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## KRUMMESSER IN THE UPPER VISTULA RIVER BASIN

### ABSTRACT

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The specific stone curved knives (*Krummesser*) appeared on the territory of Poland in the 2<sup>nd</sup> millenium BC, together with the expansion of new cultural phenomena (Otomani and Trzciniec cultures). Discoveries of this kind are still a rarity (26 specimens from 21 sites), and most of them come from the territory of Lesser Poland. Their occurrence in the Carpathian foothills is connected with the presence of the southern Carpathian population, while the specimens found on the left bank of the Vistula, or single artefacts recorded in the Polish Lowland seem to be closely associated with Otomani influences. On the sites of the Trzciniec culture the presence of *Krummesser* is connected to the occurrence of ceramic vessels with southern characteristics and bronze artefacts. The appearance of *Krummesser* can be also synchronised with new forms of flint sickle knives, known from the Polish-Ukrainian border area.

**Key words:** Early Bronze Age; South-Eastern Poland; Upper Vistula River Basin; Otomani and Trzciniec cultures; *Krummesser*

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Problems connected with the specific artefacts made of non-siliceous rocks and called *Krummesser* (“curved knives”) have been the subject of discussion in the literature for nearly half a century (Prox 1941). The origin of these artefacts is connected with the territories to the south of the Carpathian Mountains (*cf.* Kopacz 2011 — *ibid.*, previous literature). Their presence was also observed on Polish territories, particularly in Małopolska. Already during the first attempts to determine their chronology, attention was drawn to the cultural context of ceramic materials of the Trzciniec culture (Budziszewski 1998, 324, 325) and those of the Otomani culture, also called the Otomani-Füzesabony culture (including Valde-Nowak, Gancarski 1999, 183).

On the territory of Poland, finds of knives made of non-siliceous rocks and mostly dated to the second period of the Bronze Age, are still a rarity — the more valuable then are any new finds, even if their context might sometimes be not very clear. We focus our attention on “curved knives” primarily found in the province of Świętokrzyskie, in the course amateur surface survey on the territory of Połaniec Basin (Niecka Połaniecka), on the border between

the Wodzisław Ridge (Garb Wodzisławski) and the Valley of the Nida river, as well as on the knives found during many years of research connected with the Polish Archaeological Record (*Archeologiczne Zdjęcie Polski* — AZP) in the eastern part of the Kielce-Sandomierz Upland and on the southeastern edge of the Świętokrzyskie Mountains.

## MATERIALS

### Połaniec Basin

**Oleśnica**, gmina Oleśnica, powiat Staszów, site 6 (AZP 94-67/62) — in the years 2008–2009, on a vast area of arable land, covering about 5 hectares, L. Orszulak collected numerous potsherds and artefacts made of flint and non-siliceous rocks. The site is situated on the south-eastern slope of a promontory, not very distinctively shaped and forming part of a vast elevation, bounded to the south with small marshy valleys of a nameless stream and of its tributary. It is a low-lying area, covered with Quaternary sands. The site was discovered by A. and B. Matoga during Polish Archaeological Record project in 1992, and — on the basis of the discovered pottery — it was described as a settlement of the Lusatian culture and dated to the late Bronze Age. Apart from fragments of vessels, only a splinter<sup>1</sup> made of erratic stone was discovered at that time.

The collection of hundreds of artefacts discovered by L. Orszulak is not chronologically homogenous. It consists of materials dating back to the Stone and Bronze Age and/or early Iron Age (the Mierzanowice, Trzciniec and Lusatian cultures). The prevailing part of the pottery is likely to be related to the Trzciniec culture. It provides an interesting context both for the stone artefacts (*Krummesser*) discussed in this paper as well as for a stone axe fragment.

1. The top fragment of a knife, which is probably triangular in the outline depicting its outermost edges, with a straight cutting-edge (blade) going into a curved, arched back through a rounded, broad tip. In cross-section, it is flat, lenticular-oval, with a slightly rounded end, with the cutting-edge situated on the secant of the angle between both flat side faces”). The specimen was formed bifacially by detaching concentrically directed flakes, negatives of which being partially preserved on the tip and on the front faces at the knife’s end). During the final stage, the knife underwent bilateral grinding (including the end), and partly also — very careful smoothing, which covered almost 1/4 of the width of its cutting-edge, and possibly also — partly polishing, which is why its surface is somewhat “glossy” (it could not, however, be ruled out that this “glossy” effect was due to wear while the knife was used for work). Alongside

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<sup>1</sup> A. i B. Matoga, AZP documentation for the area 94–67 (typescript in the archives of the Voivodeship Office for the Protection and Conservation of Historical Monuments in Kielce).

the straight edge, there are small, delicate, secondarily obliterated negative scars (retouch connected with use/repair?). The maximum preserved dimensions are: length — 53 mm, width — 43 mm, thickness — 8 mm (Fig. 1:1). Raw material: quartz and quartzite sandstone, light grey in colour, and fine-grained and microcrystalline in structure, regenerative; the prevailing minerals in its composition are quartz and microcrystalline silica<sup>2</sup>.

2. Fragment of an axe, near its butt, with a rather difficult-to-determine outline (slightly trapezoid/oval and with the side edges minimally curved, ending in a rounded asymmetrical butt. In vertical and horizontal sections, it is flat and convex. The “rounded” side faces and the edge of the butt clearly show crushing traces almost at their entire length (probably as a result of picquetage, which was applied for shaping the preform, while half way from the place where the plane curves, they are visibly abraded though this kind of abrasion was not sufficient to obliterate the most prominent ridges and planes. The maximum preserved dimensions: length — 71 mm, width — 55 mm, thickness — 27 mm (Fig. 1:2). Raw material: ferruginous-quartz and quartzite sandstone of varying colour. On the originally preserved surfaces, it is dark cherry red (the surface being encrusted with hematite, or covered with the so-called glossy weathering glaze), while on the break and in the retouched areas, it is light grey and brown with black dots. Its structure is fine-grained, microcrystalline, regenerative. The prevailing minerals in its composition are quartz and microcrystalline silica, and colouring oxides and hydroxides of iron (as well as those of manganese).

### Wodzisław Ridge–Nida Valley

**Rudawa**, gmina Złota, powiat Pińczów, site 1 (AZP 95-62/48) or site 3 (AZP 95-62/50) — in the years 2006–2008, on the border between Rudawa and Nieprowice, J. Głogowski collected a series of stone artefacts, including three knives; a chisel made of basalt; two fragments of battle-axes, one made of gabbro and the other — of diabase; The finds were discovered on a vast promontory, at the edge of the valley of the Nida river, bounded to the north with a nameless watercourse, and — to the south with a short gully formed by erosion processes. In that area, there are two archaeological sites: Rudawa 1, discovered by E. Dąbrowska in 1961 (1965, 322) and Rudawa 3, discovered by T. Dębowski in 1972<sup>3</sup>. Both sites were investigated during surface surveys

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<sup>2</sup> The authors would like to thank Dr Lucjan Gazda from the Chair of Geotechnics of the Polytechnic in Lublin, who performed the petrographic analyses of the materials from Oleśnica and Rudawa.

<sup>3</sup> T. Dębowski, Report from the surface survey conducted in 1972 in Pińczów county (typescript in the archives of the Voivodeship Office for the Protection and Conservation of Historical Monuments in Kielce).

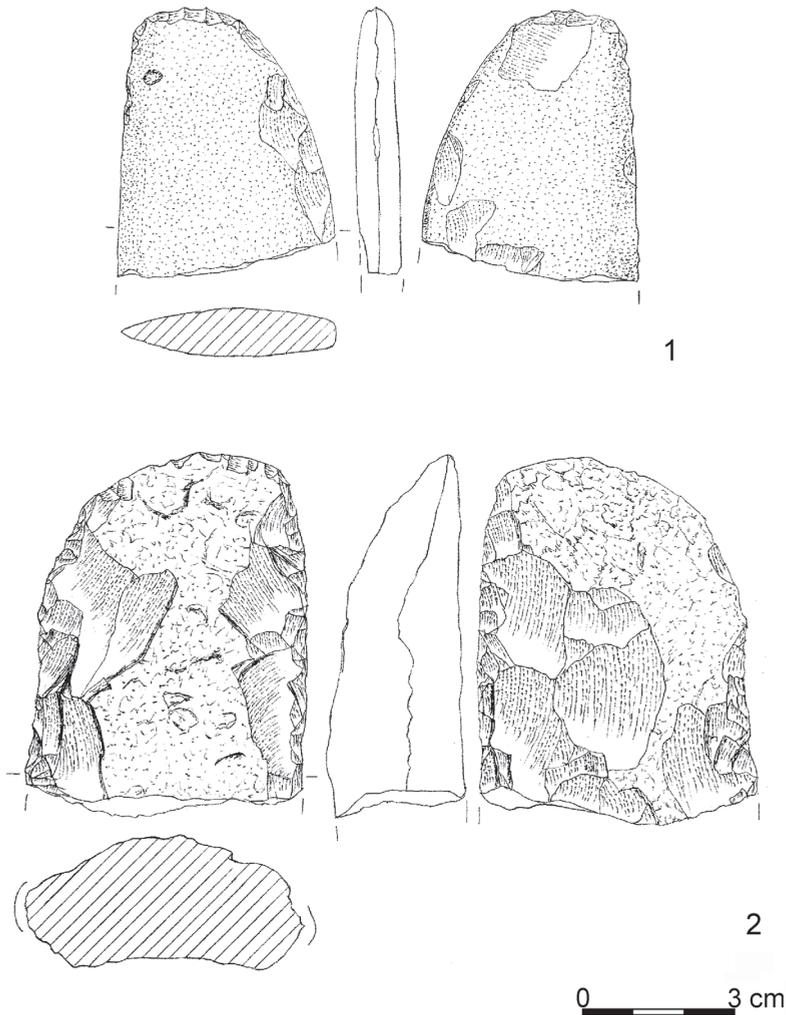


Fig. 1. Oleśnica, powiat Staszów. Backed knife (1), axe (2); drawn by J. Libera.

of the AZP 95–62 area in 1996<sup>4</sup>. On the site of Rudawa 1, Neolithic materials, Trzciniec culture materials, those of the Lusatian culture from the Hallstatt period, and some later, unspecified, but still prehistoric, materials were found. On the site of Rudawa 3, the Trzciniec culture and Early Mediaeval materi-

<sup>4</sup> W. Gliński, C. Hadamik, J. Koj, Documentation from AZP research in the area 95–62 (typescript in the archives of the Voivodeship Office for the Protection and Conservation of Historical Monuments in Kielce).

als were found. It is difficult to determine which of the two sites yielded the artefacts found by J. Głogowski.

1. The tip fragment of a knife, in the outline of its outermost edges — probably triangular, with a straight edge, turning into a curved end through the rounded tip. In cross section, it is flat, lenticular-rectangular, with a straight end. In the outline it is flat, with a slightly convergent, rounded tip and the cutting edge situated slightly asymmetrically in relation to the secant of the angle of the front walls. Very carefully bilaterally grinding, perpendicularly to the straight edge, including the tip and its ridges (no negative scars), resulting from the process of forming the preform. Polishing alongside the main axis was only applied to about 1/3 part of the cutting edge, but without obtaining a sharp edge. The latter has numerous traces of chipping and scars (most probably, recent). The maximum preserved dimensions are: length — 52 mm, width — 50 mm, thickness — 14 mm (Fig. 2:1). Raw material: quartz/quartzite sandstone; fine-grained sedimentary rock, pink and yellow-pink in colour, containing quartz sand bound with silica, slightly quartzite.

2. The tip fragment of a knife, in the outline depicting its outermost edges — probably triangular, with a straight edge, turning into a slightly curved end through the rounded, asymmetrical tip. In cross section, it is flat, lenticular-oval, with a rounded end. In the outline of its outermost edges, it was probably flat and convex (one of its flat surfaces is presently destroyed), with a convergent, slightly asymmetrical tip and the cutting edge situated symmetrically in relation to the secant of the angle of the front walls. It is a very carefully ground specimen, probably bilaterally, including the tip and the end (no negative scars from working the preform). The flat surfaces are polished perpendicularly to the straight edge (probably both were subject to that process). Polishing alongside the main axis was applied to almost 1/3 of the knife's width. On the cutting edge, there are traces of present-day chipping. The maximum preserved dimensions are: length — 43 mm, width — 30 mm, reconstructed thickness — 10 mm (Fig. 2:2). Raw material: granitoid; igneous fine-grained rock, cherry red and grey in colour, containing in its mineral composition feldspars, quartz and biotite.

3. A completely preserved knife, triangular in the outline depicting its outermost edges, with a straight cutting edge, a linear tip and a slightly curved end. Its base is wide, semi-circular, slightly undercut towards the end. In cross section, the specimen is flat, lenticular-oval, with a slightly rounded end and the cutting edge situated symmetrically in relation to the secant of the angle of the front walls. In the outline depicting it from one of the sides, it is flat, with a convergent, rounded tip and similarly shaped base. The artefact was very carefully bilaterally smoothed, perpendicularly to the cutting edge, including the tip and the base. On the latter, there are concentric negative scars from working the preform. It is polished in parallel to its entire cutting edge, and to some part of its end, with the polished area covering about L of the specimen. In its central part, on the cutting edge there are present-day chipping marks. The maximum preserved dimensions are: length — 77 mm, width — 32 mm,

reconstructed thickness — 10 mm (Fig. 2:3). Raw material: nepheline syenite; igneous medium-grained rock, lightly porphyritic, green and black in colour, composed of such minerals as plagioclases, pyroxenes, amphiboles and feldspars.

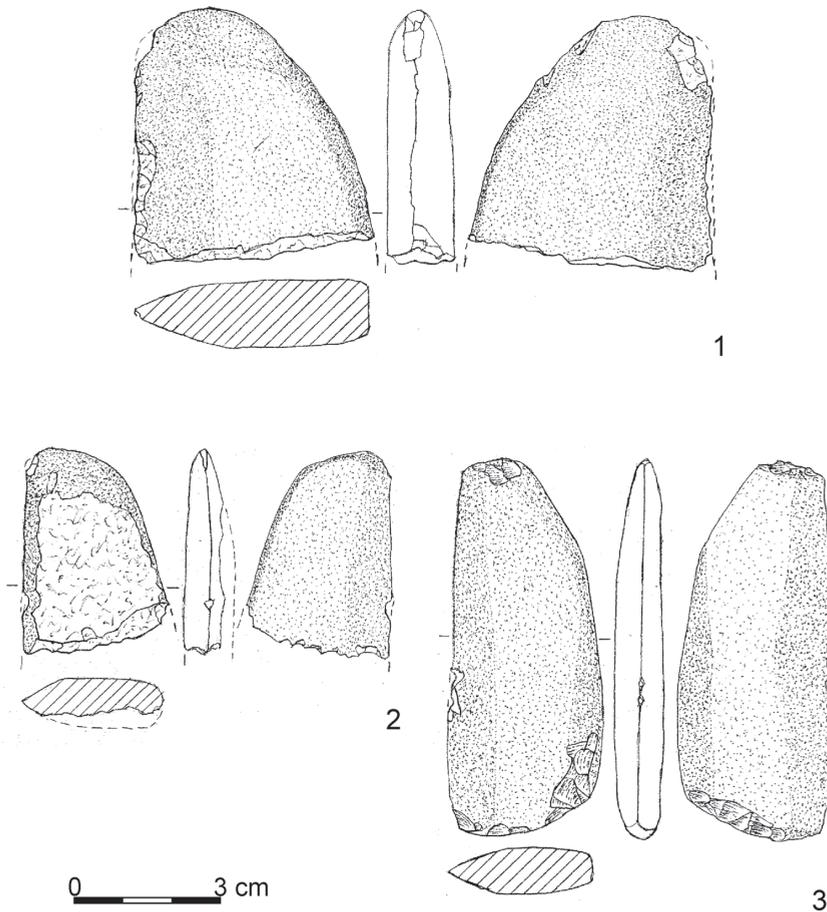


Fig. 2. Rudawa, powiat Pińczów. Backed knives (1-3); drawn by J. Libera.

### Kielce-Sandomierz Upland

**Malice Kościelne**, gmina Lipnik, powiat Opatów, site 35 (AZP 88-71/216) — during surface survey<sup>5</sup>, the following finds discovered in an unspecified part of the field by its owner were recorded: a scoop, a fragment of another vessel, a Lusatian spindle-whorl, a partly preserved sickle blade made of Świeciechów

<sup>5</sup> AZP research conducted by the Institute of Archaeology of Marie Curie-Skłodowska University (UMCS) in Lublin (Bargieł *et al.* 1989, Fig. 3j).

flint and a fragment of the tip from a backed knife. In the outline depicting its outermost edges, it is most probably triangular, with a straight edge that curves lightly towards the end. On the sharp tip, there are not any clearly visible recent chipping marks. In cross section, it is flat, lenticular-oval, with a slightly rounded end and the cutting edge situated asymmetrically in relation to the secant of the front walls. In the outline depicting it from one of the sides, it is flat, with a slightly convergent asymmetrical tip. Very carefully smoothed, on both sides, including the end (no negative scars from working the preform). The cutting edge alongside its entire length is bilaterally polished at the width of about 5 mm. The maximum preserved dimensions are: length — 83 mm, width — 46 mm, reconstructed thickness — 9 mm (Fig. 3:1). Raw material: some kind of unspecified sandstone.

**Kępie**, gmina Klimontów, powiat Sandomierz, site 3 (AZP 90-71/350)<sup>6</sup> — in 1993, during surface survey conducted by J. Libera, a fragmentary knife's tip and some Mierzanowice culture pottery were found. In the outline depicting its outermost edges, the specimen was probably rectangular, with a straight edge (somewhat damaged now), curving towards the end. On the sharp tip, there are some present-day chipping marks. In cross section, it is flat, lenticular-oval, with a slightly rounded end and the cutting edge situated symmetrically in relation to the secant of the front planes. In the outline depicting it from one of the sides, it is flat, with a convergent asymmetrical tip. It is very carefully bilaterally polished, including the end (without any negative scars from working the preform). The cutting edge alongside its entire length is polished on both sides at the width of around 10 mm. The maximum preserved dimensions are: length — 60 mm, width — 31 mm, reconstructed thickness — 10 mm (Fig. 3:1). Raw material: some kind of unspecified sandstone.

### Świętokrzyskie Mountains

**Oziębłów**, gmina Baćkowice, powiat Opatów, site 3 (AZP 87-69/193) — during the surface survey conducted by B. Bargieł and J. Libera, a prehistoric potsherd of undetermined chronology and a knife preserved in its entirety were found. In the outline depicting its outermost edges, it is trapezoid, with a straight, but slightly convex edge, and a lightly curved end. Both at the tip and at the base, there are small negative scars from working the preform. In cross section, it is flat, lenticular-oval, with a slightly rounded end and the cutting edge situated symmetrically in relation to the secant of the front walls. In the outline it is flat, with a rounded tip and base. The specimen is bilaterally polished. In the central parts of both of its sides, there are visible natural surfaces of the

<sup>6</sup> In the documentation of the Voivodeship Office for the Protection and Conservation of Historical Monuments in Kielce the site is erroneously described as Kępa Byszewska, gmina Koprzywnica, site 3.

lamellar pebble. The maximum preserved dimensions are: length — 100 mm, width — 36 mm, reconstructed thickness — 8 mm (Fig. 3:4). Raw material: some kind of unspecified fine-grained slate.

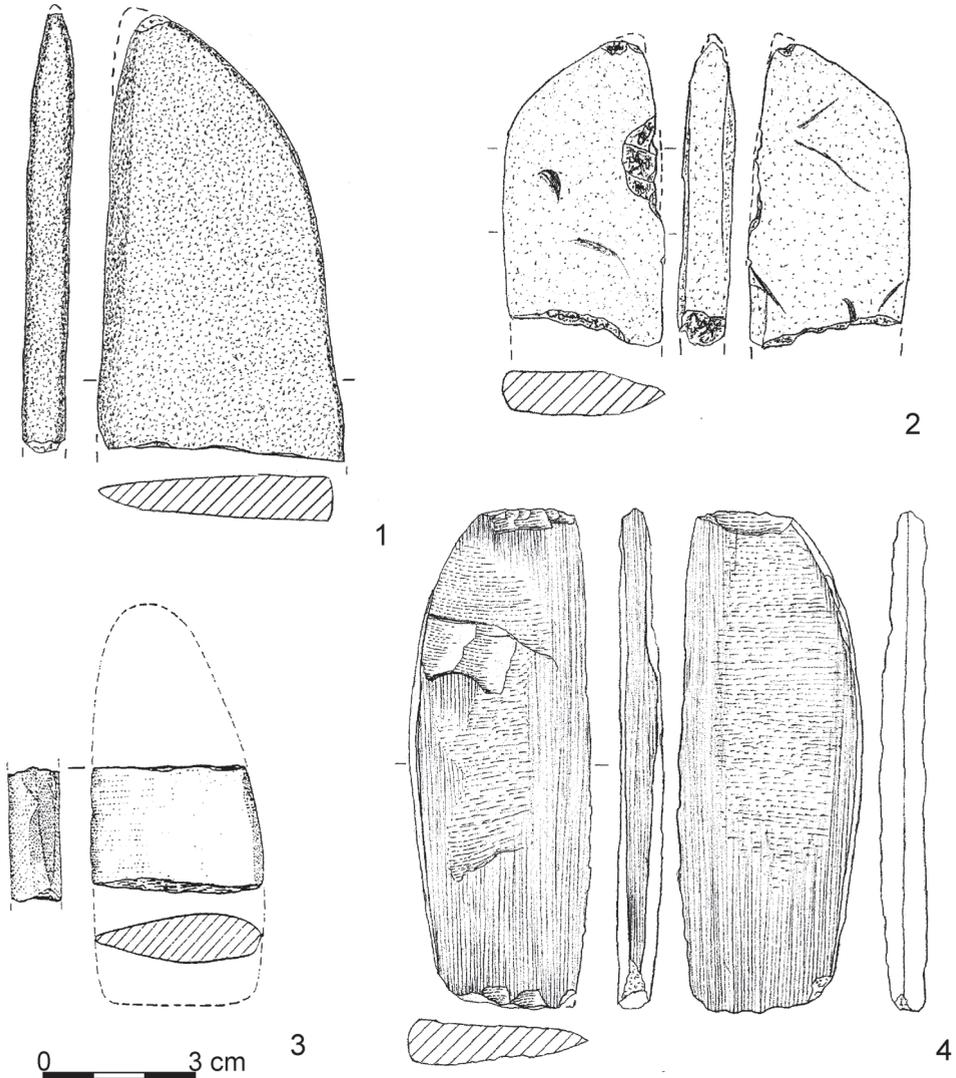


Fig. 3. Malice Kościelne, powiat Opatów (1); Kępie, powiat Sandomierz (2); Czchów, powiat Brzesko (3 — after Valde-Nowak 2003), Oziębłów, powiat Opatów (4). Curved knives (1–4); drawn by J. Libera (1, 2, 4).

### The context of “curved knives”

Finds such as *Krummesser*, as well as knife-like tools made of non-siliceous rocks are rare on the Polish territories. Mostly, they are single finds, fragmentarily preserved, and it is difficult to determine their chronology or classify them in terms of culture. Despite their not always clear context, some are likely to be related to settlement of the Trzciniec culture or that of the Otomani culture (Otomani-Füzesabony culture).

“Curved knives” made of non-siliceous rocks and found (exclusively or mainly) in the presence of Trzciniec potsherds were uncovered in the area near Kraków: Jakuszowice, powiat Kazimierza Wielka, site 2 (Fig. 4:1 — the specimen made of sandstone) and in Kraków-Nowa-Huta-Mogiła, site 55 — the data about the raw material not available (Fig. 4:2) (Budziszewski 1998, 324, 325, Fig. 14:2, 3). In both cases we are dealing with fragments from the knife’s tip — possibly, triangular forms. The tip fragment of the *Krummesser* made of fine-grained sandstone comes from the cultural layer dominated by Trzciniec culture potsherds (with some pottery of the Mierzanowice culture as well) on site 15 in Kraków-Bieżanów (Przybyła, Byrska-Fudala 2012)<sup>7</sup>. In an interesting context — namely, in the presence of late Mierzanowice culture pottery, a tip of a regularly-shaped sandstone knife was found in the settlement of Damienice, powiat Bochnia, feature 48 (Fig. 4:4; Włodarczak 2012). Perhaps, yet another specimen is the preform recorded on the surface of the multicultural site in Michałowice, powiat Kraków, which yielded both materials of the southern provenance and those of Trzciniec culture (Kruk 1969, 356ff., Fig. 4:3). Still more artefacts, which are parts of undetermined knives’ main bodies, come from the Sandomierz Basin: from Grodzisko Dolne, powiat Leżajsk, site 22 — made of “fine-grained brown sandstone” (Fig. 4:3; Czopek 2007, 54, 61; Tabl. IV:3, Fig. 32) and Kęblów, powiat Mielec, site 4 — the data about the raw material are not available (Fig. 4:5; Tokarczyk, Wilk 2007, 106, Tabl. VII: 8). Of interest are the finds from Korytnica, powiat Staszów, where on the “La Tène” cemetery, some interesting potsherds and two incomplete “stone knives” were obtained; the outlines of the latter resembling rectangles (Fig 6:1, 2; Marciniak 1964, Fig. 3:3–5). While several other artefacts known as “curved knives” still need to be confirmed<sup>8</sup>.

<sup>7</sup> Unpublished material, courtesy of Marcin M. Przybyła.

<sup>8</sup> In the settlement of the Lusatian culture from the 5<sup>th</sup> Bronze Age period and the Hallstatt period in Zakrzów, powiat Wieliczka, site 2, an artefact was found, made on raw flint chunk (Łydka, Przybyła, Trela 2006, 614, Fig. 3:10). Undoubtedly, in this case we are dealing with a flake backed knife, probably with a natural back and retouched truncation — the form known from late Post-Neolithic industries, particularly those of the Lusatian culture (cf. Libera 2005, 133ff.; 2006, 201). From the analysed group of knives, we must definitely exclude the very atypical (serving a different, changed function?) “axe-like” artefact made of chocolate flint and found in the town of Tychów Nowy, powiat Starachowice (Wiśniewski 2006). Likewise, the specimen made of fine-grained flysch sandstone and found in the multicultural settlement in Wojnicz, powiat Tarnów, site 18. It only apparently resembles the type of finds under discussion here. One of its sides is

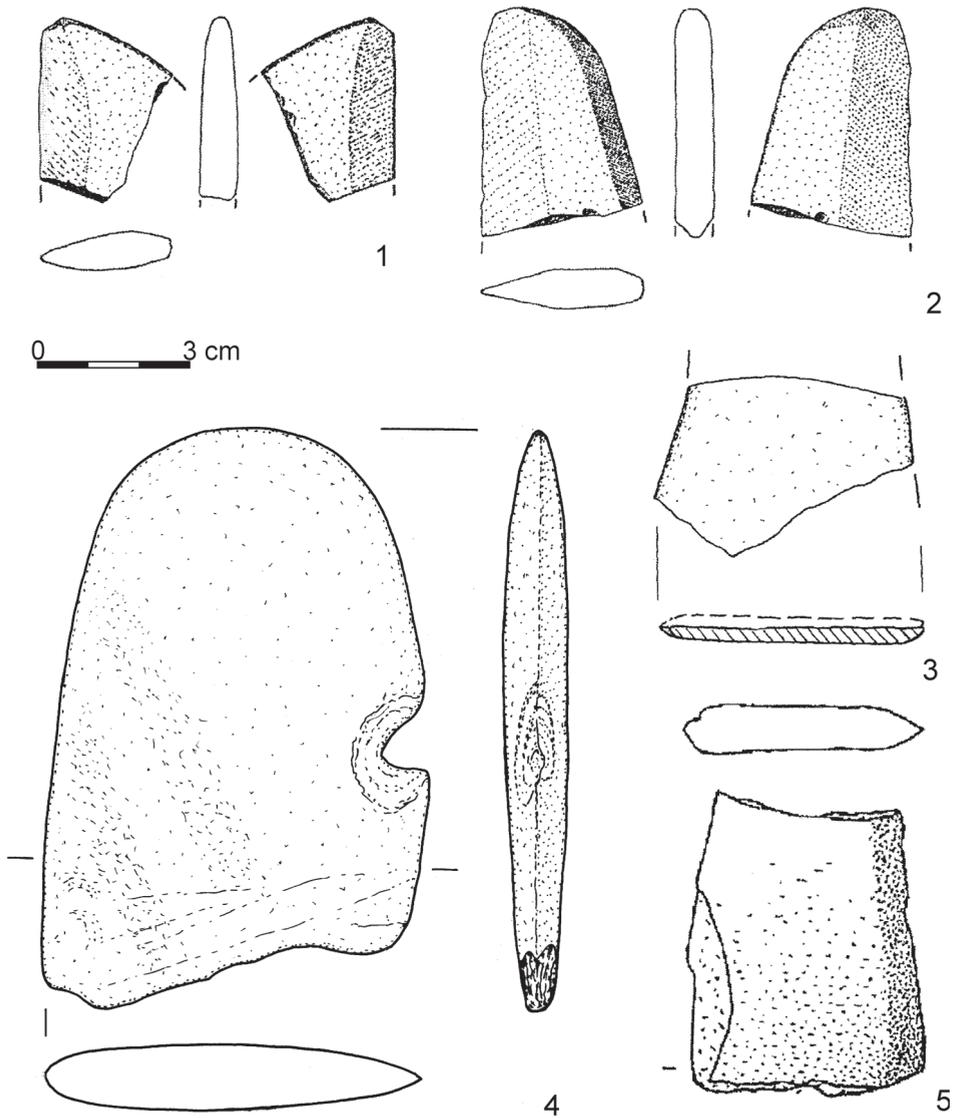


Fig. 4. Jakuszowice, powiat Kazimierza Wielka (1 — after Budziszewski 1998);  
 Kraków-Nowa Huta-Mogiła, powiat Kraków (2 — after Budziszewski 1998);  
 Grodzisko Dolne, powiat Leżajsk (3 — after Czopek 2007); Damienice, powiat Bochnia  
 (4 — after Włodarczyk 2012); Kębłów, powiat Mielec (5 — after Tokarczyk, Wilk 2007).  
 Curved knives (1–5).

flat and slightly concave, while the other one – curved, relatively thick and clearly rounded. We should accept Paweł Valde-Nowak's opinion that it must have had the function of the present-day whetstone (Valde-Nowak 2010, Tab. 4, Tabl. V:2).

*Krummesser* were recorded in the foothills of the Central Carpathians. A fragment of such a knife was found in flysch sandstone in Czchów, powiat Brzesko (Fig. 3:3; Valde-Nowak 2003, 49, Fig. 4:2). More specimens come from the Otomani sites situated in the county of Jasło, and particularly — from Trzcinica (Fig. 5: 1–4; Valde-Nowak, Gancarski 1999, 183, 187, Fig. 2:1; 5; 193, 194, Fig. 9:4; 10; Gancarski 2011, Photo 198:[1–4]), as well as from Łajsce (Gancarski 2002, 121)<sup>9</sup>.

The backed knife from Oleśnica and the artefacts from Rudawa fully correspond to the above-discussed *Krummesser* from Małopolska, both in terms of their morphology and metric characteristics (cf. Kopań 2001, 92, 93; 2011). It is very likely that they are related to the horizon of the Trzciniec culture (cf. Makarowicz 2010, 189ff.).

While the other find from Oleśnica — the unpolished axe (Fig. 1:2), despite the lack of any close analogies in the materials from the Polish territories allowing us beyond doubt to connect it with the Trzciniec culture, as a typological form (resembling the flint specimens) can be regarded as related to that culture. Such small specimens, with rectangular outlines and flat-oval sections, were primarily found in settlements. To a much smaller extent, they are also known from graves (among others, Taras 1995, 80; Makarowicz 2010, 189). Similar forms were also found in Ukrainian sites (e.g., Berezanskaja 1972, 106–107). And, their distribution on the territory occupied by the population of the “Trzciniec cultural circle” was published by P. Makarowicz, who compiled 16 sites from Poland and Ukraine (Makarowicz 2010, Fig. 6.13).

With this horizon of finds, relatively broad (including also the analysed artefact from Oleśnica), loose specimen might be connected. Found on site 33 in Łabunie, powiat Zamość, it is a fully-formed, massive preform (with the maximum dimensions: 150 × 80 × 50 mm, and the weight of almost 680 g); it is made of sedimentary quartzite, and has partly-preserved surfaces bilaterally covered with “desert glazing”<sup>10</sup>. The specimen is unpolished, and its side edges have noticeable pressure marks. The butt and a fragment of one frontal surface are slightly obliterated (presumably, as a result of picquetage, Fig. 6:3)<sup>11</sup>.

The kind of raw material similar to the one used for making axes from Oleśnica and Łabunie (siliceous sandstone) was used to make a triangular knife found on the Lusatian culture cemetery in Komarów-Osada, powiat Zamość. The knife was found among unworked “stone” pieces scattered round one of the urns (Bagińska, Libera 1996, 108, Fig. 24). Its “Lusatian” context is

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<sup>9</sup> In our opinion, the “backed knife” from the settlement of the Otomani, Fúzesabony and Trzciniec cultures on site 14 in Targowisko, powiat Wieliczka, also does not meet the technological and morphological criteria of *Krummesser* artefacts (Muzyczuk 2007, 538, Tabl. I:8).

<sup>10</sup> It is Tertiary raw material (the term was coined by Dr. L. Gazda from the Polytechnic of Lublin), occurring both on the Lublin Upland and in the area of the nearby Roztocze.

<sup>11</sup> In the area where it was found, during AZP research (area 90-89/34), archaeologists also found some pottery dated to the Neolithic, the Early Bronze and the Lusatian culture (courtesy of Ewa Banasiewicz-Szykuła; see also Banasiewicz-Szykuła 2007, 12ff.; Banasiewicz-Szykuła *et al.* 2010, 40, Fig. 24:1).

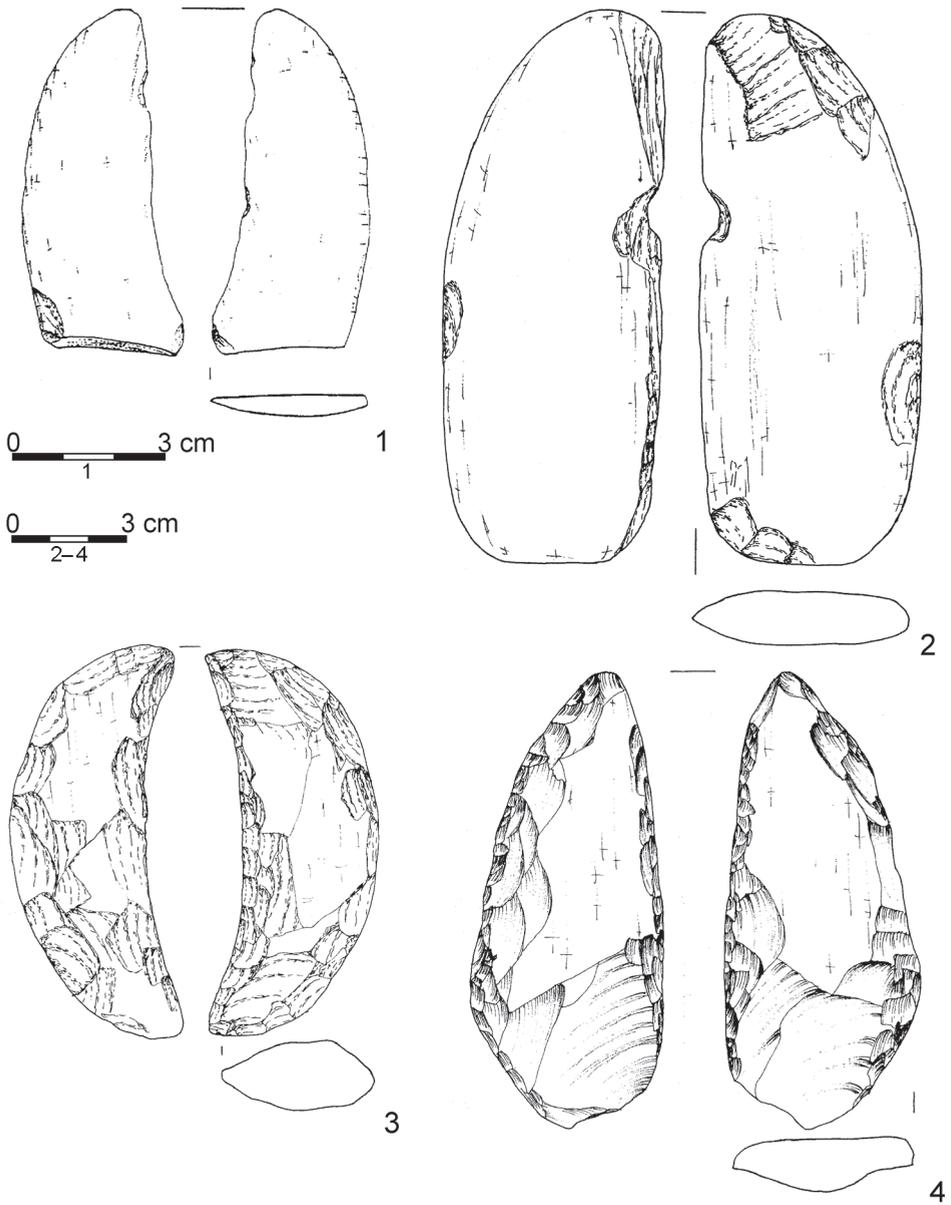


Fig. 5. Trzcinica, powiat Jasło (1-4 — after Valde-Nowak, Gancarski 1999).  
Curved knives (1-4).

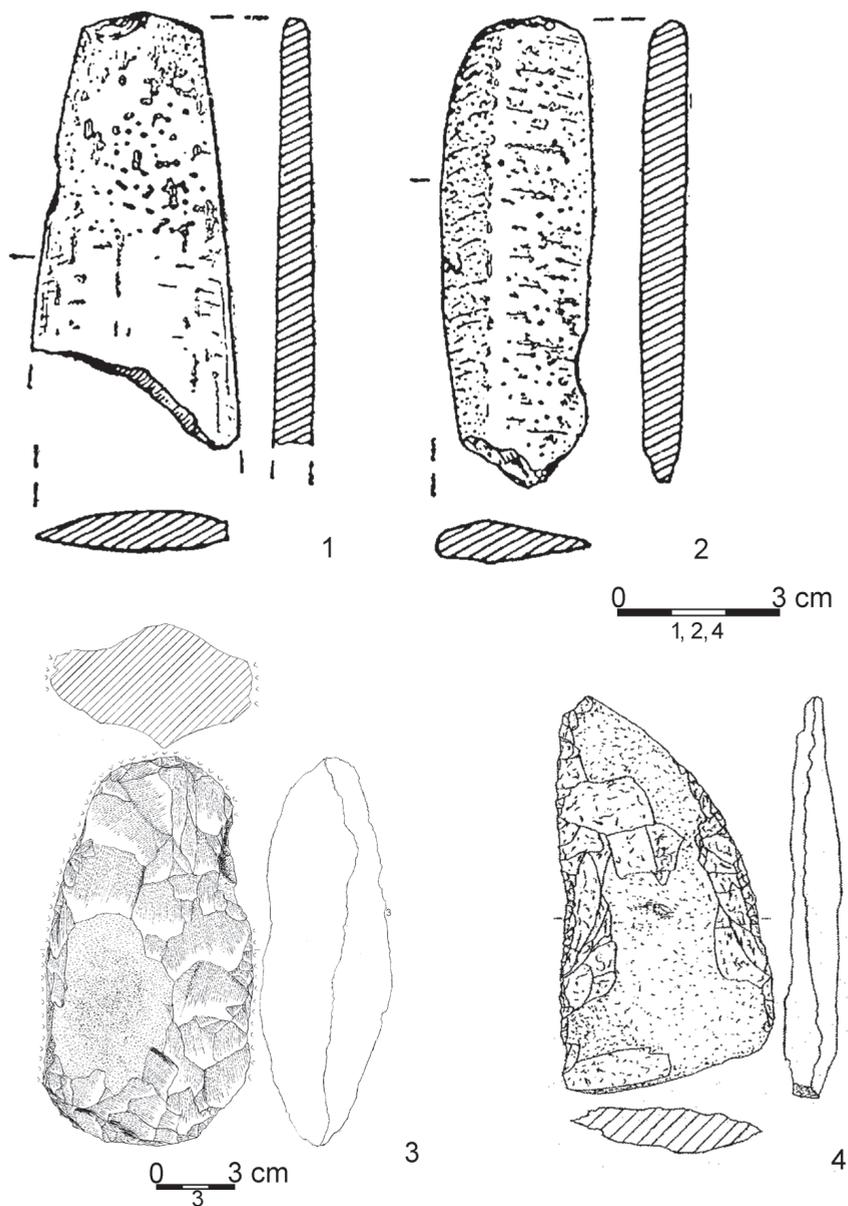


Fig. 6. Korytnica, powiat Staszów (1-2 – after Marciniak 1964); Łabunie, powiat Zamość (3); Komarów-Osada, powiat Zamość (4). Curved knives (1-2), axe (3), knife (4); drawn by J. Libera (3-4).

not fully confirmed. We do not know whether it was intentionally deposited near the urn (the phenomenon of “reutilization”<sup>12</sup>), or whether its presence is completely accidental<sup>13</sup>. It was made of siliceous lamellar sandstone, whose structure allowed for forming the piece by means of the block reduction technique. Despite the lack of grinding, due to its triangular shape (Fig. 6:4), it resembles more the original “curved” knives found in the inventories both of the Głina III and the Schneckenberg cultures, which: “...are made from local flysch rocks, mainly slates and sandstones, using the technique of grinding (to form flat faces), complemented with retouch (to form the cutting edge). We also find tools polished over their entire surface, together with the edges. Such forms will later become classic *Krummesser*” (Kopacz 2011, 68).

The variety of non-siliceous artefacts ascribed to the population of the Trzciniec culture is much more diversified (among others, Berezanskaja 1972, 105–107; see also — Makarowicz 2010, 186–189) than is apparent from previous publications. Examples include: the backed knife from grave 4 in Gabułów, powiat Kazimierza Wielka (Valde-Nowak 2006, 454, Fig. 1) and splintered piece-cutting tool from the settlement in Jakuszowice (Budziszewski 1998, 325, Fig. 14:1). The difficulty in determining their chronology is often due to the lack of a clearly-specified cultural context. The research which is currently conducted on sites in the Carpathian zone reveals more and more examples of inventories, most of which are made of non-siliceous rocks. This is understandable because of the widespread availability of such raw materials in the region – for instance, a series of various artefacts classified as Otomani — Füzesabony (*cf.* Valde-Nowak, Gancarski 1999).

### Pottery from Oleśnica

The collection of pottery from the surface of the site in Oleśnica is quite distinctive and provides an interesting context for the above-described stone knife (and probably, the axe, as well). In Oleśnica, the most numerously represented are potsherds typical of the Trzciniec culture — with thickened, bevelled rims, sherds decorated with horizontal cordons, and upper parts of vessels decorated with groups of vertical grooves and combined with different motifs impressed below (stamp impressions, groups of diagonal and vertical grooves, etc. (Fig. 7:1–12). Decorating vessels with groups of diagonal grooves and combining incised motifs (grooves) with impressed decoration (horizontal cordons) is more typical of the areas east of the Vistula and north of the San (*cf.* Taras

<sup>12</sup> It was many times recorded on the sites of the Lusatian culture: for example, J. Libera, *Z badań nad krzemieniarstwem kultury łużyckiej w dorzeczu środkowej Wisły (wybrane problemy)* [*Studies of flint industries of the Lusatian culture in the middle Vistula river basin (selected problems)*] — in print.

<sup>13</sup> The site also yielded potsherds of the Trzciniec culture (Bagińska, Libera 1996, 80, Fig. 6).

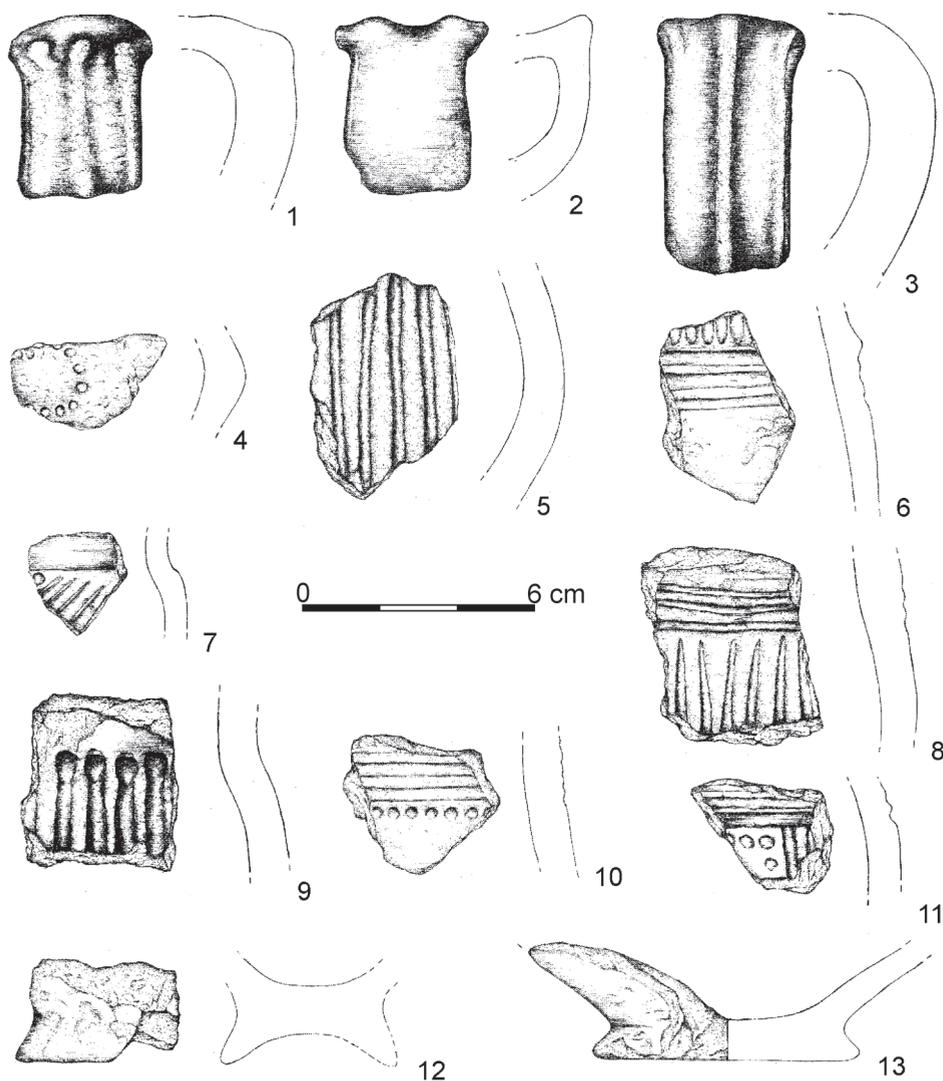


Fig. 7. Oleśnica, powiat Staszów County. Chosen fragments of ceramic vessels (1–12); drawn by A. Kosik-Roczkalska.

1995, *ibid.*, Tables). Less often, this kind of stylistics occurs in the areas round Rzeszów, Sandomierz or Kraków (Górski 2007, 92ff.). In terms of stylistics, these specimens correspond to assemblages of the classical Trzciniec phase in western Małopolska (*ibid.*, 49–62, 91–95).

In this collection, there are several distinctive, but not really typical specimens, which point towards connections of this pottery with the cultures located beyond the Carpathian Mountains. Noteworthy are characteristic handles of

jugs (Fig. 7:1–3), two of which are decorated with vertical ribs. From the territory of the Trzciniec culture, several examples are known — they are from: Żerniki Górne, powiat Busko Zdrój (Włodarczak 1998, Fig. 8:2), Gabułów (Górski, Jarosz 2006, Fig. 16:1, 7), Okalew, powiat Wieluń (Kłosińska 1997, Tabl. LVII:2) and Lutomiernik (Muzolf 2012, Fig. 63:2). On the upper base of another handle, there are crescent knobs (Fig. 7:2). These jugs do not often occur on the territory of the Trzciniec culture — as a matter of fact, they are only known from the area in the immediate vicinity of Kraków (e.g., Górski 1994, Tabl. IV:18; Górski, Jarosz 2006, Fig. 16:1, 2, 7). These vessels are related to the late phase of the Otomani culture (the Streda nad Bodrogom “horizon”) and the cultures that followed and in which Otomani influences are manifest (for a more detailed discussion — see: Górski 2003, 103, Fig. 5–7; 2007, 95–97). In the milieu of these cultures, we should also search for some analogies to the “sun-like” ornament on the shoulder of one of the vessels (Fig. 7:4). Often, these jugs have their bottoms formed with hollow legs of various heights, including really low ones (e.g., Górski, Jarosz 2006, Fig. 16:1, 2, 4, 7). In other areas, specimens on hollow legs are very rare (Kłosińska 1997, Tabl. XL:8, 10; LII:2; Czebreszuk 1996, Fig. 64:19, 22; Makarowicz 1998, Tabl. 26:2; Muzolf 2012, e.g., Fig. 52:7; 55:10).

Pottery with „southern” characteristics was also found in the region of Sandomierz during AZP research on site 21 in Tudorów, powiat Opatów (Bargieł *et al.* 1989, 43, Fig. 2:1), which corresponds very well with the *Krummesser* from Malice Kościelne, Kępie and Oziębłów.

#### Flint artefacts from Oleśnica

Side by side with the sandstone artefacts, equally noteworthy is the flint inventory collected in Oleśnica (Fig. 8:1–8), where the *Krummesser* fragment was found. Among morphologically and metrically diverse material, backed knives and knives resembling backed knives (“quasi backed knives” deserve particular attention (Fig. 8:1, 2, 6, 8); and, equally interesting are splinters. Clearly, these are forms of the flint industry in decline, which have their equivalents above all in the Trzciniec culture (*cf.* Budziszewski 1998), but also — in the Lusatian culture (Libera 2005). They seem to be supplemented with a fragmentarily preserved stone battle-axe (originally, five-sided?), which has a secondarily and incompletely drilled eye. The axe itself is made of igneous rock. Similar forms, including a specimen which underwent similar repair, were related to the Trzciniec culture by Z. Bierezańska (Berezanskaja 1972, 106, 107, Fig. V:9; XXXIII).

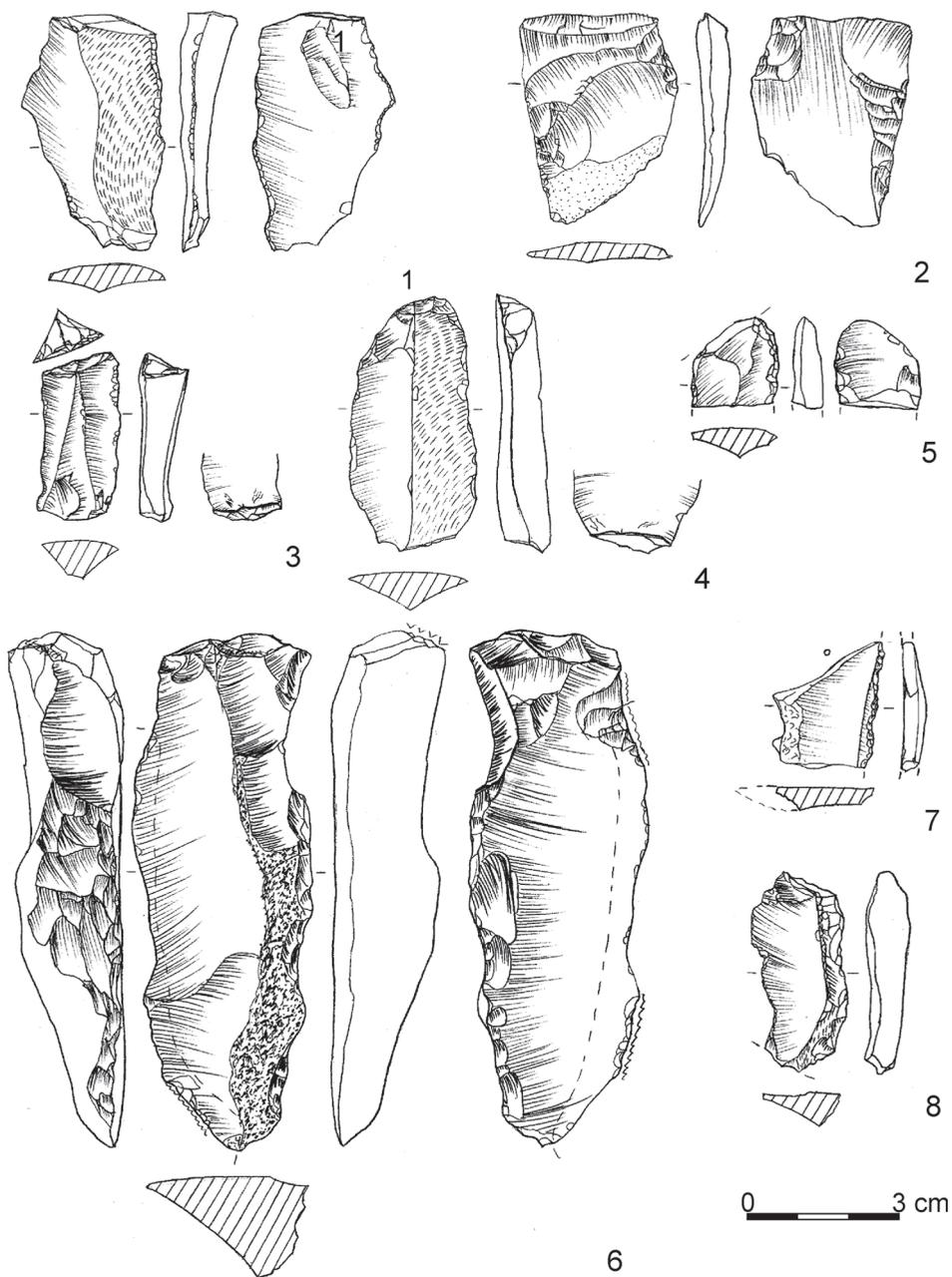


Fig. 8. Oleśnica, powiat Staszów. Chosen flint artefacts: 1-2 — “para-backed” knives; 3-4 — scraper; 5 — retouched blade; 6, 8 — backed knives; 7 — insert. Raw material: Świeciechów (1, 4), Volhynian flint (2), chocolate flint (3), Ożarów? (5), charred (7), erratic stone (8); drawn by J. Panek.

### The problem of “curved” knives in the Polish Lowlands

Knives corresponding to *Krummesser* are also known from the Polish Lowlands. They were found in the regions of Masuria (Mazury), Podlachia (Podlasie) and Kuyavia (Kujawy). In the “marshy settlement” in Barkweda, powiat Olsztyn, a polished sandstone fragment was found “among irregularly scattered, charred pieces of wood”. (Fig. 9:1; Mazurowski 1989, 66, Fig. 6). While a partly preserved body of a backed diabase knife was discovered on site X in the village of Ząbie, powiat Olsztyn. This settlement is connected with the Early Bronze Ząbie-Szestno assemblage, which is stylistically related to pottery of the Iwno and Trzciniec cultures (Fig. 9:2; Manasterski 2009, 101, Tabl. 70:2).

The literature has often stressed the role of the Bug trade route, functioning from the early phases of the Bronze Age. On the one hand, Baltic amber, carried to the south, was of interest to merchants, and — as its equivalent, artefacts made of bronze and/or the raw material itself would have been carried in the opposite direction (among others, Berezanskaja 1972, 160ff.; Bukowski 1998, 103; Kloczko 2008, 247ff., Fig.1; Makarowicz 2010, Fig. 6.1 — Map). J. Dąbrowski estimates that as much as 80% of bronze raw material that reached Polish territories should be attributed to the Otomani-Füzesabony culture (Dąbrowski 2009, 97ff.). The influence of that cultural milieu was also recorded in Podlachia, both as finds of hoards containing metal artefacts and as stylistic motifs on pottery (Pawlata 2012, 27, 28). Perhaps, the spread of “curved knives” in the eastern part of the Polish Lowlands can be related to the spread of the so-called Podlachia stylistics (Górski 2011). It seems that this stylistics can be considered as a specific transformation of the “knob” stylistics of the Otomani-Füzesabony culture by local Trzciniec groups (Górski, Makarowicz, Wawrusiewicz 2011). However, in that case, the above-discussed stone artefacts must definitely be dated later than 1600 BC.

The only known backed knife from Kuyavia is a tip fragment of a triangular specimen found in a multicultural settlement (notably, among other finds, Trzciniec culture pottery was recorded at that site as well) from site 8 in Grabkowo, Włocławek County (Mikulski 2012, Fig. 7:2).

### Flint knives — identifiers of the Otomani-Trzciniec horizon?

Generally, in the zone surrounding the Carpathians, *Krummesser* were made of fine-grained crystalline rocks. This can also be seen in the knives found in the Polish territories. However, in many Bronze Age cultures, we also find flint artefacts (for instance, Păunescu 1970 — numerous examples there; see also Kull 1986). Their presence is very important because they occur in the Otomani culture — which is of interest to us. Otomani bifacial sickle-shaped flint knives were found on several sites of its developed phase. In Tiream (judetul Satu Mare, Romania), side by side with a typical *Krummesser*, the middle part of

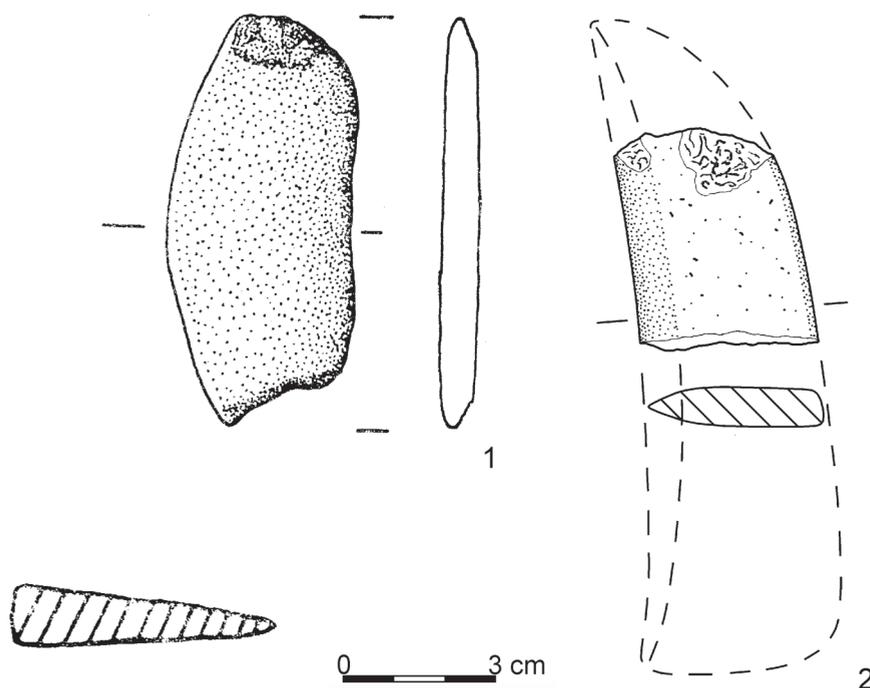


Fig. 9. Barkweda, powiat Olsztyn (1 — after Mazurowski 1989); Zabie, powiat Olsztyn (2 — after Manasterski 2009). Curved knives (1, 2).

a flint sickle knife was found (Fig. 10:1; Kopacz 2001, 51, 80, Tabl. XII:1, 2). In Besenyöd (megye Szabolcs-Szatmár-Bereg, Hungary), a Volhynian flint sickle in an “Otomani” vessel was found (Fig. 10:2; Kopacz 2001, 80, Tabl. XXIV:7). Also, in the same country, another (unspecified) sickle was found in the region of Székely (ibid., 57, 80; no data about the raw material used is available). This brief overview of sickle-shaped knives must be extended to include another artefact (with the broken base), made of Dniester flint and found on site 29 in Jasło (Fig. 10:3; Gancarski 1988, 77, Fig. 11:8). The outlines depicting the outermost edges of the above-cited artefacts show a great similarity to some kinds of non-siliceous knives; however, their small number does not give us a clear answer as to whether this similarity of shapes is coincidental or whether we are dealing here with copying of the idea of *Krummesser* in flint raw material. However, the “crescent” shapes of knives made of Volhynian flint cannot be coincidental<sup>14</sup>.

<sup>14</sup> A similar technological intention can be observed in the case of at least several dozen specimens in the group of almost 60 crescent preforms of sickle-shaped knives discovered in a flint-working area near the flint mine of the Lusatian culture in Kosina, powiat Kraśnik, site 4 (unpublished materials from the excavations conducted by B. Bargieł, M. Florek i J. Libera, kept

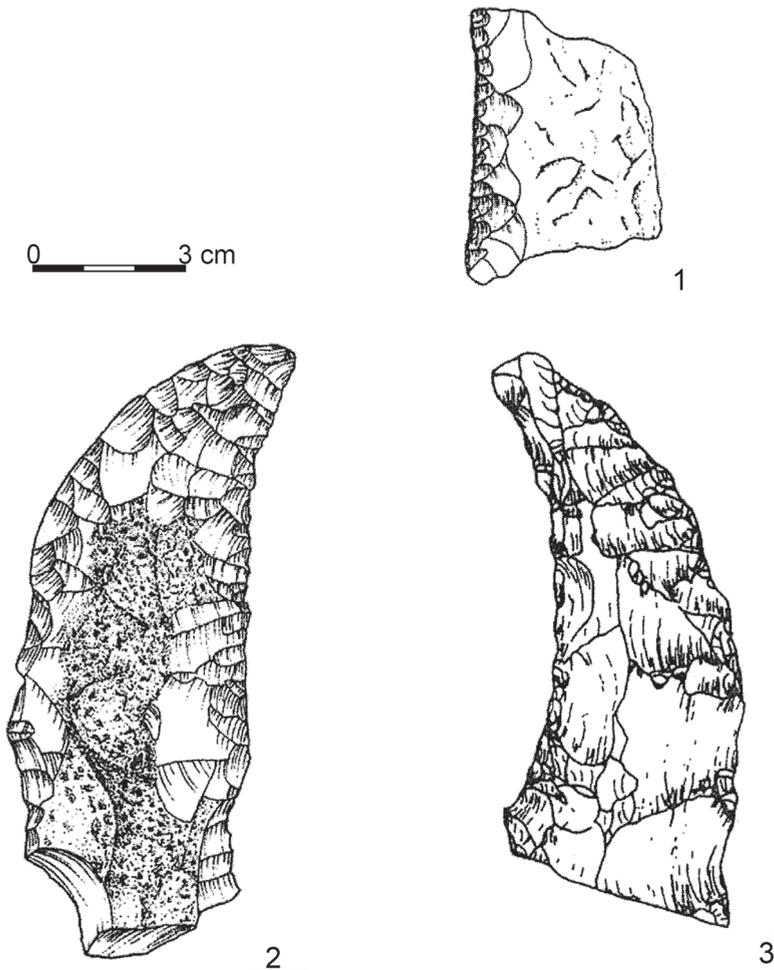


Fig. 10. Tiream, județul Satu Mare (1 — after K o p a c z 2001); Besenyöd, megye Szabolcs-Szatmár-Bereg (2 — after K o p a c z 2001); Jasło, powiat Jasło (3 — after G a n c a r s k i 1988). Flint sickle knives (1–3) found in the context of Otomani culture pottery.

While searching for an analogy of the above-mentioned artefacts of the Otomani culture, we should remember that they have their equivalent among sickle-shaped knives with the separate base (described with the BA symbol in the taxonomy proposed by J. Libera 2001, 54ff.), known almost exclusively as loose finds.

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in the archives of the Institute of Archaeology of Maria Curie-Skłodowska University in Lublin). This observation should not be overgeneralized on all “sickles” with undercut inner edges because among them there are also artefacts secondarily (and often many times) sharpened (*cf.* Libera 2001, 63–66).

The knife from Besenyöd — it is a form with a slightly convex or straight inner side, and the visibly lowered cutting edge (the BA1b type after J. Libera 2001). Among the collected several dozen finds of this kind, there is a specimen which most probably comes from a destroyed site of the Trzciniec culture in Hrubieszów, Osiedle Jagiellońskie, where also several vessels were found (Fig. 11:1; Bargieł, Libera, Panasiewicz 1999, 242, Fig. 2:1; also, Libera 2001, 168)<sup>15</sup>.

An analogy for the flint knife from site 29 in Jasło can be found among forms belonging to the BA-III type, i.e. forms with a slightly undercut side. In the group of almost 20 similar specimens, there is one found in pit 29 in the settlement in Tyszowce, powiat Tomaszów, site 25B (Fig. 11:2), which most likely can be connected with Trzciniec culture settlement (Buszewicz 1986, Fig. 1:1; also, Gosik-Tytuła 2006)<sup>16</sup>.

The cited similarities, although they concern single specimens of the Otomani culture, seem to be very important because, together with the finds of sickle-shaped knives recorded on the territories of central-eastern Poland and western Ukraine, they have a relatively compact area of distribution. Until now — due to the absence of a clear context — they were recognized as one of the types belonging to the Trzciniec-Lusatian culture horizon (Bargieł, Libera 1997, 155ff.; Libera 2001, 95–98, catalogue: pos. 232–238 and 253–256, Maps 40–41). Perhaps, the single specimens of these types, indirectly pointing to links with “Trzciniec” settlement (for type BA1b — Hrubieszów, Osiedle Jagiellońskie; for type BAIII — Tyszowce, site 25B), constitute a premise for their recognition as cultural identifiers. Very significant is also the kind of raw material used in their production — Volhynian flint. It was used to produce both the specimens from Besenyöd and Jasło, as well as the specimens classified as types BA1b and BAIII<sup>17</sup>. Equally interesting is the fact that in these collections there are artefacts from several flint-working areas located either directly over or near the flint mines. Knives of BA1b type were recorded in the district of Równe (Iwanicze, Liski, Mirohoszcza), while knives of BAIII type — in the district of Równe (Kościaniec, Listwin, Zbytyń) and in the district of Tarnopol (Litowiszczce, Ludwiszczce, Miskowice, Sapanów, Szumbar; Libera 2001, catalogue — *ibid.*, literature).

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<sup>15</sup> Perhaps, another sickle-shaped knife from that site is the specimen with the tip and base which were broken off, published by H. Taras (1995, 223, Pl. XLIX:12, 13).

<sup>16</sup> On that site, Lusatian pottery was found as well.

<sup>17</sup> With the exception of an artefact made of Rejowiec flint — the raw material macroscopically resembling Volhynian flint.

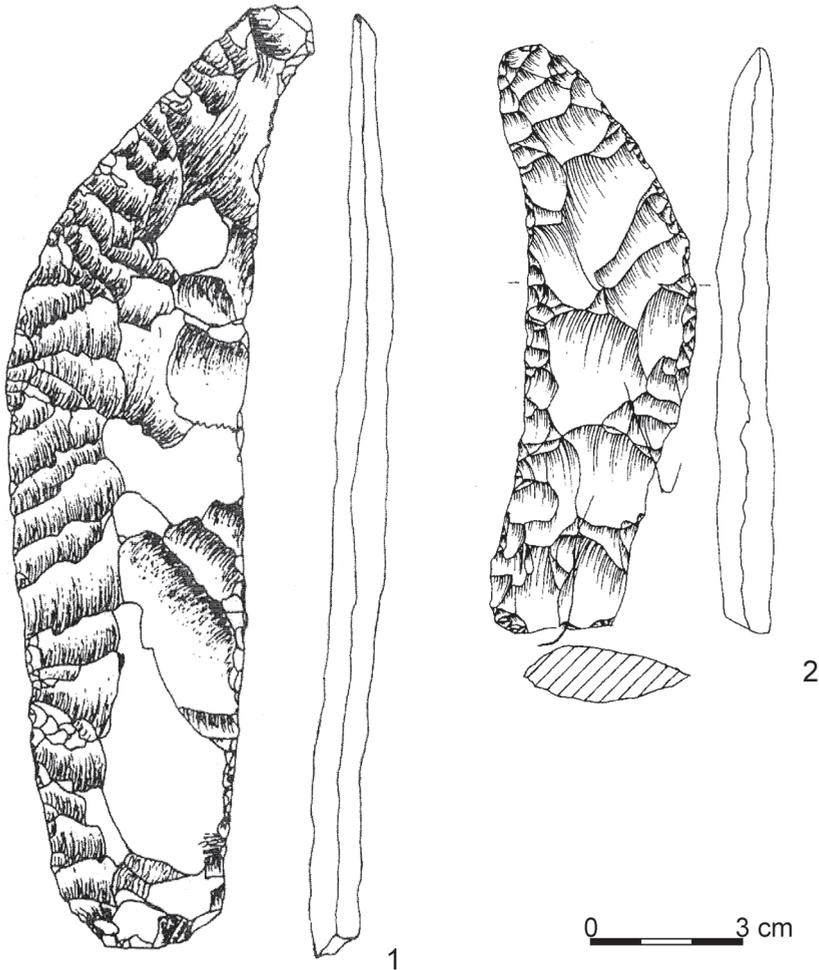


Fig. 11. Hrubieszów, powiat Hrubieszów (1 — after Bargieł, Libera, Panasiewicz 1999); Tyszowce, powiat Tomaszów Lubelski (2 — Buszewicz 1986). Sickle knives (1–2) from supposed features of the Trzciniec culture.

## CONCLUSIONS

At site 6 in Oleśnica, *Krummesser* occurred in a characteristic context — within the deposited pottery materials (and possibly also, flint ones) of the Trzciniec culture, among which relatively numerous “southern” links, mostly with the Otomani culture, were observed. The link between the discussed tools made of non-siliceous rocks with the territories south of the Carpathians seems obvious (e.g., Kopač 2011). However, we do not know whether they should be under-

stood as imports or imitation. The latter seems to be supported by the results of macroscopic petrographic analyses. Let us remember that they were made of the raw material from beyond the genetic area of the “Otomani” settlement: erratic stones or Paleozoic sandstone from the Świętokrzyskie Mountains (Oleśnica, Rudawa), nepheline syenite and granitoid from Volhynia (other knives from Rudawa) or Carpathian flysch sandstone (Trzcinica, Czchów). We must therefore consider a transfer of the ideas of the artefacts used by the Early Bronze population living south of the Carpathians and their representation in local non-siliceous materials. The site in Oleśnica is presently the northernmost Trzciniec settlement where we can find such a large collection of pottery material with the characteristics of the cultures from the other side of the Carpathians.

To date, excavations on the territory of Poland have revealed at least 26 specimens of *Krummesser* from 21 sites, clearly concentrated on Carpathian foothills and the left-bank upland of the Vistula (from Kraków to Sandomierz), with single points in the Sandomierz Basin and on the Lublin Upland, as well as in the Lowlands (Fig. 12). Although their occurrence in the Carpathian foothills is connected with the presence of the Otomani population (among others, Gancarski 1994; 2011, 27–28; Kopacz 2011, 74), the specimens found on the left bank of the Vistula or single artefacts recorded in the Polish Lowlands (however, their context is not clear) seem to be closely connected with Otomani influences. Settlement of that culture on the northern slopes of the Carpathians began in the 17<sup>th</sup> century B.C. — at the same time when, in the vicinity of Kraków, settlement of the Trzciniec culture appears. In consequence, a new cultural setting was shaped in the upper Vistula river basin. Its southern part was dominated by the Otomani/Füzesabony culture, while its northern part — by the Trzciniec culture. As a result of mutual contacts between the populations of the two cultures, the latter joined the network of far-reaching contacts connected with distribution of bronze and amber. Mainly in the territory of western Małopolska, a relatively large number of vessels with southern characteristics are recorded. With those vessels, we observe an influx of bronze artefacts. Within the reach of the Trzciniec culture, exotic goods appear — glass, amber, and harness bone elements) They occur with a much greater density on the loess-covered areas of western Małopolska. To a smaller extent, they are then present in the areas round Sandomierz, in the watershed between the Warta and Prosna rivers in the vicinity of Sieradz and in Kuyavia; they are also scattered on other territories. The Otomani-Füzesabony culture is widely credited with the role of organizing the trade and distribution of amber to the Aegean area. In our country, centres in which imports were concentrated could have an important role in mediating this exchange because of their location (Cabalska 1980; Górski 1999; Makarowicz 1999; Dąbrowski 2004, 97–99; Górski, Makarowicz 2007; Makarowicz 2010, 336–338; Jaeger 2010; Górski 2012).

Regardless of different interpretations, the presence on Polish territories of the *Krummesser* must surely be connected with the Otomani culture — as

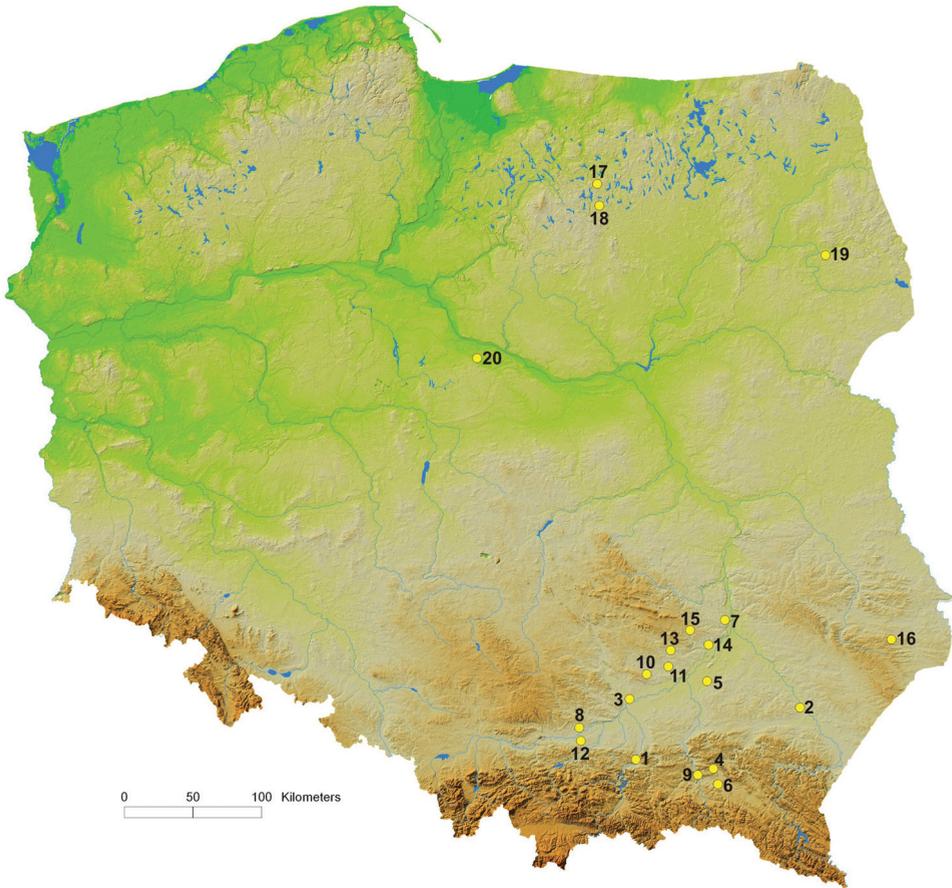


Fig. 12. Location of sites with *Krummesser* in the Polish territories;  
drawn by J. Libera, E. Włodarczak.

- 1 — Czchów, powiat Brzesko; 2 — Grodzisko Dolne, powiat Leżajsk; 3 — Jakuszowice, powiat Kazimierza Wielka;  
4 — Jasło, powiat Jasło; 5 — Kębłów, powiat Mielec; 6 — Łąjsce, powiat; 7 — Malice Kościelne, powiat Opatów;  
8 — Kraków-Nowa Huta-Mogiła, powiat Kraków; 9 — Trzcinica, powiat Jasło; 10 — Rudawa, powiat Pińczów;  
11 — Oleśnica, powiat Staszów; 12 — Kraków-Bieżanów, powiat Kraków; 13 — Korytnica, powiat Staszów;  
14 — Kępie, powiat Sandomierz; 15 — Oziębłów, powiat Opatów; 16 — Komarów-Osada, powiat Zamość;  
17 — Barkweda, powiat Olsztyn; 18 — Ząbie, powiat Olsztyn; 19 — Złotoria, powiat Białystok;  
20 — Grabkowo, powiat Włocławek.

a result of settlement of its population in the northern foothills of the Carpathians (among others, Czopek, Machnik 2013, Fig. 11) and the effect of contacts and transfer of the idea of the “curved” knife into the *oecumene* of the Trzciniec circle. What should be emphasized is that most of these artefacts were discovered in the context of ceramic materials of the Trzciniec culture or with the clear presence of such materials on multicultural sites. For genetic reasons, the discussed finds therefore complement the map of Otomani sites or influences (Fig. 13). The analysis of the distribution of the sites leads to

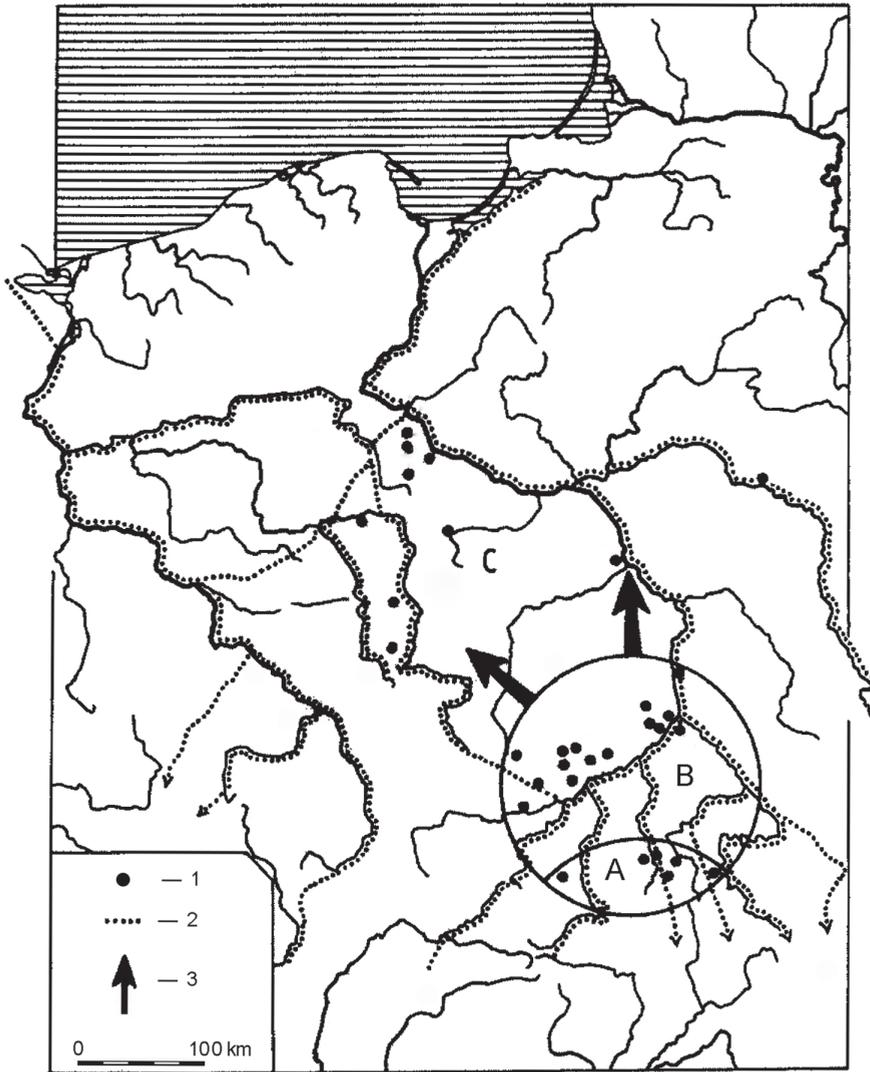


Fig. 13. Dispersion of the Otomani culture elements in the Vistula and Warta river basins.

1 — sites with the component of the Otomani culture in the Vistula and Warta river basins; 2 — main trade routes of the far-reaching exchange of goods in the Oder and Vistula river basins; 3 — the main directions of the Otomani culture expansion; A, B, C — reception zones of Füzesabony Culture traits (after Makarowicz 1999).

a very important conclusion. On the territory of eastern Poland, the number of *Krummesser* is relatively large compared to a small number of other finds with southern characteristics. For example, easily distinguishable pottery, even in the area round Rzeszów — directly neighbouring with the “Otomani” zone — is registered only sporadically.

While tracing the expansion of “curved” knives from the Schneckenberg-Glina III complex, J. Kopacz draws attention to two directions: north-eastern connected with the Monteoru culture, and north-western identified with the Otomani-Füzesabony culture (Kopacz 2011, 74). Particularly important for the origin of the analysed “curved” knives seems to be the expansion of the Monteoru culture towards the middle Dniester river and farther — in the direction of Volhynia. In both regions, there were flint-working areas — either located directly over the mines, or in the vicinity of the mines — from which we know both knives of BA1b type and those of BAIII type, based on the excellent quality of raw materials — commonly known as Volhynian and Trans-Dnistran flint<sup>18</sup>. The similarity of sickle knives produced there to finds from the area occupied by the Otomani-Füzesabony culture (*e.g.*, Besenyöd, Jasło) and their relatively compact area of distribution, covering western Ukraine and central-eastern Poland, seems to offer the basis for verification of at least some of the things that have previously been determined about chronologies and cultures.

Crescent-shaped flint knives with the separate, wide base (linear or close to linear) and the inner side: 1. a slightly convex or straight and markedly lowered cutting edge (knives of Besenyöd type; 2. very much arc-like undercut (knives of Jasło type) — perhaps, they should be connected with Otomani settlement (or its influences), and — in consequence, with Trzciniec settlement or influences. Undoubtedly, they differ from other crescent forms. Both are based exclusively on Volhynian material. Perhaps, their cultural identification can be done on the basis of their base: decidedly wide (close to the maximum width of the specimen, or else — of its widest part) — in the group of Trzciniec and Otomani knives; very narrow (oscillating around half of the maximum width of the specimen) — among “Lusatian” knives. If we could confirm this division, then — having a larger series at our disposal — we could state precisely metric proportions of their bases. Most probably, a similar correction should be performed in the case of the other collection (BA1b<sub>s+k</sub>), in which — with the exception of the most likely “Trzciniec” specimen from Hrubieszów, Jagiellońskie estate, there is nothing else that would allow us to date it. Perhaps, both types will serve as identifiers of the Otomani-Trzciniec horizon, and then this phenomenon should refer to the time of colonization of the Uplands: Małopolska, Lublin, Podolye and Volhynia by the “Trzciniec cultural circle” (*i.e.*, the period between 1800–1650 BC), and the time of settlement of the „Otomani/Füzesabony” culture in the northern foothills of the Carpathians. Currently, their dispersion (almost 30 specimens) covers the area of Polish-Ukrainian border (*cf.* Libera 2001, catalogue).

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<sup>18</sup> With regard to their diversification and location of various types (*cf.* Zakościelna 1996, 15–18, Map 2; Konoplja 1998).

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