

FOUND IN A BOX

Unknown bifacial leaf point from the Koziarnia Cave

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Abstract: Throughout the 19th century, caves of the Polish Jura have become of interest to both businessmen and amateur archaeologist. The landlord of Ojców, Jan Zawisza, explored the caves in search of traces of ancient man and conducted his excavations which were subsequently published. At the same time, neighbouring landowners started cooperation with the Prussian Mining Office and exploited caves for their soils, rich in organic matter, including phosphoric acid. Sediments removed from the caves were later sold as a natural field fertiliser. Industrial mining of the caves brought to the light numerous artefacts and bones of extinct animals, which were entrusted to the palaeontologist Ferdinand Römer, director of Mineralogical Museum at Breslau University. The assemblage from Nietoperzowa Cave, the first cave around Ojców to be mined for soil, became the starting point of Römer's collection and his fieldworks in the area. Koziarnia Cave was one of the caves exploited on request of the landowner and later excavated on Römer's behalf by Oskar Grube. Among other artefacts, a single leaf point was found and published from Koziarnia Cave. Many years later, when a new transitional industry – Jerzmanowician – was identified, based on the mentioned leaf point, the cave has been included into a group of scarce cave sites attributed to the new Middle/Upper Palaeolithic transitional entity. In the second half of the 20th century, Waldemar Chmielewski conducted extensive fieldworks at the site but failed to find other artefacts that could be linked with the leaf point published by Römer. Meanwhile, the only bifacial leaf point from Koziarnia Cave has been lost. However, recently conducted studies of Römer's collection brought into light one more bifacial leaf point from Koziarnia Cave. This paper aims to show this previously unpublished leaf point with the use of modern analytical approach in order to present new evidence of Jerzmanowician occupation in the Koziarnia Cave.

INTRODUCTION

Polish Jura, a karstic region situated in Southern Poland (Fig. 1), has a long history of archaeological research. First amateur archaeological fieldworks in the caves were conducted by Jan Zawisza, the owner of Ojców castle, since 1871 (*Zawisza 1871; 1873; 1874a; 1874b*). Since then over 210 archaeological cave sites have been discovered and studied in the region. In the second half of the 19th century, along with scientific interest, a more utilitarian one appeared. Cave sediments were exploited and used as field fertiliser (Fig. 2: a). In majority, local farmers used cave sediments for their own purposes (*Wojenka 2012*), although several caves, including Koziarnia and Nietoperzowa Caves were industrially exploited by their owners (Fig. 1: c). It was at that time, when the first bifacial leaf points, among other artefacts, were found, first in Nietoperzowa Cave and later in Koziarnia Cave. Almost a century later from the name of a village Jerzmanowice, where Nietoperzowa Cave is located, originated a name of a new Middle/Upper Palaeolithic transitional entity – called Jerzmanowician. W. Chmielewski first introduced the term in 1961 (*Chmielewski 1961*) based on his archaeological fieldworks conducted in Nietoperzowa Cave. Jerzmanowician was soon included in one of the transitional industries distinguished in Europe, called Lincombian-Ranisian-Jerzmanowician (LRJ; *Desbrosse/Kozłowski 1988*). The distinctive features of this industry include the use of double platform cores and production of leaf points on blades with minimal bifacial shaping. To this day there are only several sites in Poland that could be unequivocally linked with Jerzmanowician (*Kowalski 1967; 1969; Kowalski et al. 1965; Krajcarz et al. 2018; Lorenc 2006; Madeyska 1992*). One of them was Koziarnia Cave, where a single bifacial leaf point was found and published by

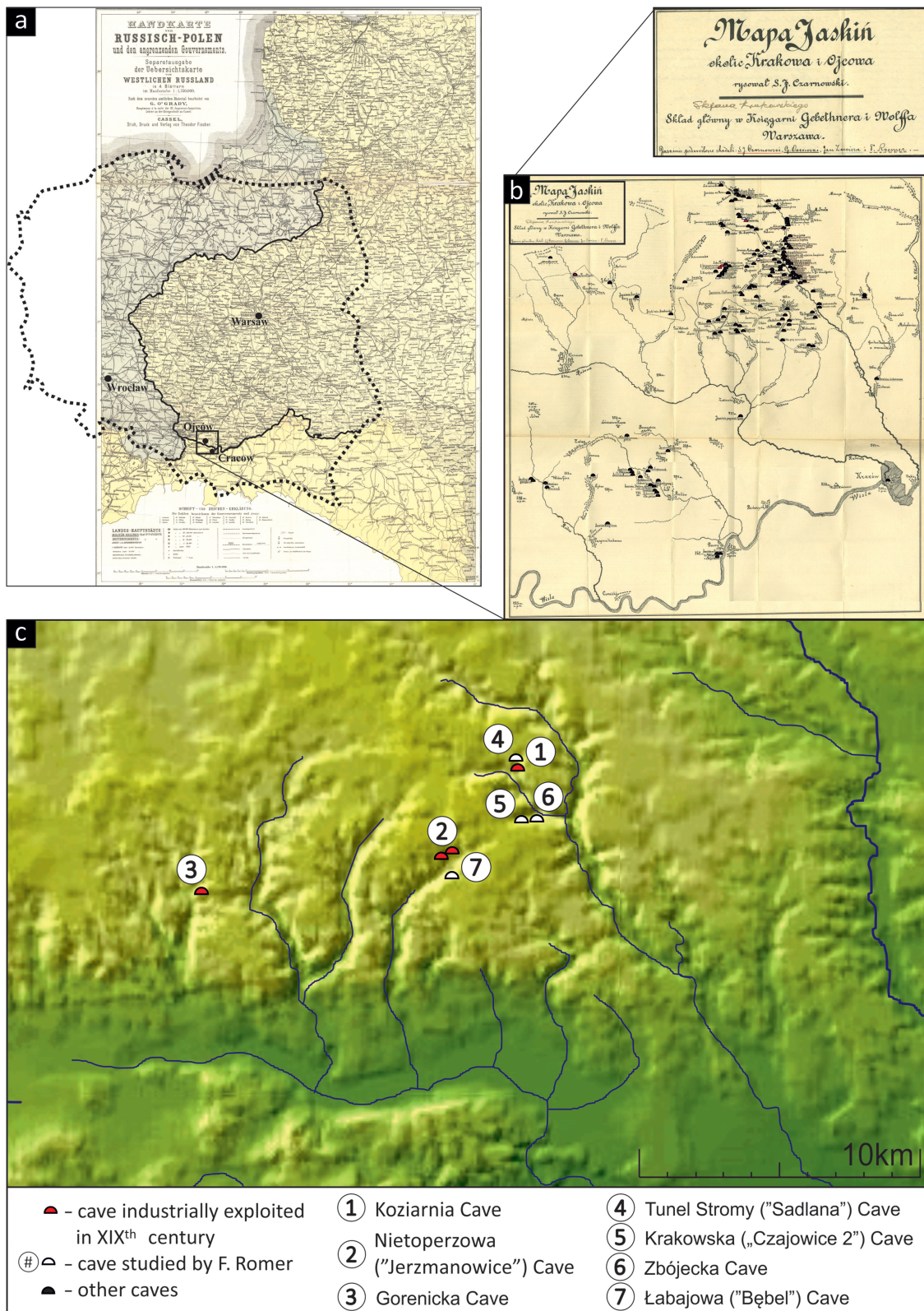


Fig. 1. The localisation of the caves mentioned in the text. a – current map of Poland plotted on the map of Western Russia and neighbouring countries from 1890. Solid lines and colours indicate partitions: blue colour – Prussian Partition, green – Russian Partition, yellow – Austrian Partition; b – scan of a personal exemplar of a “Map of caves around Cracow and Ojców” published by S. J. Czarnowski (1911) belonging to S. Krukowski. Map with S. Krukowski personal notes available from the archive of the State Archaeological Museum in Warsaw: <http://193.39.71.4/atom/index.php/spuszczna-stefana-krukowskiego>; isad, inventory number: PL PMA 1-1-5-1-13-1; c – map of caves studied by F. Römer.

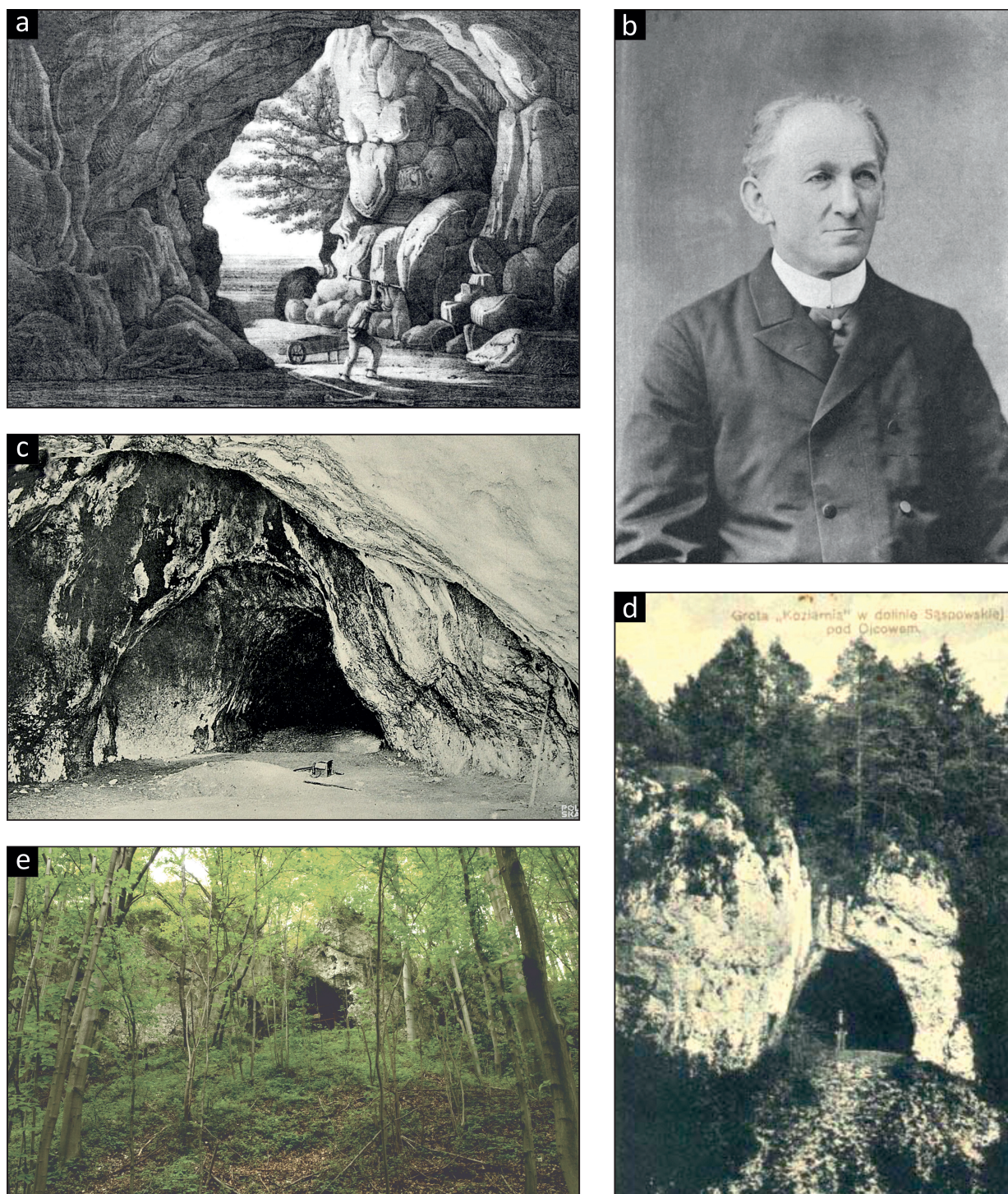


Fig. 2. a – cave sediment exploitation in the 19th century, cave in Złoty Potok drawn by J. Cegliński (after: Wójcik 2004, 271, fig. 2); b – Ferdynand Römer (after: Simonds 1902); c – Koziarnia Cave around 1910, the pit visible in the middle part may be a remnant of the F. Römer fieldworks in 1879; d – postcard dated to 1927 illustrating the entrance to the Koziarnia Cave; e – Entrance to the Koziarnia Cave in 2018, seen from the bottom of the Koziarnia Gorge (photo by M. Bogacki).

F. Römer (1883; 1884). The fieldworks in Koziarnia Cave conducted by W. Chmielewski in 1958–1962 aimed at finding more traces of Jerzmanowician occupation in the cave (Chmielewski *et al.* 1967). Even though he managed to determine 22 geological layers in the cave, none of them could be attributed to Jerzmanowician. For this reason, until now, the Jerzmanowician occupation in Koziarnia Cave could be confirmed solely on the basis of a single bifacial leaf point (Fig 3: 1a, 1b).

The recently launched project focused on prehistoric settlement in Sąpów Valley (Kot *et al.* 2019), where Koziarnia Cave is located, created an opportunity to get back to the old collections and obtain new insights into transitional industries in Poland (Kot *et al.* 2021). One of the restudied collections was Römer's one. Interestingly, during the archive investigation, several unpublished artefacts have been found in the collection. Among them, another bifacial leaf point from Koziarnia Cave. The paper aims at studying this previously unpublished bifacial leaf point from Koziarnia with use of the modern analytical approach in order to present new evidence of Jerzmanowician occupation at the site.

RÖMER'S COLLECTION

Ferdinand Römer, born 1818 in Hildesheim in Lower Saxony, was a palaeontologist and geologist (Fig. 2: b). He received his doctoral degree from University in Berlin. In 1845 he travelled to America to study its geology and palaeontology. He focused mainly on the geology of Texas. Till now, he is used to be named the "Father of Geology of Texas" (Simonds 1902). In 1855 he was offered a position of ordinary professor at the Schlesische Friedrich-Wilhelms-Universität in Breslau (Wrocław), where he worked as head of the Department of Geology and Mineralogy till his death in 1891 (Simonds 1902). In 1868 he established the Mineralogical Museum of Royal University of Breslau. He always sought to improve the paleontological collection at the University. Opportunity for that presented itself when he was notified of industrial mining of cave deposits in Polish Jura (Römer 1875).

The region rich in caves suitable for exploitation was at that time part of the Russian Empire (Fig. 1: a), but the mining activities were conducted or coordinated by the local landlords, Prussian businessmen and Upper Silesian Mining Office. Sediments were transported from the Russian territory to Prussia and then sold as a field fertiliser. Cave soils were said to contain guano, animal bones and carcasses which made them rich in phosphoric acid. Chemical analyses of the cave sediments made by Dr. Fr. Hulwa, confirmed a high concentration of phosphonates in the exploited soil (Römer 1879, 47).

It is not clear how F. Römer obtained the information about archaeological and palaeontological discoveries made during the cave sediment exploitation. At that time caves around Ojców (e.g. Mamutowa Cave, Zbójecka Cave) were explored by Jan Zawisza, the owner of Ojców, who not only conducted his excavations but also published his results (Zawisza 1871; 1874). In 1874 Römer visited Nietoperzowa Cave, which was at this time exploited by O. Ogrowsky, a businessman from Breslau, and the mine foreman named Tischler, who acquired the right to work in the Nietoperzowa Cave and another cave nearby (Römer 1875; 1879). In order to enrich the Mineralogical Museum collection, Römer made an agreement with Ogrowsky to select the bones and artefacts during the future works (Römer 1879, 48, 49). In 1878 Römer started his investigations in Nietoperzowa Cave, funded by Königl. Preussische Cultusministerium (Royal Prussian Ministry of Culture). He also visited Jan Zawisza, who at that time was exploring Mamutowa Cave (Römer 1884, 11). Zawisza's rich findings of fossil bones, but also meticulous methods undoubtedly influenced Römer, convincing him of cave sediments potential and value in palaeontological research.

Encouraged by the obtained results, Römer sought to excavate beyond Nietoperzowa Cave. Therefore, in 1879 he acquired further funding from Königliche Akademie der Wissenschaften (Royal Academy of Sciences) in Berlin and studied several more caves (i.e. Koziarnia Cave, Zbójecka Cave, Krakowska Cave (called by him Czajowice 2 Cave), Tunel Stromy Cave (called by him Sadlana Cave), Łabajowa Cave (called by him Bębel Cave) and Gorenicka Cave (Fig. 1: c; Römer 1884, 17). The person entrusted with leading the excavations and collecting material at his request was Oscar Grube, as he was unable to lead and supervise the excavations himself (Römer 1884). According to S. J. Czarnowski (1910), Grube was a Prussian businessman involved in industrial mining of cave sediments, but according to P. Socha and K. Stefaniak (2006, 16), he was a director of Upper Silesian Prussian Mining Office.

After the completion of fieldwork and ensuing description and publication, all the collected materials, including artefacts and fossil bones, were deposited in the Mineralogical Museum of the University of Breslau. Currently, Römer's collection is dispersed. Animal bones are stored in the Palaeontology Department of the Institute of Zoology at the University of Wrocław. A few dozen of stone, bone, metal and pottery artefacts are stored in the Archaeological Museum in Wrocław. Some artefacts have been lost including the published bifacial leaf point from Koziarnia Cave.

KOZIARNIA CAVE

Koziarnia Cave is situated in the southern part of the Polish Jura (Fig. 1). It is located on the left slope of Koziarnia Gorge, which is part of Sąspów Valley. The entrance of the cave is 5-metre-high and heads SW. It opens up onto the main chamber, which covers an area of over 100 m² and then turns into a single 40-metre-long gallery narrowing toward the end of the cave (Fig. 2: c–e).

In the second half of the 19th century, Koziarnia Cave belonged to the Lordship of Pieskowa Skała named Mieroszewski, and it was on his request that cave was excavated in order to procure fertiliser in 1877 (Römer 1884, 9). Römer mentions that the sediments were sieved to separate soil from stones.

O. Grube conducted fieldworks in Koziarnia Cave on behalf of F. Römer in 1879. Römer described in his publication several artefacts found in the cave including:

- flint tools, among them a leaf point (Fig. 3: 1a, 1b; Römer 1883, pl. XXII (I): 7),
- spindle whorls (Fig. 3: 2; Römer 1883, pl. XXII (I): 12),
- bronze ring (Fig. 3: 3; Römer 1883, pl. XXVII (VI): 5),
- glass beads (Fig. 3: 4, 5; Römer 1883, pl. XXVI (V): 1, 2),
- stone polishers (Fig. 3: 6; Römer 1883, pl. XXVI (V): 8),
- bone needle (Fig. 3: 7; Römer 1883, pl. XXV (IV): 10),
- silver coin (Fig. 3: 8; Römer 1883, pl. XXVII (VI): 7a, b),
- pottery vessels (Fig. 3: 9; Römer 1883, pl. XXVII (VI): 2),
- bone borer (Fig. 3: 10; Römer 1883, pl. XXIII (II): 7),
- iron spearhead (Fig. 3: 11; Römer 1883, pl. XXVII (VI): 8),
- perforated tusk of *Ursus sp. palaeus* (Fig. 3: 12; Römer 1883, pl. XXV (IV): 7).

Interestingly, among the artefacts from Römer's collection, some have neither been studied nor published. In his collection one may find the following unpublished artefacts from Koziarnia Cave: two spindle whorls, two metal arrowheads, a fragment of antler with incisions, undistinguishable metal artefact, pottery piece, three bone tools with traces of processing, single bone splinter and a single flint leaf point. Recently two of the mentioned bone tools were analysed and radiocarbon dated (Kot *et al.* 2021).

METHODS

The artefact under scrutiny was submitted to a detailed morpho-technological description based on the scar pattern analysis (working step analysis; Bar-Yosef/Van Peer 2009) which is currently a standard method for the analysis of bifacial tools production and reduction processes. The method, as proposed by German researchers over 20 years ago (Pastoors *et al.* 2015; Pastoors/Schäfer 1999; Perreault *et al.* 2013; Richter 2001), relies on the reconstruction of *chaîne opératoire* derived from evaluating the characteristics, spatial distribution and chronology of scar pattern visible on the tool. The method is successfully used for the analysis of bifacial forms such as asymmetrical knives (Jöris 2001; Kot/Richter 2012; Urbanowski 2004), leaf points (Kolobova *et al.* 2019; Kot 2014; 2017), handaxes (Boëda 2001; 2013) as well as for debitage (Bar-Yosef/Van Peer 2009; Przeździecki 2019).

LEAF POINT ANALYSIS

The analysed tool is made of the cortical blade. It is 51 mm long, 19 mm wide and 9 mm thick (Fig. 4: a, b). The artefact was made on flint. Over 50% of its dorsal surface is covered with cortex; moreover, the tool is highly patinated, which renders it almost ineligible for detailed raw material identification. The glossy surface patina covers almost the entire artefact. The edges display numerous postdepositional damage traces such as notches, blunting removals and truncations (Fig. 4: c). Only a small fragment of the retouched edge does not exhibit any postdepositional damage. The postdepositional damage areas are either not patinated or patinated to a degree which allows for observing the original dark-grey colouring of the flint mass, indicating most probably its local Jurassic origin.

The tool manufacturing process can be divided into the following stages (Fig. 4: d, e):

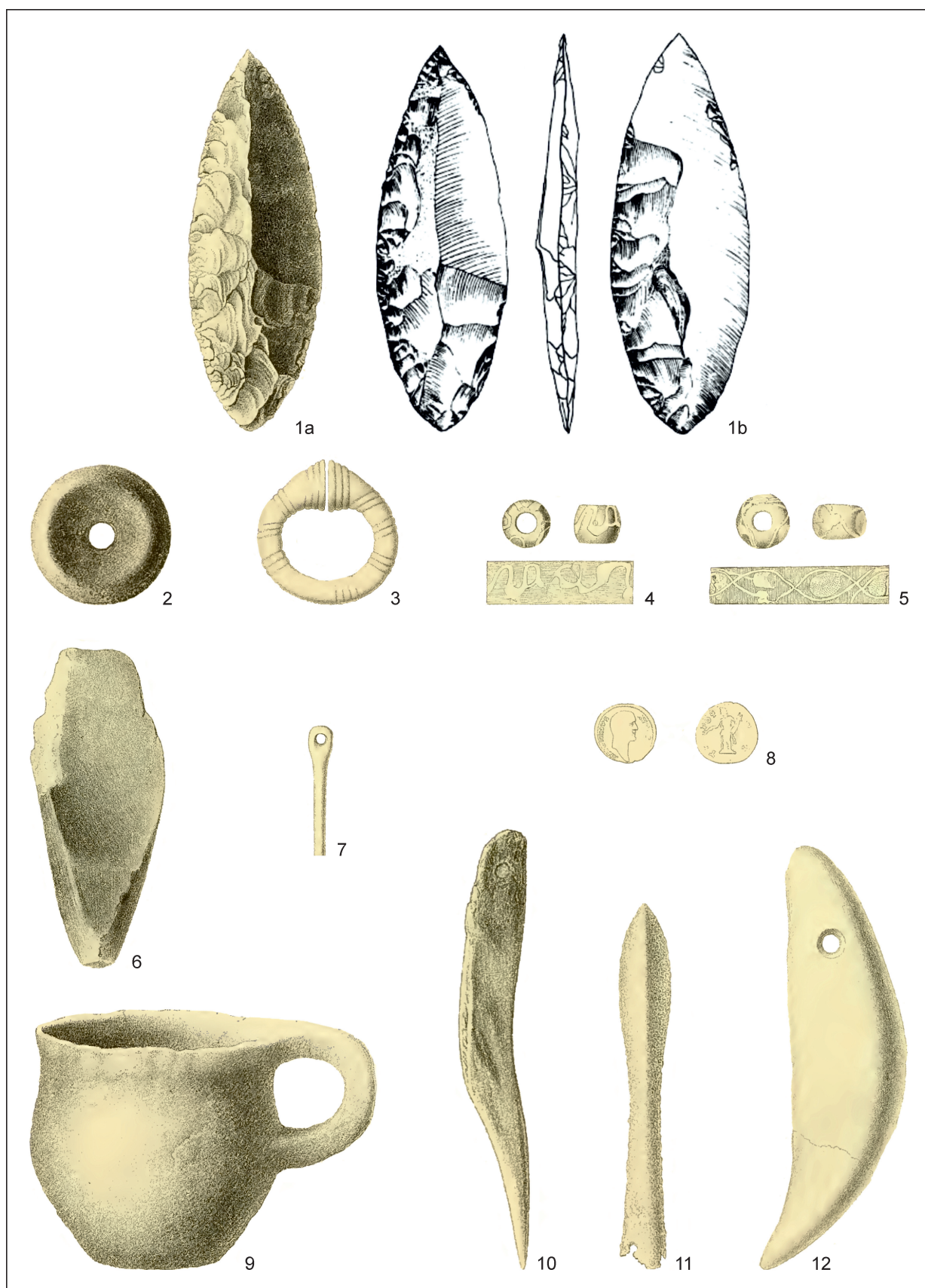


Fig. 3. 1a, 2–12 – artefacts from Koziarnia Cave published by F. Römer (1883; 1884); 1b – drawing of both sides of bifacial leaf point from Koziarnia Cave published by W. Chmielewski et al. (1967). The leaf point must not have been lost then. No scale.

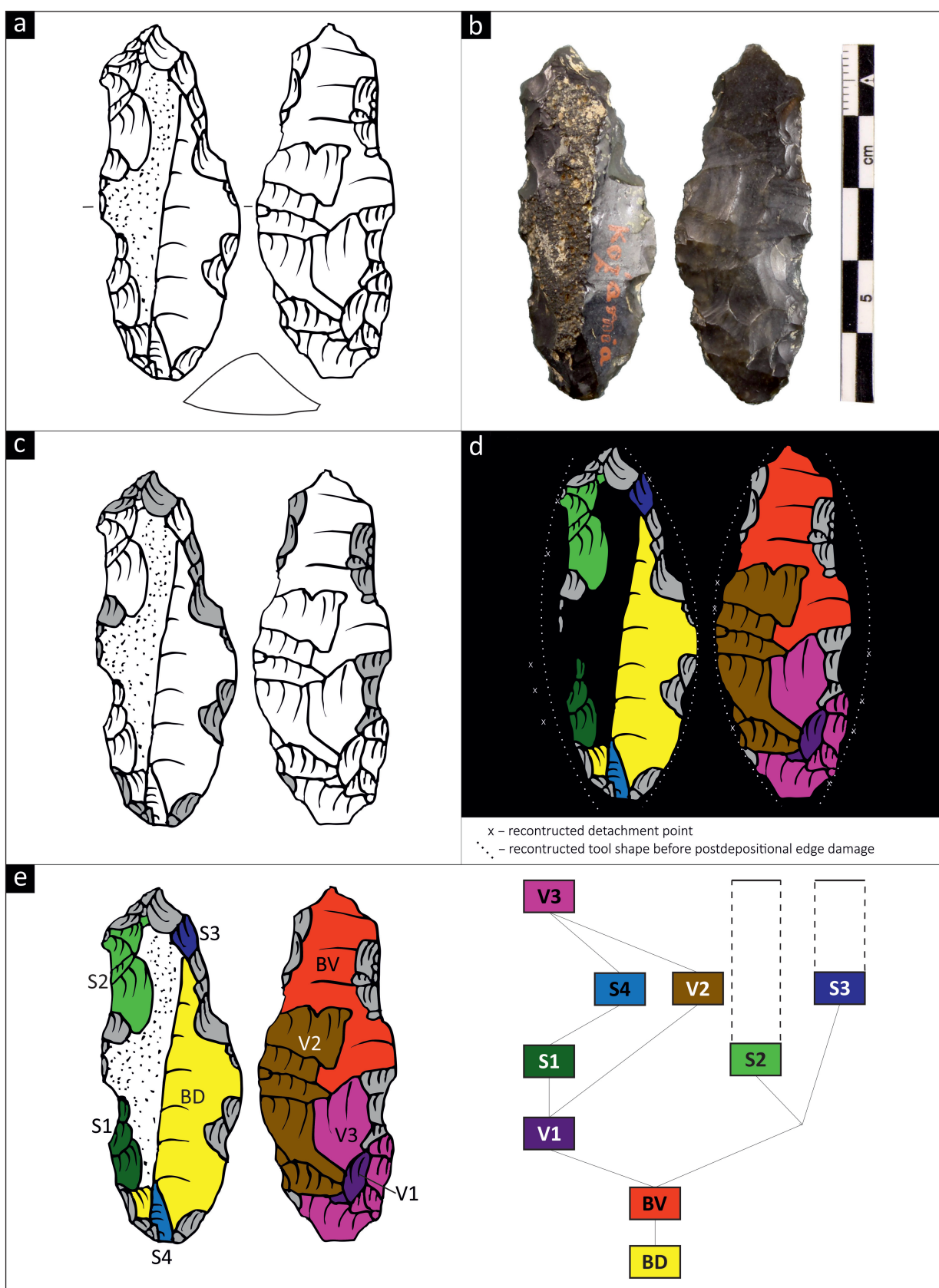


Fig. 4. Unpublished leaf point from Koziarnia Cave found recently in Römer's collection. a, b – drawing and photo of the leaf point; c – state of preservation; postdepositional retouch marked in grey; d, e – scar pattern analysis results with a diagram of chronological relation between subsequent series of removals (drawing by M. Kot).

Blank detachments (BD, BV)

The blade has on its dorsal side a negative of a previous blade detached from the same flint nodule. Both blades were detached from the same striking platform. Due to the further ventral thinning, no observations can be done on the proximal part of the original blank.

Tool thinning in its basal ventral part (V1)

One of the first stages of tool preparation was a detachment of flat removals on the ventral side of the blank in its proximal part. Its aim was thinning and flattening of the near-the-base part of the blank, as well as the reduction of the bulb.

Edge shaping (S1–S4)

This stage is only partially represented on the tool due to the significant postdepositional damages of the edges. Only several scars of semi-steep and semi-flat removals detached on a dorsal side of the tool can be attributed to this particular stage of tool production. Still, one can observe removals detached angularly along the edges, which aimed at shaping the convexity of the edges.

Additional thinning in the basal ventral part (V2, V3)

Already after the edge shaping at least near the base, the ventral side was knapped again. The last stage of the tool preparation is a series of flat removals detached near the base. The removals aimed at final thinning and flattening the near-the-bulb part of the blank. Still, due to postdepositional damages, one cannot exclude, that the near-the-tip part was shaped (S2, S3) even after the ventral thinning.

DISCUSSION

The state of preservation of the described tool is considerably different from the other leaf point found in Koziarnia, especially due to the presence of such an intensive postdepositional retouch. As long as the artefact is missing, one can base his assumptions solely on the drawings. Still, the drawn sharp tip and edges (Fig. 3: 1b) as well as lack of steep multidirectional marginal removals, seem to indicate a lack of such invasive postdepositional damage, as seen on the recently discovered artefact.

On the other hand, one should take into consideration, that the majority of the artefacts found in Koziarnia both by W. Chmielewski, and recently by M. Kot (*Kot et al. 2021*), show a high degree of postdepositional damages. The postdepositional edge retouches were especially abundant both in the lowermost strata (layer L) representing Middle Palaeolithic settlements as well as in the upper ones, up to layer D, which was recently connected with Jerzmanowician settlement. The Gravettian artefacts found in the uppermost part of the cross-section, i.e. layers K and K' are less postdepositionally damaged (*Kot et al. 2021*). Similar postdepositional damage as well as a glossy patina is present, e.g. on a double platform blade found by W. Chmielewski in layer 17 of trench IX, which can be correlated with layer D from the recent fieldworks.

Regardless of the intensive postdepositional damages of the edges, the knapping scheme of the tool can be at least partially reconstructed, showing a focus on ventral thinning and surface flattening in the bulbar part of the blade. As a result of such an intensive ventral thinning, more than 50% of the ventral surface is covered with removals, whereas the dorsal edge shaping removals cover no more than 10% of the upper surface. Such an extensive treatment of the ventral surface of blade blanks is a distinctive feature of the LRJ leaf points. One can observe such intensive ventral thinning especially in the proximal part of the blades, but the artefacts with invasive flat thinning in the distal part of the tool are also present (*Bolus 2012; Flas 2011; Chmielewski 1961; Jacobi/Debenham/Catt 2007; Pope et al. 2013*). Also use of cortical blades for leaf point production is common in LRJ, e.g. in Nietoperzowa Cave (*Chmielewski 1961*).

CONCLUSION

As long as the described tool has no clear stratigraphic context, its cultural affiliation should always be treated with caution. Still, taking into consideration the state of preservation of the leaf point, distinct knapping scheme used for its production, and previously obtained data from Koziarnia Cave, we can conclude, that the artefact is a heavily posdepositionally damaged Jerzmanowician leaf point. Therefore we can confirm the presence of at least two Jerzmanowician leaf points in Koziarnia Cave, what goes well with the recent results presenting the traces of Jerzmanowician occupation connected with layer D (layer 15 by Chmielewski *et al.* 1967).

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Znalezione w pudełku

Nieznane bifajalne ostrze liściowate z jaskini Koziarni

Małgorzata Kot – Natalia Gryczewska

Streszczenie

Od XIX. wieku jaskinie Jury Krakowsko-Częstochowskiej były przedmiotem zainteresowania nie tylko archeologów amatorów, ale także lokalnej ludności, czy nawet biznesmenów. Osady jaskiniowe, ze względu na dużą zawartość materii organicznej, były w tym czasie uważane za nawozy naturalne wysokiej jakości i używane przez okolicznych rolników. Przynajmniej kilka jaskiń, m.in. jaskinia Koziarnia oraz Nietoperzowa, dzięki współpracy lokalnych właścicieli ziemskich oraz pruskiego urzędu górniczego, było eksploatowane na większą skalę. To w tych jaskiniach znaleziono pierwsze ostrza bifajalne, opublikowane w 1884 r. przez F. Römera, na podstawie których pół wieku później W. Chmielewski wyodrębnił nową jednostkę kulturową z okresu przejścia między środkowym i górny paleolitem tzw. jerzmanowicien. W Polsce znanych jest zaledwie kilka stanowisk jerzmanowickich, stąd zrodziła się potrzeba dokładnego przeanalizowania dawnych materiałów, mianowicie kolekcji Ferdynanda Römera.

Ferdynand Römer, paleontolog i geolog, od 1855 r. był profesorem na Uniwersytecie Wrocławskim (ówczesny Breslau), późniejszym twórcą Muzeum Mineralogicznego. Gdy rozpoczęto przemysłową eksploatację sedymentów jaskiniowych, dowiedział się o znajdowanych w nich kościach zwierzęcych oraz zabytkach i w 1874 r. osobiście odwiedził jaskinię Nietoperzową. Zawiadujący pracami w jaskini, ówczesny dzierżawca O. Ogrowsky, złożył obietnicę przekazania znajdujących sukcesywnie materiałów Römerowi. Kilka lat później, prawdopodobnie zainspirowany aktywnością właściciela Ojcowa, archeologa-amatora Jana Zawiszy, F. Römer zainicjował własne prace wykopaliskowe, początkowo w jaskini Nietoperzowej (1878 r.), a następnie okolicznych jaskiniach, m.in. Koziarni, Zbójeckiej, Krakowskiej (Czajowice), Tunelu Stromym (Sadłana), Łabajowej (Bębel) i Gorenieskiej. Prace w terenie prowadził na polecenie Römera-Oscar Grube. Kolekcja pozyskana z jaskiń jurajskich, częściowo opublikowana przez F. Römera, zdeponowana została w Muzeum Mineralogicznym. Obecnie zbiory są rozproszone, większość zabytków archeologicznych znajduje się w Muzeum Archeologicznym we Wrocławiu.

Jaskinia Koziarnia, położona w południowej części Jury, w Dolinie Sąpsowskiej, w drugiej połowie XIX. wieku przynależała do majątku rodziny Mieroszewskich. Na zlecenie właścicieli, w 1877 roku jaskinię eksploatowano w celu pozyskania nawozu. W 1879 roku, z polecenia F. Römera, O. Grube przeprowadził w jaskini wykopaliska. W pracy z 1883 roku opublikowano kilkanaście znalezionych wówczas zabytków, m.in. narzędzia krzemienne, w tym krzemienne ostrze liściowate, paciorki szklane, fragmenty ceramiki czy kościane igły. Nie wszystkie zabytki

z jaskini Koziarni znajdujące się obecnie w Muzeum Archeologicznym we Wrocławiu zostały jednak opisane i opublikowane. W kolekcji znajduje się m.in. nieopublikowane ostrze liściowate, brakuje natomiast ostrza z Koziarni, które znalazło się w publikacji F. Römera.

Niepublikowane wcześniej ostrze wykonane zostało na wiórze korowym i ma wymiary 51 x 19 x 9 mm. Ponad 50% powierzchni narzędzia zajmuje kora, ponadto jest ono silnie spatynowane. Ostrze nosi ślady uszkodzeń postdepozycyjnych, szczególnie zniszczone są krawędzie, z licznymi wnękami i ukruszeniami. Niemniej, z dużym prawdopodobieństwem można stwierdzić, że formę wykonano z krzemienia jurajskiego. Proces produkcji ostrza podzielić można na 4 etapy: odbicie półsurowca, ścienienie narzędzie przy podstawie na stronie wentralnej, kształtowanie krawędzi, dodatkowe ścienianie przy podstawie na stronie wentralnej.

Stan zachowania opisywanego ostrza liściowatego diametralnie różni się od ostrza liściowatego opublikowanego i opisanego przez F. Römera, w szczególności ze względu na znaczne zniszczenia (retusze) postdepozycyjne krawędzi. Niemniej, zabytki pozyskane w trakcie prac wykopaliskowych w Koziarni, zarówno w latach 60. przez W. Chmielewskiego, jak i przez M. Kot w 2017 r., a w szczególności w warstwach związanych ze środkowym paleolitem (warstwa H'/I'HT i L) jak i w warstwie powiązanej z jerzmanowiczeniem (warstwa D–E–F), również noszą liczne ślady silnych uszkodzeń postdepozycyjnych. Pod względem technologicznym ostrze wykazuje typowe cechy dla ostrzy jerzmanowickich. Dużo uwagi poświęcono przede wszystkim ścienianiu przy podstawie po stronie wentralnej, a więc usuwaniu sęczka. Mniej zaś kształtowaniu krawędzi poprzez retusz strony dorsalnej. Również użycie półsurowca ze znaczną ilością kory, jest powszechne w przemyśle jerzmanowickim i występuje np. w przypadku ostrzy znalezionych w jaskini Nietopertzowej.

Opisywane ostrze liściowate nie posiada kontekstu stratygraficznego, zatem z ostrożnością należy traktować wszelkie atrybucje kulturowe czy chronologiczne. Niemniej, uwzględniając stan zachowania, charakterystyczny schemat produkcji oraz dotychczas uzyskane dane z jaskini Koziarni, uznać należy, że mamy do czynienia z silnie postdepozycyjnie zniekształconym jerzmanowickim ostrzem liściowatym. Odkrycie przynajmniej dwóch ostrzy liściowatych w jaskini Koziarni, potwierdza jeszcze dobitniej obecność na stanowisku śladów osadnictwa jerzmanowickiego.

Ryc. 1. Lokalizacja stanowisk wzmiankowanych w tekście. a – obecny zarys granic Polski oznaczony na mapie zachodniej części Cesarstwa Rosyjskiego i krajów ościennych z 1890 roku. Linie ciągłe i kolory oznaczają podział na zabory: kolor niebieski- zabór pruski, zielony- zabór rosyjski, żółty- zabór austriacki; b – skan prywatnego egzemplarza „Mapy jaskiń okolic Krakowa i Ojcowa” opublikowanej przez J. Czarnowskiego (1911), a należącego do S. Krukowskiego. Mapa z notatkami odręcznymi S. Krukowskiego przechowywana jest w archiwum Państwowego Muzeum Archeologicznego w Warszawie pod numerem inwentarzowym: PL PMA 1-1-5-1-13-1, wersja online: <http://193.39.71.4/atom/index.php/spuszczna-stefana-kruckowskiego>; isad; c – mapa jaskiń badanych przez F. Römera.

Ryc. 2. a – Rycina prezentująca eksploatację sedymentów jaskiniowych w 19. wieku; jaskinia w Złotym Potoku; rysunek autorstwa J. Ceglińskiego (za: *Wójcik 2004*, 271, Fig. 2); b – Ferdynand Römer (za: *Simonds 1902*); c – jaskinia Koziarnia około 1910 roku; zakłębienie osadów widoczne w środkowej części ilustracji może stanowić pozostałości po pracach wykopaliskowych z 1879 r. kierowanych przez F. Römera; d – pocztówka z 1927 przedstawiająca wejście do jaskini Koziarni; e – widok z dna wąwozu Koziarnia na otwór wejściowy do jaskini Koziarni, stan na 2018r. (foto M. Bogacki).

Ryc. 3. 1a, 2–12 – zabytki znalezione w jaskini Koziarni opublikowane przez F. Römera (1883; 1884); 1b – rysunek obu stron bifacialnego ostrza liściowatego z jaskini Koziarni opublikowany przez W. Chmielewskiego et al. (1967). W tym okresie ostrze to musiało być dostępne do analiz. Brak skali.

Ryc. 4. Niepublikowane ostrze liściowate z jaskini Koziarni znalezione obecnie w kolekcji Römera. a, b – rysunek i zdjęcie ostrza liściowatego; c – stan zachowania powierzchni i krawędzi; retusz postdepozycyjny oznaczono kolorem szarym; d, e – analiza scar pattern z diagramem prezentującym chronologię sekwencji odbić prowadzących do powstania ostrza (rysunek M. Kot).

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