski 1974; Apel 2001; Gijn van 2010; 2015; Czebreszuk and Kozłowska-Skoczka 2008; Piličiauskas 2010; Zápotocký 2013). The artefact from Brzoza was also classified according to a classification system proposed by J. Libera (2001).

The dagger under scrutiny was shaped in a form consisting of two clearly distinctive parts: a blade and a handle. The blade is lancet-shaped, with a flat, lens-like cross-section. Its width and thickness reach their maximum values in the mid-length of the specimen. The handle is thick and lens-like in its cross-section. Its edges are parallel in general, though one of them is slightly asymmetric in the top view (Fig. 2). The dagger has a total length of 19.3 cm (including the handle length of 8.6 cm, and the blade length amounting to 10.7 cm). Its maximum width accounts for 4 cm (which is also the maximum width of the blade, while the handle width is 2 cm in its mid-length). The tool in question is relatively regular in its longitudinal section, gradually widening from both of its ends. The maximum thickness of both, the blade and the handle amounts to 1.4 cm.

The tool was elaborated by means of bifacial retouch, covering the entirety of both of its sides, dorsal and ventral. The retouch is clearly diversified and multi-stage. On the blade surface there are large, diffuse and flat scars, produced by blows shaping the tool from its edges. The handle was prepared by semi-abrupt or partially stepped retouch. By the edge of the blade there are tiny scars of semi-abrupt, obverse and inverse retouch, slightly resembling denticulated retouch, especially by the tip of the blade. Retouch of the same type is present on fragments of the edge of the handle. These tiny scars on the edges are visibly younger than the large scars covering the surface of the tool, which was also confirmed by the use-wear analysis (see chapter 4).

The only fragment of cortical surface was preserved on the end of the handle – it is also its thickest fragment. This cortical surface is intensively polished and partly destroyed due to the utilisation of the tool (see chapter 4).

Noteworthy is the fact that the dagger blade is transversely broken in two sections: in the tip part and in the two-thirds of its length, though it should be mentioned that the damage occurred after its discovery. The surface of the tool is covered with patina of two different types. In the main it is red patina caused by water, while one of the blade surfaces and fragments of the handle surface are additionally covered with light grey patina induced by oxygen. Thanks to the recent, post-discovery damage, the fractured surface of the specimen could be subject to macroscopic observation in order to determine the raw material it

was made of. The flint used for production of the dagger is dark grey with tiny, light grey intrusions. These intrusions, when observed on the tool surface, are visible as big, irregular dots that slightly faded due to external factors (water and air), and became lighter and matt (Fig. 2). There is no doubt that the dagger was made of the Scandinavian Cretaceous flint, probably from Jutland.

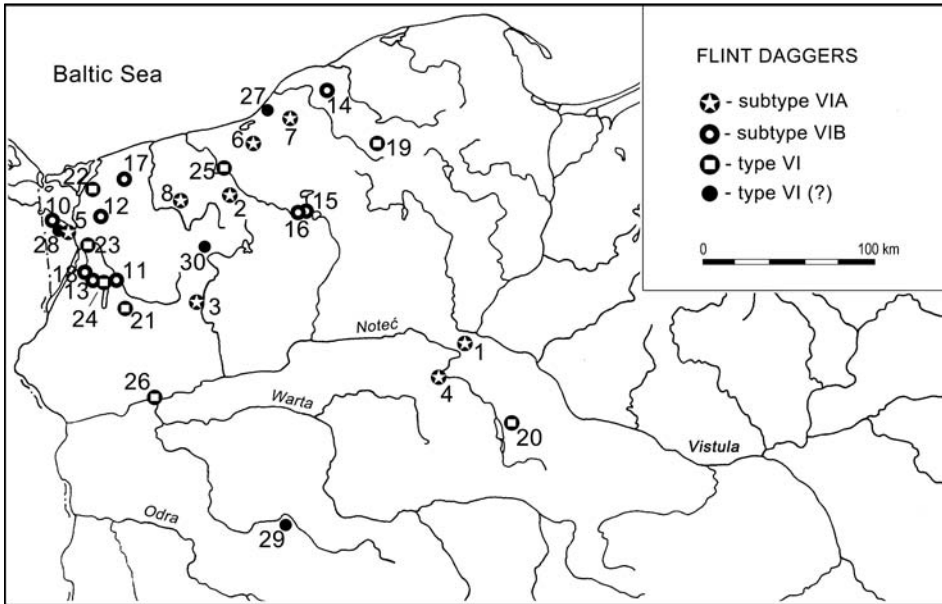
Morphological features of the dagger from Brzoza allowed the authors to classify it to the subtype VIA (Lomborg 1973, 61-63, fig. 40). This is indicated by the handle, oval-shaped in its cross-section and significantly thicker than the blade (Fig. 2). The major features of daggers representing the subtype VI are as follows: 1) lens-like or pointed, oval-shaped cross-section of a blade and a handle, 2) percussion-finished blade, 3) handle with parallel edges 4) specific manner of shaping a handle base, which according to the subtype definition, should not be thicker than its top (Lomborg 1973, 1; Apel 2001, 247-248, fig. 8.8). With regard to the dagger from Brzoza, the latter typological marker is missing. Due to the cortical surface preserved on the handle base, it is the widest and the thickest part of the entire tool (Fig. 2). Moreover, intentionally left cortex disturbed proportions of the dagger form (noticeable also in the shape of the blade), which “broke” the rule of symmetrical shaping of flint daggers (comp. comments: Apel 2001, 231-233).

According to the classification system developed by J. Libera (2001, 25-33), the dagger from Brzoza can be assigned to the group represented by points with well-distinguished shafts and leaf-like tips, with long shafts and lancet-shaped forms, i.e. sub-variant BBII2a. This group encloses artefacts from Polish territories named as “daggers of the Scandinavian type” (Wojciechowski 1976, 75; Libera 2001, 88-89).

### 3. CHRONOLOGICAL AND CULTURAL ANALYSES

A chronology of the find from Brzoza can be determined only in reference to the time-frames of production and utilisation of daggers of the type VI in Scandinavia and adjacent regions. A much more difficult challenge is to establish the local cultural (social) context for the artefact found in northern Kuyavia.

Daggers of the type VI are considered to represent the youngest typological group of such artefacts in Scandinavia. Their relative chronology was established in the early 1900s, placing them within the Early Bronze Age (comp. comments: Apel 2001, 255). These conclusions are still valid (Lomborg 1973, 64; Vandkilde 1996, 159; Apel 2001, 259-262, 293-294, fig. 8.16). A few specimens of this type, found in Denmark and northern Germany, co-occurred within a single archaeological context with bronze objects, such as swords and flanged axes, typical of the Older Bronze Age in Central Europe and Nordic region (Lomborg 1973, 74, ryc. 46-50; Vandkilde 1996, 159; Libera 2001, 89; Czebreszuk and Kozłowska-Skoczka 2008, 24). Daggers of the type VI from the Netherlands are dated to the local



**Fig. 3.** Distribution of daggers of the type VI in Poland (based on: Wojciechowski 1976; Libera 2001; Czebreszuk, Kozłowska-Skoczka 2008; with supplements). Drawn by K. Adamczak  
 Explanations: subtype VIA: 1 – Brzoza, com. Nowa Wieś Wielka, 2 – Czarnowęsy, com. Białogard, 3 – Drawno, com. Drawno, 4 – Młodocin, com. Barcin, 5 – Police, com. Police, 6 – Szarzyno, com. Koszalin, 7 – Smardzewo, com. Sławno, 8 – Starogard, com. Resko; subtype VIB: 10 – Brzózki, com. Nowe Warpno, 11 – Grzędzice, com. Stargard Szczeciński, 12 – Łożnica, com. Przybiernów, 13 – Niedzwiedź, com. Kobylanka, 14 – Pałówko, com. Postomino, 15 – Parsęcko, com. Szczecinek, 16 – Parsęcko, com. Szczecinek, 17 – Stuchowo, com. Świerżno, 18 – Szczecin-Płońia, com. Szczecin; type VI: 19 – Barkocin, com. Kołczygłowy, 20 – Chełmce, com. Kruszwica, 21 – Kolin, com. Dolice, 22 – Koniewo, com. Wolin, 23 – Lubczyna, com. Goleniów, 24 – Miedwiecko, com. Kobylanka, 25 – Rościno, com. Białogard, 26 – Santok, com. Santok; fragments of daggers, probably of the type VI: 27 – Bobolin, com. Darłowo, 28 – Borkowo, com. Police, 29 – Bruszczewo, com. Smigiel, 30 – Zarańsko, com. Drawsko Pomorskie

Middle Bronze Age (comp. Gijn van 2010, 189). In southern Scandinavia, i.e. within the flint dagger production centre at the Baltic Sea, the beginning of the Bronze Age (*Older Bronze Age*, phases IA and IB) is currently dated to a period between 1700 and 1500 cal BC (Vandkilde 1996, 175; fig. 134).

W. Wojciechowski dated daggers of the type VI from Poland within the timeframes starting at the turn of the first and the second period of the Bronze Age, and lasting throughout the second period of this age (Wojciechowski 1976, 69). J. Libera placed daggers of the variant BBII2, enclosing i.a. the type VI by Lomborg, within the IV horizon with points in the western-Baltic zone. This horizon is synchronised with younger phases of the Únětice and the Tumulus cultures in western Poland (Libera 2001, 88-89). J. Czebreszuk and D. Kozłowska-Skoczka withdrawn from determining the chronology of daggers of the

type VI in the context of local, cultural and chronological transformations that took place in Western Pomerania, since none of them was found within a single archaeological context with other well-dated artefacts (Czebreszuk and Kozłowska-Skoczka 2008, 37). The authors mentioned above correlated the general chronology of the type VI with that established for regions located to the north-west of the Lower Oder basin. Similar reasoning should be applied about the find from Brzoza, the general chronology of which can be enclosed within a period between 1700 and 1500 cal BC.

In the territories of Poland, 26 daggers of the type VI have been found (Fig. 3). Nine of them were classified to the subtype VIA, while another nine were counted to the subtype VIB. Other eight specimens were described in general as the type VI (Wojciechowski 1976; Libera 2001; Czebreszuk and Kozłowska-Skoczka 2008). Perhaps, this collection should be complemented with another four artefacts, which due to their fragmentary state of preservation or difficulties in undisputable classification, may be considered to belong to the type VI with a certain dose of probability (Fig. 3).

The artefacts discussed in this paper mainly occurred in Western and Central Pomerania (26 specimens). Another three daggers were discovered in Kuyavia. A fragment of a handle belonging most likely to a dagger of the type VI (comp. Wojciechowski 1976, 90-91, fig. 14:d) was discovered in a fortified settlement (stronghold) of the Bronze Age community (Únětice, Tumulus and Lusatian cultures) in Bruszczewo, in southern Greater Poland. Distribution of daggers of the type VI in Poland revealed a noticeable concentration in the north-western part of the country (Fig. 3). The region of Western Pomerania constituted south-eastern fringes of the western-Baltic dagger production centre in the Late Neolithic and the beginning of the Bronze Age, and it was most probably connected with the latter in terms of genetic and cultural links (comp. comments: Czebreszuk and Kozłowska-Skoczka 2008).

Daggers of the subtype VIA from Poland are exclusively single finds (Table 1). Therefore, they cannot be linked with other prehistoric materials, such as ceramic vessels that can be subject to a certain cultural assessment. Due to this any chronological verification of the artefacts from Poland is hindered. This also concerns the dagger from Brzoza, the chronology of which was established indirectly, based on typological and comparative analyses.

The Early and Older Bronze Age in Kuyavia have become the subject of advanced archaeological studies (Koško 1979; Czebreszuk 1996; 2001; Makarowicz 1998). Field surveys and excavations carried out in this region revealed numerous prehistoric sites dated to those periods. Between 1700 and 1500 cal BC the northern part of Kuyavia could have been occupied by communities of the final phases of the Iwno and Trzciniec cultures. The presence of the Tumulus communities near Bydgoszcz is rather unlikely (see also comments: Woźny 2003, 34-36). "Scandinavian daggers" have never been found in the context of the above-mentioned cultures, which concerns not only Kuyavia but also other regions within their settlement extent. Therefore, it is difficult to point a particular community that actually used the dagger discovered in Brzoza. There is one more possible interpretation that cannot be excluded. The dagger could have been an element of the personal



Table 1. Flint daggers of the type VI acc. to Lomborg in the territories of Poland

No.	Location	Context	Dimensions (cm)	Raw material, patina	Related literature
subtype VIA					
1.	Brzoza, com. Nowa Wieś Wielka	single find (aquatic deposit*?)	length 19.3 width 4	dark grey flint with light intrusions **"water" and "oxygen" patina	-
2.	Czarnowęsy, com. Białogard	single find	-	-	Czebrszuk, Kozłowska-Skoczka 2008, 52, fig. 14:127.
3.	Drawno, com. Drawno	single find	length ca 14 preserved length 7 width 2.5	grey flint with light dots	Libera 2001, 150; Czebrszuk, Kozłowska-Skoczka 2008, 48, fig. 14:128.
4.	Młodocin, com. Barcin	single find	length 13.3 width 2.8	-	Wojciechowski 1976, 89; Libera 2001, 149.
5.	Police, com. Police	single find	length 18.1 width 4.1	light grey glossy flint	Czebrszuk, Kozłowska-Skoczka 2008, 56, fig. 14:129.
6.	Sarzyno, com. Koszalin	single find	length 11.5 width 3.2	grey flint with dark intrusions	Czebrszuk, Kozłowska-Skoczka 2008, 58, fig. 14:130.
7.	Smardzewo site 1, com. Sławno	single find	length 18.5 width 4.1	light grey dotted flint	Wojciechowski 1976, 86; Libera 2001, 149, fig. 14:e; Czebrszuk, Kozłowska-Skoczka 2008, 58, fig. 15:131.
8.	Starogard, com. Resko	single find	length 18.9 width 4.7	-	Czebrszuk, Kozłowska-Skoczka 2008, 59, fig. 15:132.
9.	Unknown locality, Western Pomerania	single find	length 18.6 width 3.1	grey-black glossy flint with light dots	Czebrszuk, Kozłowska-Skoczka 2008, 65, fig. 15:133.
subtype VIIB					
10.	Brzózki, com. Nowe Warpno	single find	length 17 width 3	-	Czebrszuk, Kozłowska-Skoczka 2008, 45-46, fig. 15:134.
11.	Grzędzice, com. Stargard Szeceński	single find	length 15.3 width 3	dark grey and light grey glossy flint with light dots	Libera 2001, 145; Czebrszuk, Kozłowska-Skoczka 2008, 49, fig. 15:135.
12.	Łoźnica, com. Przybiemów	single find	length 9 width 3	grey-black glossy flint with light dots	Czebrszuk, Kozłowska-Skoczka 2008, 52, fig. 15:136.

Table 1 cont. Flint daggers of the type VI acc. to Lomborg in the territories of Poland

No.	Location	Context	Dimensions (cm)	Raw material, patina	Related literature
13.	Niedźwiedź, com. Kobylanka	single find	length 14.3 width 4	-	Czebreszuk Kozłowska-Skoczka 2008, 55, fig. 15:137.
14.	Pałówko, com. Postomino	single find	length 12.5 width 3.1	grey flint	Wojciechowski 1976, 86, fig. 14:b; Libera 2001, 149; Czebreszuk, Kozłowska-Skoczka 2008, 55, fig. 15:138.
15.	Parsecko, com. Szezecinek	obtained in 19 <sup>th</sup> c. from supposed tumulus grave?	length ca. 10 preserved length 8.5; width 2.6	grey glossy flint with brown intrusions	Czebreszuk, Kozłowska-Skoczka 2008, 55, fig. 16:139.
16.	Parsecko, com. Szezecinek	single find	length 8.5 width 2.7	-	Czebreszuk, Kozłowska-Skoczka 2008, 55, fig. 16:140.
17.	Stuchowo, com. Świerczno	single find	length 10.5 width 2.5	grey-black glossy flint with light intrusions	Libera 2001, 144; Czebreszuk, Kozłowska-Skoczka 2008, 59-60, fig. 16:141.
18.	Szezecin-Płonia, com. Szezecin	Cemetery (context of deposition unknown).	length 10.7 width 2.5	dark grey glossy flint with light dots	Czebreszuk, Kozłowska-Skoczka 2008, 61, fig. 16:142.
type VI					
19.	Barkocin, com. Kończyłowy	single find	length 10.5 width 3.4	-	Czebreszuk, Kozłowska-Skoczka 2008, 44, fig. 16:143.
20.	Chełmce, com. Kruszwica	single find	-	-	Erzepik 1893, fig. 4:31; Libera 2001, 149.
21.	Kolin site 7, com. Dolice,	single find	length 17 width 3.6	-	Wojciechowski 1976, 82; Czebreszuk, Kozłowska-Skoczka 2008, 50, fig. 16:144.
22.	Koniewo site 2a, com. Wolin,	single find	length 14.5 width 3.2	yellow flint; patinated	Wysomiński 1974, 78, fig. 8:3; Czebreszuk, Kozłowska-Skoczka 2008, 51, fig. 16:145.

No.	Location	Context	Dimensions (cm)	Raw material, patina	Related literature
23.	Lubczyna, com. Goleniów	single find	length 22,5 width 5	-	Wojciechowski 1976, 79; Libera 2001, 149; Czebreszuk-Skoczka 2008, 52, fig. 16:146.
24.	Miedwiecko, com. Kobyłanka	single find	length 13 width 4.1	-	Czebreszuk Kozłowska-Skoczka 2008, 53, fig. 16:147.
25.	Rościno site 2, com. Białogard	single find? (found in turf; aquatic deposit?)	length 13,5 width 5.1	-	Czebreszuk, Kozłowska-Skoczka 2008, 57, fig. 16:148.
26.	Santok, com. Santok	single find	-	-	Wojciechowski 1976, 90.
supposed fragments of type VI					
27.	Bobolin site 1, com. Darłowo	single find	preserved length 7, width 3, fragment of a dagger handle (subtype VB or VIA)	-	Czebreszuk-Skoczka 2008, 45, fig. 13:116.
28.	Bolkowo site 1, com. Police	settlement site (camp site)	preserved length 3.6; width 3; fragment of a dagger handle (type I-II or VI)	grey glossy flint with light dots	Czebreszuk, Kozłowska-Skoczka 2008, 45, fig. 18:168.
29.	Bruszczewo, com. Śmigiel	settlement site (stronghold of Unětice, Tumulus and Lusatian cultures)	fragment of a dagger handle (subtype VIA?)	-	Wojciechowski 1976, 90-91, fig. 14:d.
30.	Zarańsko, com. Drawsko Pomorskie	single find	length 9,2 width 4.6 (dagger of type I or VI)	grey flint with light dots	Czebreszuk, Kozłowska-Skoczka 2008, 63, 92, fig. 17:154.

belongings brought by a representative of communities from the western Baltic Sea area (the Early Bronze Age communities in Denmark, or groups of the “Tumulus culture” type in the Lower Oder basin: see also comments: Bukowski 1998, 19). The mobility of individuals in the Bronze Age has been confirmed by the aDNA examinations of osteological material and archaeological studies (e.g. Kristianasen and Larsson 2005, 32-33). It is possible that the dagger discussed in this paper was not used by the local (Kuyavian) cultural groups, and it was deposited in the swamps or waters of the Noteć River by an incomer, a “traveller”.

#### 4. USE-WEAR ANALYSES

The use-wear analysis of the dagger was performed using a microscope-computer set, Nikon SMZ-2T, which enables an observation with an objective magnification of 12.6x (total magnification up to ca 120x), as well as digitalisation and processing of optical images. This instrument was also used for obtaining a microphotograph displayed in figure 5A. For the observation of polishes a microscope-computer set, Zeiss-Axiotech, was employed, which allowed the investigators to obtain an objective magnification of 50x (total magnification up to 500x). It also served for taking other microphotographs presented in this paper. Before the use-wear analysis was performed the artefact had been washed in water containing a cleaning detergent and pure  $C_2H_5OH$ .

The terminology used in this paper was based on the existing conceptual system published in the related literature (Vaughan 1985, 10-13, Glossary, VII; Gijn van 1989, 16-20; Juel Jensen 1994, 20-27; Korobkova 1999, 17-21; Osipowicz 2010, 24-35), adjusted to the requirements and needs of the current analysis. The set of comparative materials employed for observations made during these studies enclosed 500 experimental tools, presently stored in the Institute of Archaeology of the Nicolaus Copernicus University in Toruń.

The artefact under examination is well-preserved, only partially covered with patina, which did not hinder performing the use-wear analysis.

As a result of the examination, well-developed and diversified traces of usage were recorded on the artefact surface. However, none of them were detected on the cutting edges of the blade, where tiny, intentional, obverse and inverse retouch occurred, forming micro-denticulated profile of the specimen (Fig. 4, 5:A). Most likely its presence should be connected with a rejuvenation treatment performed just before the tool was discarded/deposited. Nevertheless, considering the context of the dagger discovery, it cannot be excluded that the significance of this retouch exceeds beyond its utilitarian aspect. Rejuvenation of tools before they were placed into the ground during, and as a part of ritual practices, has already been recorded for the Late Neolithic artefacts, found at other Polish sites (Osipowicz *et al.* 2014, 97-98).

All the use-wear traces detected on the dagger blade are spread over its surface, not entering onto the cutting edges (a zone covered with rejuvenating retouch), and are basically

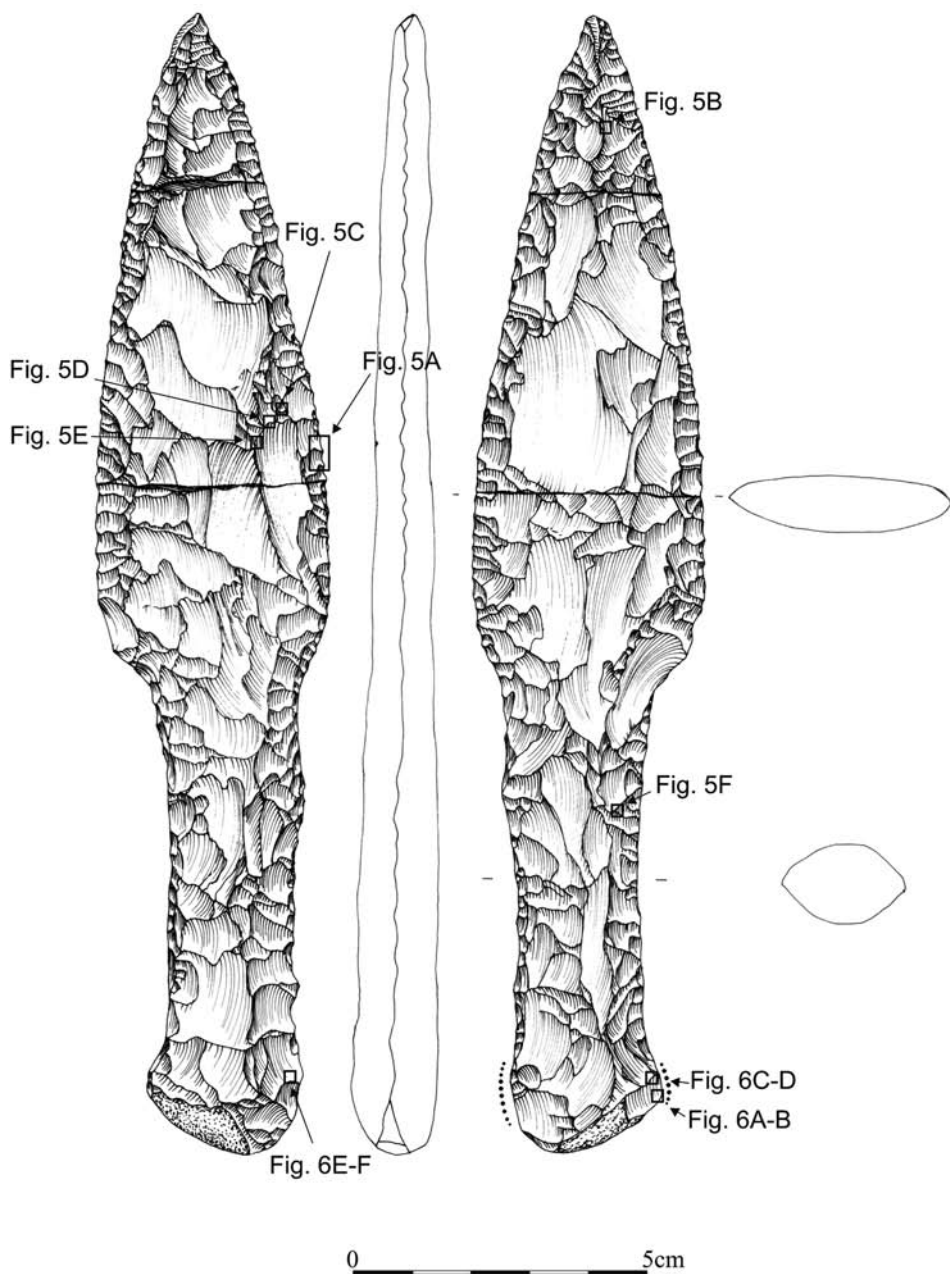
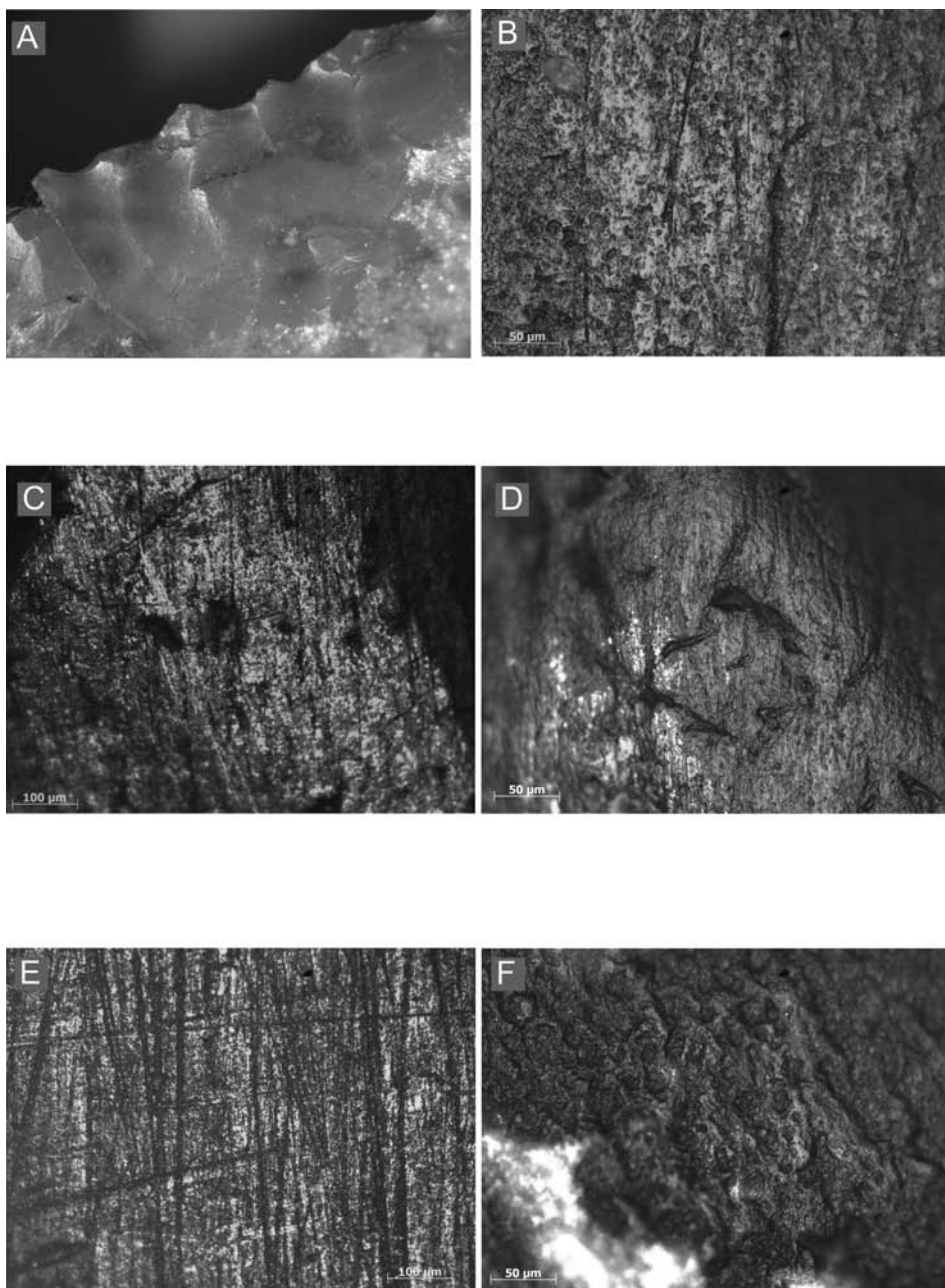


Fig. 4. Brzoza, Nowa Wieś Wielka com.  
 Flint dagger with marked spots where microphotographs were taken.  
 Drawn by M. Sudoł-Procyk



**Fig. 5.** Microphotographs of use-wear traces detected on the dagger from Brzoza: A – x. 10, OBJ 10; B, D, E – x250, OBJ 20; C, E – x125, OBJ 10. Photo by G. Osipowicz

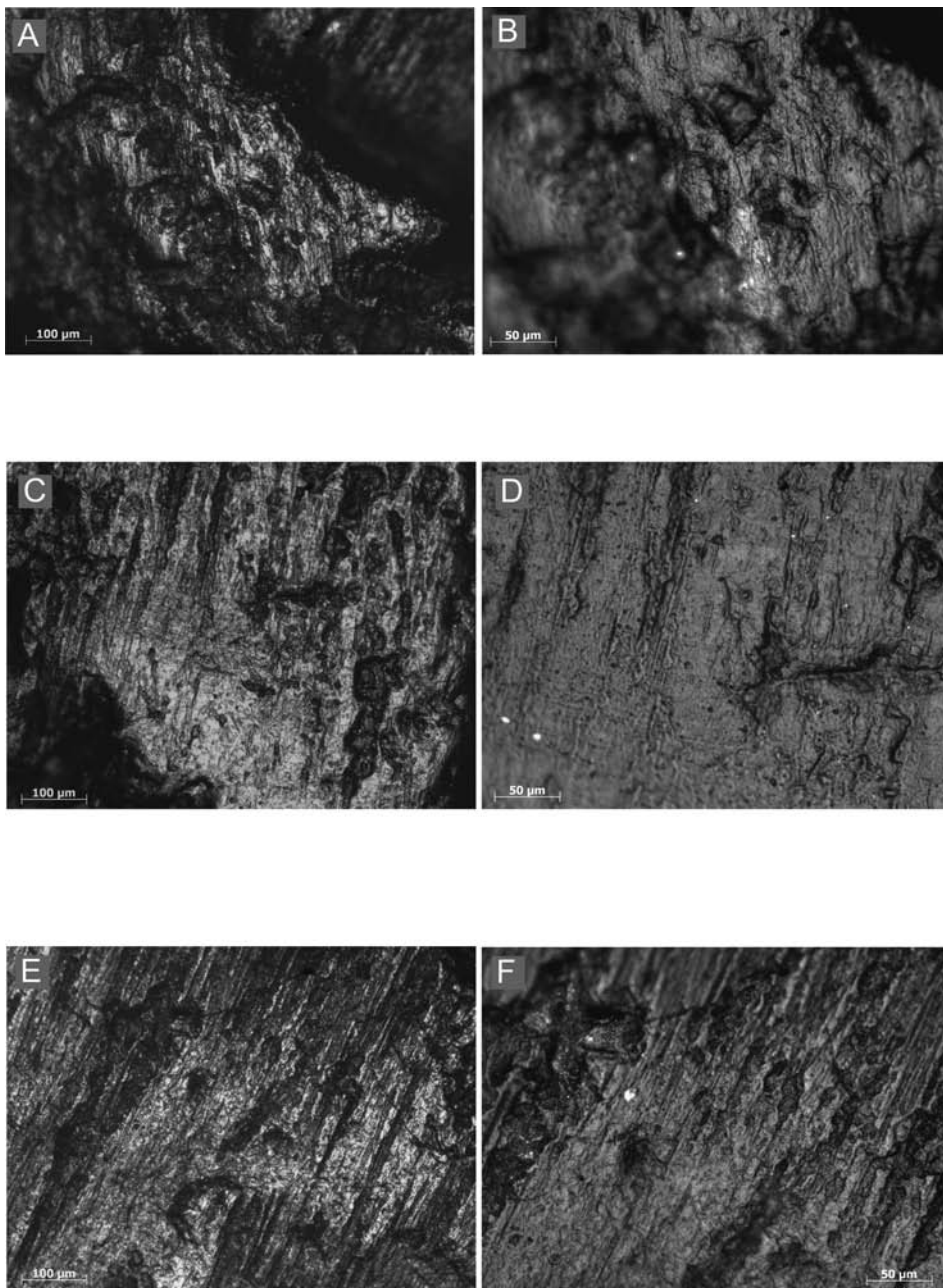


Fig. 6. Microphotographs of use-wear traces detected on the artefact from Brzoza:  
A, C, E – x125, OBJ 10; B, D, F – x250, OBJ 20. Photo by G. Osipowicz

readable only on the ridges between the scars produced by blows shaping its form. Four types of damage were observed. In the tip part of the specimen (Fig. 4), there was shiny polish-striation of a domed topography and smooth texture, analogous to traces recorded on experimental tools used for processing hard wood or antler. This deformation was accompanied by linear traces, mostly black striations, running parallel to the longitudinal axis of the artefact (Fig. 5:B). A completely different type of damage was recorded in the middle part of the blade (Fig. 4). There was, i.a. polish with characteristics typical of hide processing, which means “greasy”, of cratered topography and slightly rough texture (Fig. 5:D). Similarly to the above-mentioned deformation, the polish was parallel to the longitudinal axis of the tool, making the scar ridges strongly rounded. The both types of use-wear traces are most likely due to a complicated structure of a sheath, in which the dagger was stored. Its bottom part might have been made of wood or antler (the latter is more probable), while the mouth part was made of hide (or lined with this material). Probably, the other polish detected in the same part of the dagger was of similar origins, though it is far less characteristic, which basically hinders any more specific and convincing interpretation. One thing that is certain is that this is abrasion accompanied by shiny polish of flat/domed topography and very rough texture. Within this polish there are black striations parallel to the longitudinal axis of the specimen (Fig. 4, 5:C). On one of the scar ridges another use-wear traces were recorded, which are very likely to be remnants of bidirectional polishing (Fig. 4, 5:E). This treatment could have been performed in final stages of the tool production to remove a “prominent protrusion” (a hinge in a distal part of the scar) that emerged during the flaking process. The removal of this small barb was necessary to ensure easy mounting and dismounting of a handle to the blade or to protect the user’s hand from injury. Archaeological experiments covering analogical treatments of polishing have recently been presented in the related literature (comp. Osipowicz *et al.* 2016).

And finally, closing the part dedicated to use-wear traces detected on the dagger blade, small scars recorded on its tip must be mentioned, produced by microburin blows. Most likely, these scars emerged as a result of post-depositional processes or a failure during retouching. They are not an effect of the tool utilisation, which is supported by the blow direction (from one of its sides) and the lack of any other types of damage.

In the lower part of the artefact use-wear traces of utilitarian nature and varied characteristics were recorded. On its handle there are deformations indicating long-lasting utilisation. Amongst those one should name abrading and polishing of side edges, and (to a lesser extent) ridges between scars on the tool surface (Fig. 4, 5:F). In this part there is also pale, dispersed polish of cratered/domed topography and smooth texture, which emerged, most likely, as a result of the contact between the tool and a user’s hand.

The most visible use-wear traces were recorded on the oval-shaped base of the blade. On both sides there are numerous deformations in a form of stepped chipping (Fig. 4), crushing and rounding; the latter is clearly readable on side edges and scar ridges. They



are accompanied by extremely shiny, linear polish-striation of flat topography and rough texture (Fig. 6:A-F), which completely destroyed a flint microrelief on a considerable part of the tool surface. Apart from the polish, there are also clearly visible linear traces (black and filled-in striations) differing in terms of their length, width and depth, running perpendicularly to the longitudinal axis of the specimen. Characteristics of these deformations indicate that this part of the dagger was used as a strike-a-light (comp. Stapert and Johansen 1999, 770; Sorensen *et al.* 2014, 481). This is not an isolated case. Bases/handles of daggers of the Scandinavian type found in Denmark were utilised in an analogical manner, which particularly concerns the types I and VI (Stapert and Johansen 1999, 766, Fig. 1-3; Lomborg 1973). A possibility of this kind of utilisation of daggers was also raised by H. Hingst (1952, 7), and recently it has been mentioned by J. Libera as well (2001, 40).

In the related literature, a connection between utilisation of flint daggers, an act of making fire and metallurgy is noticeably stressed (Koch 1990, 16-17; Harding 2011, 102). Noteworthy is the fact that in the British Isles at the beginning of the Bronze Age flints (strike-a-lights) were found exclusively in male burials, as a part of grave goods (Clarke 1970, 448). The above-mentioned craft specialisations required advanced knowledge and well-developed practical skills (production of flint daggers and bronze casting), therefore they might have been reserved for a certain group of males (specialised craftsmen or warriors?). In this respect, the traces of fire making recorded on the specimen from Brzoza fit in well with utilitarian and symbolic scenarios of flint daggers utilisation by communities at the beginning of the Metal Age in Europe.

## 5. SUMMARY

Results of the morphological analysis and the raw material determination performed for the artefact from Brzoza prompted the authors to consider it to be imported from the western-Baltic zone of the flint dagger production centre. It can be dated to the end of the Early or the beginning of the Older Bronze Age in Poland (*ca* 1700-1500 cal BC). The dagger was deposited in the boundary zone between the Vistula and Oder watersheds, within a vast floodplain of the Noteć River. However, it is impossible to link the dagger with the activity of certain communities that occupied the Polish Plain in the Bronze Age. On the other hand, it cannot be excluded that the dagger deposition was associated with a visit of a representative of foreign cultural communities (Nordic or Tumulus cultures?) in northern Kuyavia.

Results of the use-wear analysis explicitly indicated that the flint dagger was a utility object, used for a long time, probably for various activities, including fire making. Determining a utilitarian function of its blade is not possible since it is covered with scars produced by secondary, rejuvenating retouch. The very act of its rejuvenation suggests that the blade was also a functional tool (to some extent at least), and its significance was more than just symbolic. The dagger was stored in a multilayer sheath, traces of which are

readable on its surface. At a certain point in time the blade was thoroughly rejuvenated, and then discarded, lost or placed into a swamp or water reservoir. The latter hypothesis seems to be the most probable.

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