Threads Leads to the East
A Major Spreading Area of the Perforated Cylindrical Bone Tubes from the 12th-13th Century (Orosháza, Békés County, Hungary)

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Abstract:

Based on the overview of hungarian and international literature, the following picture emerges regarding the function of the bone tubes from Orosháza.

Among the bird bone artifacts featuring one to three central openings, scholarly classifications suggest they could have functioned as thread guides, whistles or needle cases. They are considered needle cases if they have one or two circular perforations. However, this type of accessory is characteristic of an earlier horizon, specifically the 10th century. From the 11th century onward, a new variant featuring a pair of circular perforations on opposite sides of one end became widespread, including in regions where yurks were known, making it possible to clearly distinguish between the two differently used artifact types.

For specimens with three openings arranged directly next to each other and perpendicular to the object's longitudinal axes, the whistle function is questionable. Furthermore, they are unlikely to be needle cases, as more than two perforations in the central section would not have been necessary for attachment. In relation to the bone tubes from Orosháza, we lean toward the „yurok" (thread guide) function, a term frequently appearing in Russian and Ukrainian literature. At the beginning of our research, the analysis of scattered data suggests that yurks were present in the East-Central European region during the 11th-13th centuries, and in their area of origin, they can be documented even in later periods. Their use in the Carpathian Basin, based on the available data, is known from the 11th to the 13th centuries. After the Mongol invasion (1241-1242), they disappeared from archaeological findings, though simpler versions persisted in ethnographic records until the early 20th century.

Rezumat: Firele duc spre est. O zonă majoră de răspândire a tuburilor din os cilindrice perforate din secolele XII-XIII (Orosháza, comitatul Békés, Ungaria)

Pe baza analizei literaturii ungare și internaționale, se conturează următoarea imagine cu privire la funcția tuburilor de os de la Orosháza.

Dintre artefactele din os de pasăre cu una până la trei deschideri centrale, clasificările academice sugerează că acestea ar fi putut funcționa ca ghidaje de ață, fluiere sau cutii de ac. Sunt considerate cutii pentru ace dacă au una sau două perforații circulare. Cu toate acestea, acest tip de accesoriu este caracteristic unui orizont anterior, în special secolului al X-lea. Începând cu secolul al XI-lea, o nouă variantă care prezintă o pereche de perforații circulare pe părțile opuse ale unui capăt a devenit larg răspândită, inclusiv în regiunile în care yurk-urile erau cunoscute, făcând posibilă o distincție clară între cele două tipuri de artefacte utilizate diferit.

Pentru exemplarele cu trei deschideri dispuse direct una lângă alta și perpendicular pe axele longitudinale ale obiectului, funcția de fluier este discutabilă. În plus, este puțin probabil ca acestea să fie cutii de ace, deoarece mai mult de două perforații în secțiunea centrală nu ar fi fost necesare pentru fixare. În ceea ce privește tuburile de os de la Orosháza, înclinăm spre funcția de „yurok" (ghidare a firului), un termen care apare frecvent în literatura rusă și ucraineană. La începutul cercetării noastre, analiza datelor dispersate sugerează că yurk-urile au fost prezente în regiunea est-centrală a Europei în secolele XI-XIII, iar în zona lor de origine, ele pot fi documentate chiar și în perioadele ulterioare. Utilizarea lor în Bazinul Carpatic, pe baza datelor disponibile, este cunoscută din secolele XI-XIII. După invazia mongolă (1241-1242), au dispărut din descoperirile arheologice, deși versiuni mai simple au persistat în documentele etnografice până la începutul secolului al XX-lea.

Keywords: perforated bone tubes, loom warping, workshops, city forts

Cuvinte cheie: tuburi perforate din os, război de țesut, ateliere, fortificații orășenești

Introduction

During an archaeological rescue excavation of the Orosháza main road bypass (Békés County, Hungary) between 2004 and 2006, a 12th-13th century settlement was excavated.

The nearly 400 features contained a large quantity of animal bones, however the zooarchaeological analysis did not identify any skeletal elements of pigs. Adjacent to the settlement, surrounded by ditches, the former cemetery of the inhabitants was also brought to light. Only one burial contained grave goods, a ring-ditch dating to the 12th-13th century was discovered from the unearthed 180 graves, all formed with a side-wall niche. The unusual characteristics of these sites from the period suggest a different community of this otherwise poorly documented region. The written sources mention a place named Böszörményestelek in the area, which according to the historical investigations considered to be the legacy of an eastern-origin Böszörmény-Káliz (Muslim) colony.[1]

We are unable to separate amongst the uncovered large quantity of pottery assemblage and metal detecting finds, those that could be unequivocally linked to this group, which is characterized by distinct cultural practices. Every item can be placed within the material culture of the era in the Carpathian Basin. Among these groups of objects, there are certainly some that may later be identified as being associated with the Böszörmény-Káliz (Muslim) population, which first appeared in the territory of the Kingdom of Hungary.

These may have been the little objects made from bird bones, on which two or three perforations were made perpendicular to the axis of the object.[2] The first, a bird humerus found in the fill of the 3rd semi-subterranean house, has two openings (Figure 1, 3a-c, Table 1). These perforations are created with slanted horizontal and perpendicular vertical (semi-circular) cuts. In contrast, on the piece made from a goose humerus found in the 38th semi-subterranean house, there are three carefully drilled openings (Figure 1, 2a-c, Table 2).[3] These archaeological small finds associated with pottery assemblage dated to the 12th-13th centuries. Observations during the excavation of these features suggest secondary deposition, however their original function is unclear.

WHISTLES, NEEDLE CASES, AND/OR TOOLS FOR THREAD PROCESSING?

At first glance, the objects appear to be whistles, though this has been disconfirmed by musicians and music historians based on the positioning of the perforations on the objects.[4] Additionally, both the small size of the items and the openings themselves raise considerations. Since these tiny holes on the bird bones could be covered simultaneously by a single fingertip, it would be difficult to produce sound by covering them individually. The object with three openings is bent along its length, a form characteristic that is also not ideal for fulfilling the function of an instrument.

V. E. Flyorova published similar bone perforated objects under the name of „yurok," dedicating an entire chapter to this type of object.[5] Andrej Maslovskij also published similar pieces in the Museum of Azak collection.[6] We contacted our Russian colleagues, who, in their letter, identified the finds from the Orosháza site as yurok.[7]

But what exactly is a yurok? What might these objects have been used for? Below, we will review bone items from Central and Eastern European archaeological sites, dating from the 11th to 13th centuries, typically cylindrical, hollow, and perforated two or more times, and discuss their possible functions.

Theory of Thread Guidance

Bone tubes associated with thread work were found to the east and southeast of the Carpathians, in Kievan Rus,[8] Volga Bulgaria,[9] and Moldova (under the name of *tuburi de urzeală*),[10] in the archaeological material from the area

1 Rózsa 2025.

2 We are grateful to Attila Gyucha for granting access to the unpublished assemblage and the documentation.

3 We are grateful to Beáta Tugya for the identification of the faunal remains.

4 We are grateful to János Bali flute artist and Péter Király music historian for their help.

5 Flyorova 2001, 74-77.

6 https://www.youtube.com/watch?v=1aj2-5YBvvg (accessed: 2024.11.23).

7 We are grateful to Valerij Flyorov és Andrej Maslovskij for their help.

8 Chornivka (Voznij 1998, 72, Foto 47); Kolodiazhyn (Sergêêva 2012a, 19-20, Ris. 10, 120, Ris. 6, 3); Novgorod (Kolchin 1985, 268. Tab. 109, 3); Pronsk (Mal'm and Fechner 1974, 204, Ris. 7); Rajkovec (Goncharov 1950, Tabl. XXXI, 1, 7, 12); Ryazan (Mongajt 1955, 182, Ris. 141, 3; Rybakov 1959, 58, Ris. 6. 12, 16); Sarkel (Flyorova 2001, 74-76, Ris. 34, 1-14); Seversky Donetek (Prokof'ev 2005, 116, Ris. 4, 7); Vyshgorod (Sergêêva 2022, Ris. 1, 14); Vizsa (Rybakov 1959, 58, Ris. 6, 14), Voin (Dovzhenok, Goncharov and Jura 1966, Tabl XXV. 16-18; Sergêêva 2012b, 136, Ris. 11, 25-26, Ris. 12; Sergêêva 2015, 51, Ris. 60, 1-3); Murom (Mateeva and Kochkina 1998, 38); Novogrudok (Gurevich 1981, 120, Ris. 79, 4.); Kiev (Sergêêva 2011, 79. Tabl. 25, 4-9). Tsarevskoje Gorodishche (Gluhov 2013, 110-119, Ris. 5, 1).

9 Bilyar (Paltseva, Shakirov and Hudyakov 2012, 211, Ris. 4, 5; Paltseva and Shakirov 2022, 521-529, Ris. 57, 1).

10 Old Orhei (Byrnia 1984, Ris. 31, 2-3; Bacumenco, Pîrnău and Bejenaru 2018, Fig. 5, 6); Pharniceni-Petrucha (Postică 2021, Fig. 25, 8, Fig. 55, 14, Tentiuc 1996, Fig. 18, 29).

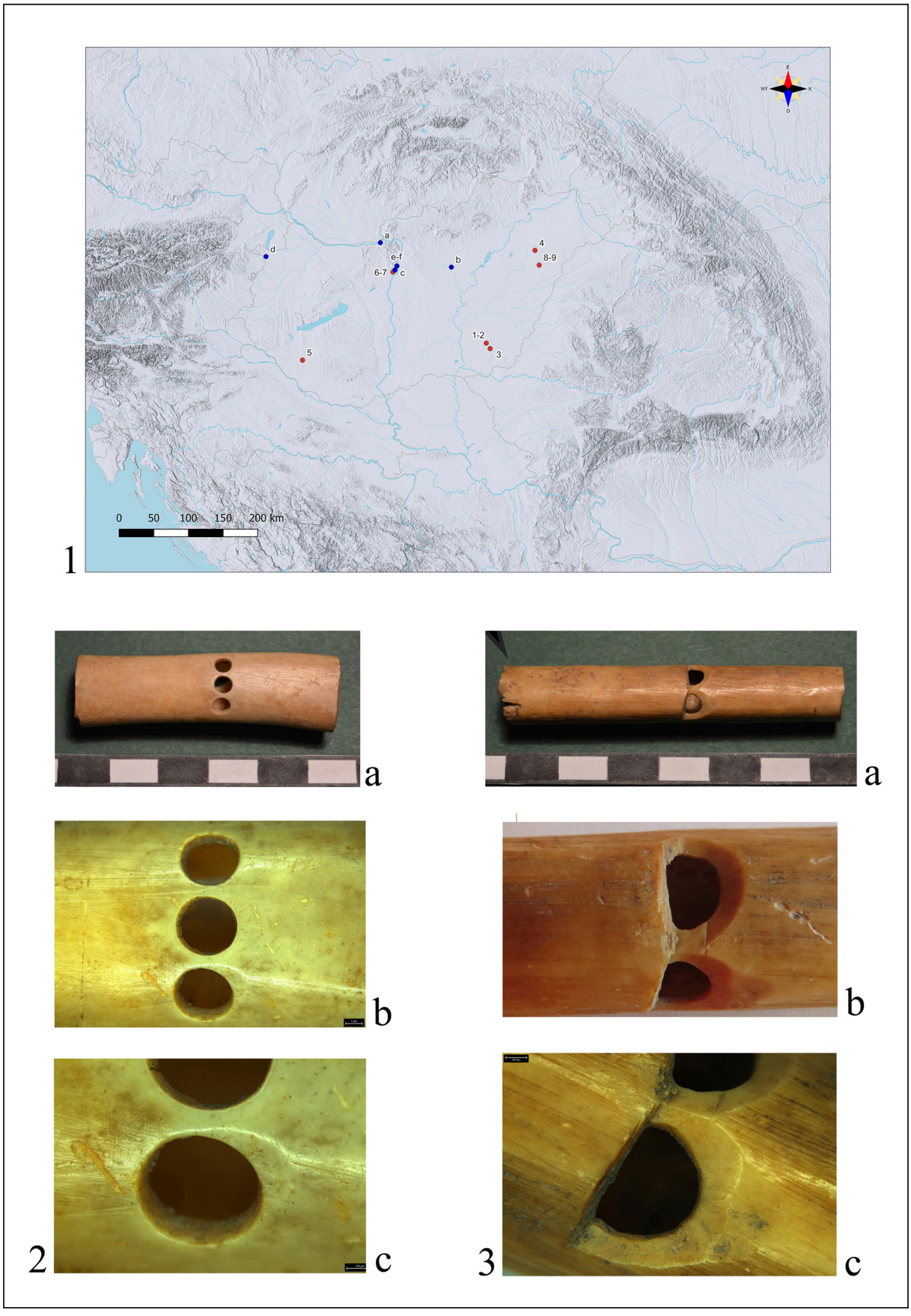

Fig. 1. 1. Distribution map of the bone tubes in the Carpathian Basin. 2-3. Photographs of the two bone tubes. The Michroscopical photoes made in the Laboratory of Archeological Indtitute, (Hungarian National Museum).

bordering the western steppe. These were primarily present in 11th-13th century city forts built against incursions from the steppe, where contemporary trade and developed craftsmanship concentrated, and in some places continued to function into the 14th century, even after the Golden Horde's invasion.[11] Occasionally, some examples were uncovered from the inventory of bone manufacturing workshops.[12]

The bone tubes were made predominantly from the long (tubular) bones of birds, sometimes of small ruminants.[13] The epiphyses were sawn or cut off and the inner part of the diaphyses, the medulla, was removed. Semicircular or circular holes were formed in the walls of the resulting cylindrical specimens. Finally, theire outer surfaces was polished.[14]

There were workshops also contained iron tools, including specialized knives and drills, which were suitable for creating the two types of perforations observed in the yuroks: cut semi-circular and drilled circular versions.[15] The cut opening was simpler to make and could be achieved within household industries, while the round or oval drilled opening required more professional expertise.[16] This could be the reason why fewer examples are found among the artifacts (Figure 5, 2-6).[17]

Most of the researchers from the east of the Carpathian region suggest that the yuroks were associated with the warping of the loom: guiding of the warp threads in the course of the work process.[18] Warps are the longitudinal threads of the fabric crossed by weft threads in the right angle direction during weaving. Before weaving these longitudinal threads are placed on an equipment and then on the loom. (A more detailed description follows below.)

Additionally, following Flyorova's suggestion, the function of cord twisting by yuroks became increasingly accepted in the 2000s.[19] According to these theories, in both work processes, threads pass through the holes and the interior of the tube, with the task of keeping multiple threads close to each other while preventing them from tangling.[20] However, no technological parallels have been found for creating cord or rope from threads passed through this type of small and thin bone tube. It is likely that the tension of the threads during the work process would have split apart the tool.[21]

In contrast, the small perforated tube used as a *thread guide* during the warping of the loom remained in the ethnographic material of the East Slavs until the turn of the 19th and 20th centuries, as a tool involved in the warping of the horizontal treadle loom.[22] Made of wood or bone, with two or three openings on its side, it is known from the Bolshevoje Ryazany and Bryansk Polisija regions. A simpler and longer version is represented by a narrow wooden tube, essentially a piece of wood, drilled at both ends and perforated on the side to allow the passage of the thread (Figure 2.4.2.b). The archaeological assemblage from Novgorod contained more than 100 pieces, elaborately carved, and dating from the 13th to 15th centuries.[23] It was also used until the early 20th century in the Vitevskaja, Voloskaja, Novgorodskaya, and Dobrudzha regions. The draw device increases friction and allows for the tightening of the warp thread during movement.[24] The thread guide tube has also survived in various versions in Hungarian ethnography (with or without holes on the side) and made from different raw materials. It was used during the warping of the loom and for reeling thread.[25] It was known as „csívet" or „cievka" among the Slovak (Slav) population in Hungary.[26]

[11] Novgorod (Kolchin 1985, 268); Tsarevskoje Gorodishche, Selitrenoje Gorodishche, Bolgar, Ukek (Nedashkovskij and Morgerin 2020, 479-482, Ris. 2, 17); Old Orhei (Byrnya 1984, 156, Ris. 31, 2-3).

[12] Sergêêva 2012a, 120, Ris. 3, 3.; Sergêêva 2020, Ris. 1, 14.

[13] Sergêêva 2011, 53; Bacumenco, Pîrnău and Bejenaru 2018, 164.

[14] Sergêêva 2011, 53.

[15] Sergêêva 2011, 62-66, Ris. 21.; Nedashkovskij and Morzherin 2020, 474.

[16] Sergêêva 2011, 62.

[17] Chornivka (Voznij 1998, 72, Foto 47); Murom (Mateeva and Kochkina 1998, 38); Kijev Sergêêva 2011, Ris.9.6; Drevnij Novogrudok (Gurevich 1981, 120, Ris. 79, 4); Old Ohrei (Byrnya 1984, Ris. 31, 2-3; Bacumenco-Pîrnău and Bejenaru 2018, Fig. 5, 6); Bilyar (Paltseva, Shakirov and Hudyakov 2012, 211, Ris. 4, 5; Paltseva and Shakirov 2022, 521-529, Ris. 57, 1).

[18] Warping the loom: before weaving the longitudinal threads of the fabric are placed side by side and then on the loom. Warps: longitudinal threads of the fabric crossed by weft threads in the right angle direction during weaving.

[19] Flyorova 2001, 75-76; Sergêêva 2015, 51.

[20] Flyorova 2001, 76.

[21] Tagán 1935, 87-89; Bura 1993, 75-86.

[22] Lebedeva 1956, 496, Ris. 18, 2a.

[23] Kolchin 1968, Ris. 166.1-19; Kolchin 1985, 52-61, Tabl. 109, 3; Savenkova 2011, 176.

[24] Lebedeva 1956, 496, Ris. 18, 2b.

[25] Kántor 2002 40-41. Mentioned as a hard paper reel.

[26] Ébner 1927, 58-59. A piece of leather often used to protect the hand instead of a tube.

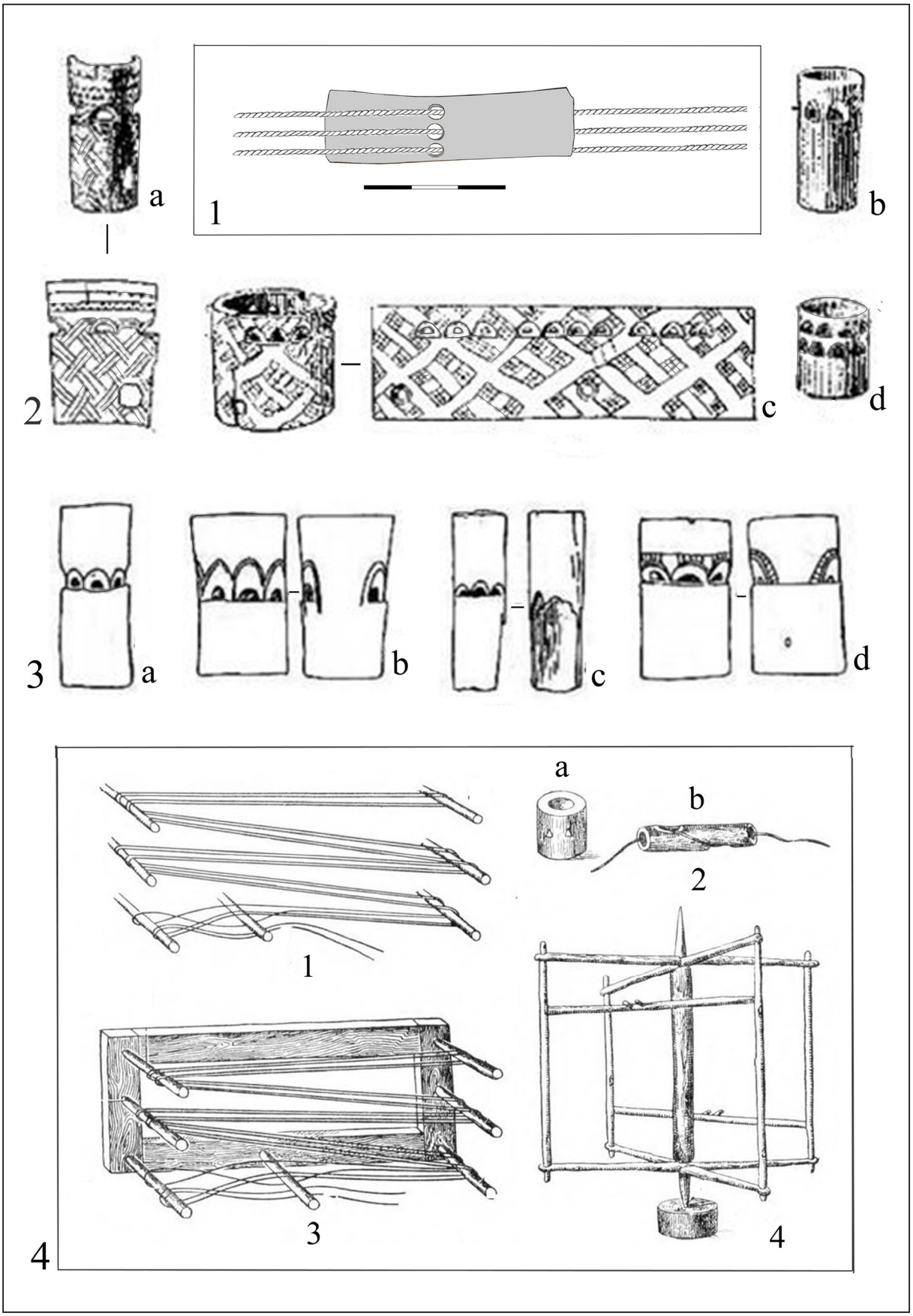

Fig. 2. Warping. 1. Location of the threads in the guiding tube. 2. Yurok. Rajkoveck (bone). Goncharov 1950, Tabl. XXXI. 2, 5, 1, 12; 3. Yurok. Sarkel (bone). Flyorova 2001, Tabl. 34. 9,8,2,5. ; 4. 1.Warping sticks. 4.2.a, Yurok for several threads. b, Yurok for one thread, 4.3. (Lebedeva 1956. 18. 1-4).

Loom Warping: The warp threads must be arranged parallel to each other and of equal length before being placed on the loom.[27] For this goal, a supporting structure is necessary. Among the East Slavs - as well as among other ethnic groups - several solutions have survived for this purpose.[28] The tool can consist of stabbed stakes (in the ground or in the house walls, etc), it could be a warp frame, or a motolla, a rotating wooden scaffold (Figure 2.4.4).[29] The warp threads, which are broken in length, must be wound onto this structure in parallel, which can be done either by hand, between the fingers, or with some tool. According to Hungarian ethnographic descriptions, when using the motolla, in order to prevent the thread from rubbing the palm of the worker, it was run through a small elderwood tube hanging from the upper cross-sticks of the device.[30]

With the help of a multi perforated warping tube, multiple threads can be guided parallel to each other simultaneously, speeding up the process. In archaeological finds, single perforated tubes occasionally appear, but two- or three openings, and even multi perforated bone tubes are more common.[31] For example, in the Sarkel fortress, most have three openings, but some have five,[32] while in Rajkovec, there are even examples with ten openings. In some cases, the perforations are arranged in two rows, one above the other (Figure 2, 2.c-d).[33]

At several sites, finely crafted engraved decorations can also be observed on certain pieces.[34] In Rajkovec, one specimen shows a depiction of the simplest form of thread-crossing known from weaving and basketry, the so-called plain (tabby/linen) weave. In this pattern, the threads alternately pass over and under each other.[35]

According to Nakhlik's observations regarding the Novgorod textile fragments, this structure, plain weave (tabby/linen) became dominant in the region during the 13th century, coinciding with the spread of the more productive horizontal loom.[36] Kolchin linked the use of the *yurok* to the late 12th- to 13th-century spread of the horizontal treadle loom, considering it an expression of urban trade, industrial activity, and the adoption of innovations.[37]

In the Carpathian Basin and the European regions west of it, thread-guiding tools of shapes different from the tube were commonly used for warping. One such tool is the *warping mallet*,[38] a handled wooden board with holes.[39] Medieval depictions provide some examples. On the wall painting in the Constance Canon House, which illustrates the stages of thread processing, the woman performing the warping procedure is holding this tool in her hand (Figure 3, 1). In another depiction, it is difficult to determine whether the woman engaged in the process is holding a tool or if she is simply unwinding 12 warp threads from the spools with bare hands (Figure 3, 2).

Thread Winding: In European rural thread processing in the 20th centuries, a smaller tool than the frame-like motolla was used for winding/balling threads. Ethnographer Sándor Ébner observed among the Slovak population in Hungary that a cylindrical rod with drilled ends was used as a thread-guiding tube. The ends of this rod were drilled, and a whistle-like slit was cut along its side through which the thread was passed).[40] This version is related to the medieval Novgorod type (Figure 2, 4.2.b).

Instrument Theory

In German[41], Slovak,[42] Polish,[43] and western Ukrainian[44] territories, artifacts with one or more perforations are almost universally identified as musical instruments, primarily as whistles or flutes.

27 The length of the warp is much longer than the horizontal treadle loom. Breaking the length of the warps is part of the warping process. Then the threads reeled to a roller and connected to the loom.

28 Szolnoky 1950, 29-56.

29 Lebedeva 1956, 496, Ris. 18, 1, 3-4; Domonkos 1991, 361.

30 Bátky, Győrffy and Visky 1933, 308-309. The elderflower branches easily hollowed.

31 Sergêêva 2012b, Ris. 12.

32 Flyorova 2001, 77, Ris. 34.

33 Goncharov 1950, Tabl. XXXI, 1, 7, 12.

34 Sarkel: Flyorova 2001, Ris. 34, 5; Kijev: Sergêêva 2011, Tabl. 25, 8.

35 Goncharov 1950, Tabl. XXXI, 2. The 'binding', as a technical term meaning the crossing of the threads together in the textile.

36 Nakhlik 1963, 293; Kolchin 1985, 268. The previous common type was the vertical warp weighted loom.

37 Kolchin 1985, 268.

38 Domonkos 1991, 362.

39 Frecskay 2001, 394; Gönyei 1934, 40.

40 Ébner 1927, 58-59. V. table 2.

41 Biermann 2008, 252-253, Abb. 11: Gutenberg site contained 10-12. century parallels from Saalkreis.

42 Staššiková-Štukovská 1981, Obr. 6, 12.

43 https://exarc.net/issue-2021-4/ea/bone-pipes-parallel-tone-holes-materials-medieval-poland-until-end-12th-c (2024.11.23); Malinowski 1996, 24, Ris. 9/8; Popławska 2020.

44 Terskyi and Zinkiv 2022, 14, Fig. 4; Yaroslavìvna 2020, 9-18.

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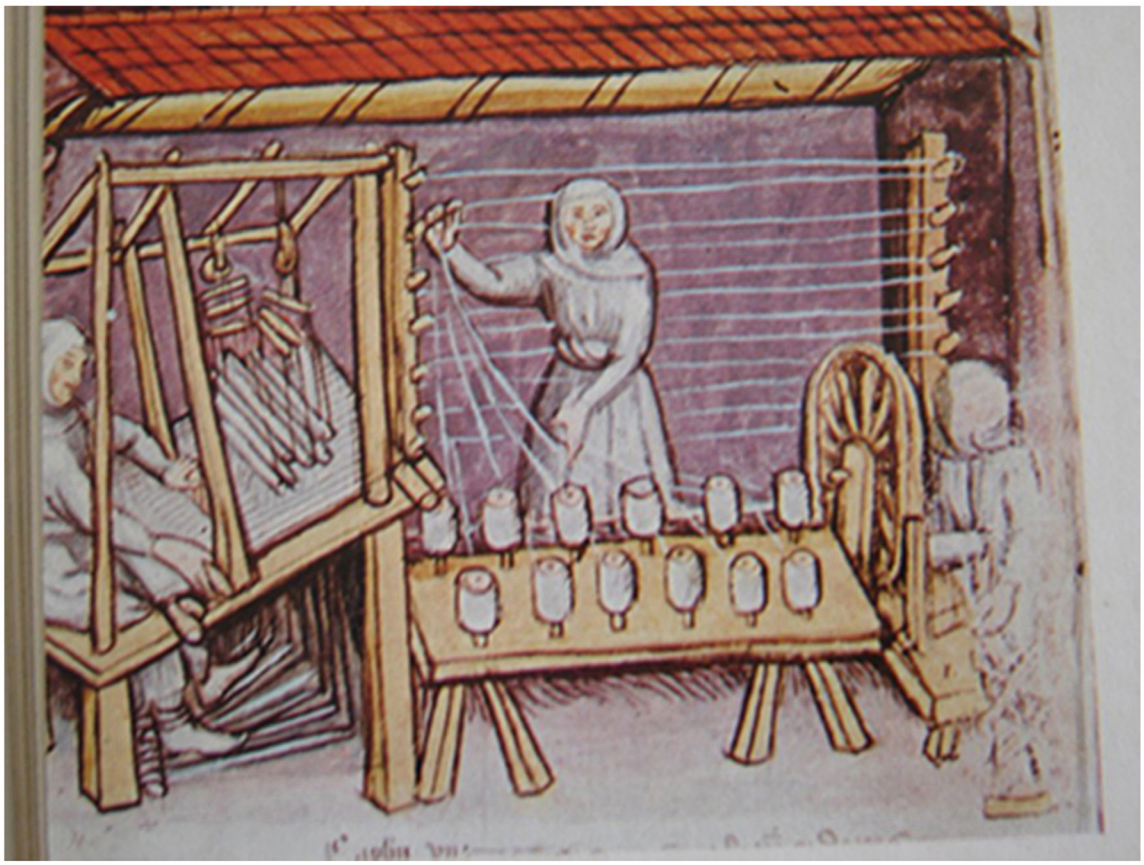

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Fig. 3. Warping procession on wall paintings: 1. Constance Canon House, 1320. Germany; 2. Bibliotheca Ambrosiana, 1424. Italy.

Polish researchers tested the two and three opening finds with musicians.[45] The three opening specimens featured an arrangement where two perforations were positioned together side by side in a line, while the third was separate, on a narrow and elongated bone tube (Figure 4, 2.2). Out of the four published finds, two exhibited signs of working at one end of the tube, where it tapered, possibly indicating the attachment point of a nozzle. One piece also featured grooving in the worked section (Figure 4, 2).

Moving further towards the Lower Danube, such objects appear only sporadically, and they are consistently classified as whistles by researchers.[46] Consequently, among the referenced examples, „traditional" bone flutes are also included.[47] Atanasov, discussing a find from Dobrudzha, considered both the tapering at one end of the bone tube and the presence of grooving as characteristic features of a whistle.[48]

For Hungarian research, objects dating to the 11th-13th centuries, similar to the Orosháza finds, have been known for a relatively long time. These artifacts have generally been classified as bone whistles by their publishers. In the spring of 2022, at the grand *Kings and Saints* archaeological exhibition held in Székesfehérvár, the organizers also displayed the Orosháza pieces as bone whistles. Research has shown a fairly consistent correlation between the number of perforations and the presumed function (Table 1). Objects with a single, usually wider, central opening were generally considered to be whistles by researchers. István Méri held the same view regarding the Kardoskút find (Table 1, 3), which features two openings. László Zolnay also classified the Kardoskút piece as a whistle in his monographic work on the centuries of Hungarian music, drawing parallels with a single opening example from Buda Castle (Table 1, e-f).[49]

Zolnay also published the specimen found in Esztergom-Kovácsi (Table 1, a), which had an or two openings in the middle. Unfortunately, this detail cannot be determined from the drawing, and the description does not specify the number of holes. A denarius of St. Stephen I (1000-1038) was also discovered in the grave as a burial obolus, securely dating the grave and its contents to the first half of the 11th century.[50] Zolnay classified the object as a whistle, but its placement at the waist is noteworthy. We are not entirely convinced that this find represents a sound-producing instrument placed in the grave; rather it is more plausible that it was a needle case.

In the early 2000s, the whistle theory remained widely accepted for two openings variants. Kálmán Magyar published a specimen from excavations in Segesd (Table 1, 5), an area that was once a royal estate, classifying it among the products of a local bone manufacturing workshop.[51] László Szabó described a 5 cm long specimen from Hajdúböszörmény (Table 1, 4) as a whistle, noting that it featured two small semicircular notches.[52] He argued against the needle case interpretation, pointing out that no traces of rust were found inside.[53].

Most bird bone artifacts with one to three openings in the middle section found in Hungary were discovered at the Kána excavation site. A specimen from Kána with a single large hole drilled through the center (Table 1, c) was identified as a whistle by its publishers.[54] Similarly, the first researchers to document the two openings specimens found at the same site (Table 1, 6-7) also classified them as whistles.[55]

East of the Carpathians, the whistles had a slightly different appearance. If they had multiple holes, they were aligned along the tube's length.[56] Sergêêva regarded the classification of *yuroks* as whistles as a historiographical phenomenon.[57]

In the later Middle Ages, a single-hole whistle found at Vrbovec Castle in Croatia had a mouthpiece that tapered significantly, being much narrower than the opposite end. In such cases, the function as a musical instrument could be clearly determined.[58].

45 Popławska et alii 2021, videos.

46 Atanasov 1987, 107-108, Tablo VI, 6, V, 7; Dončeva-Petkova, Ninov and Parushev 1999, 88, 154-155, Tablo XXXIX, 386-390.

47 Dinogetia: Ștefan et alii 1967, 328, Fig. 180, 17-23.

48 Atanasov 1987, 107-108, Tablo VI, 6, V, 7.

49 Méri 1964, 44; Zolnay 1977, 29.

50 Zolnay 1965, 156.

51 Magyar 1988, 155, 18. kép 4; Magyar 2010, 147, 2. ábra.

52 Szabó 2003, 80, 12. tábla 4.

53 Szabó 2003, 84.

54 Terei and Vargha 2013, 153.

55 Daróczi and Szabó 2013, 205.

56 Sergêêva 2020, 193-194, Ris. 1, 6, Ris. 2, 3.

57 Sergêêva 2015, 51.

58 Tkalčec 2016, 358. Fig. 2.; Whistles from the 15-17th century could be easily separated from the above discussed finds. For example Pl: Sarvaly (Holl and Parádi 1982, 132. t. 7-9); Zagyvató, 15. century/destruction layer (Bodnár, Cabello and Simon 1993, 104, 4. tabl. 11); Marótipuszta, 15-17. century object/settlement (Gulyás, Gallina and Költő 2020, 212).

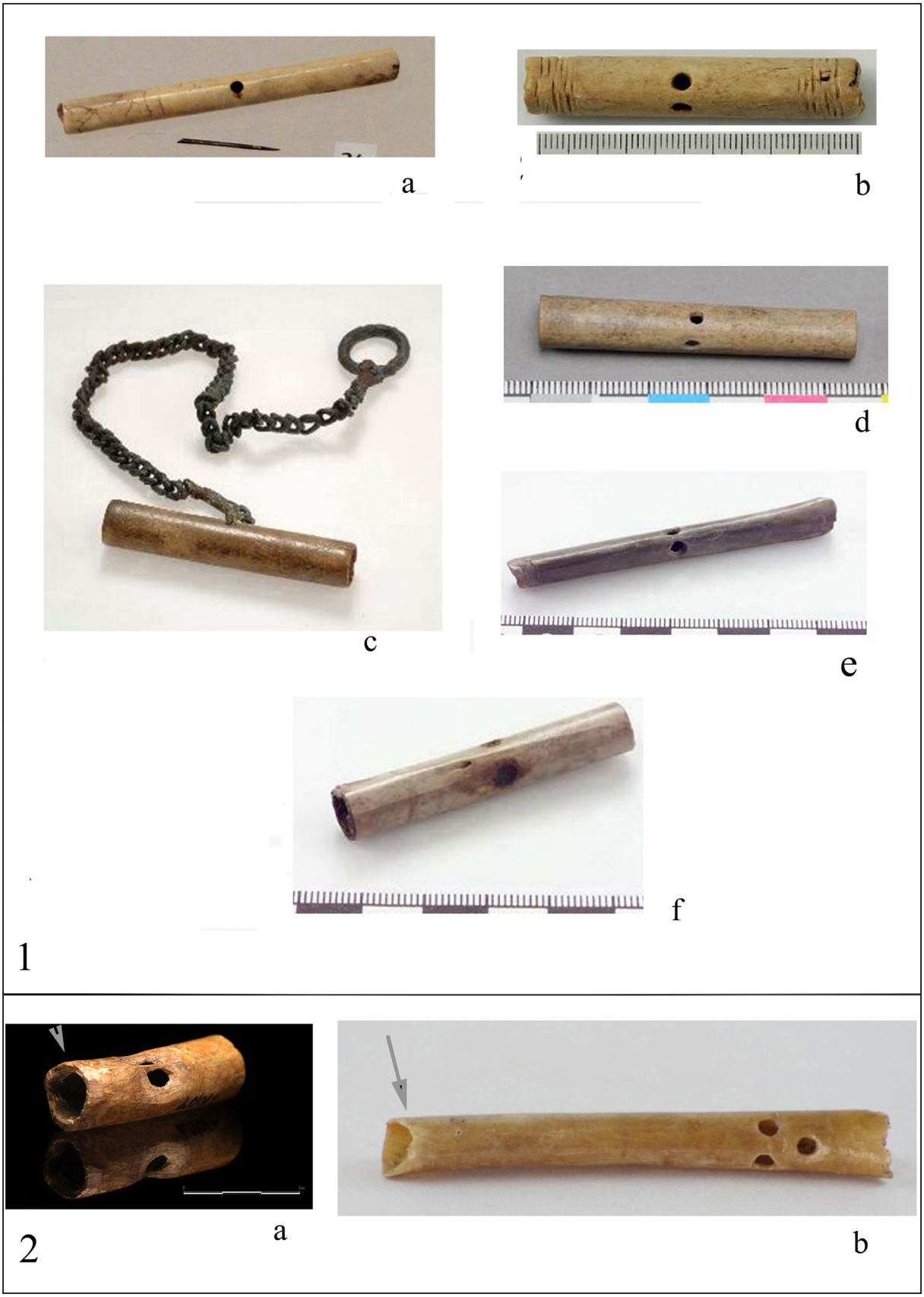


Fig. 4. 1. a. Kneep. Scotland. National Museum of Scotland. X.IL848; b. Adelsö. Sweden. History Museum. Inv.N.: 35245; c. Hulterstad. Sweden. History Museum. Inv.N.: 21802; d. Adelsö. Sweden. History Museum. Inv.N.: 42904; e. Adelsö. Sweden. History Museum. Inv.N.: 50208/1513; f. Adelsö. Sweden. History Museum. Inv.N.: 5208/1510; 2.a. Santok. Poland. (Popławska et al. 2021.Fig.1. b.); 2.b. Giecz. Poland. (Popławska et al. 2021,Fig.4.)

The two opening bone tubes from Orosháza are worked and grooved at one end, which could indicate the attachment point of a whistle's mouthpiece. For this reason, it may belong to this category, but the exact purpose of these surface features remains uncertain.

As mentioned in the introduction, the small perforations, positioned close together and perpendicular to the object's longitudinal axis, cast doubt on its function as a musical instrument. Due to their small size, both openings can be covered with a single fingertip, making it impossible to individually control them for sound modulation.

Needle Case Theory

Bone tubes pierced in the middle, similar to the North European (Viking) type needle cases, spread from Scandinavia to the British Isles and Scotland in the 10th century.[59] According to Sergêêva, they reached the Kievan Rus' territory through merchant intermediaries.[60] Some of these needle cases were found with needles still inside, mostly from 10th-century graves.[61] The cylindrical body always featured one or two drilled circular openings[62] which served for attachment to clothing.[63] When a single opening was present, a long metal piece was inserted, whereas in the case of two openings, a metal ring was used to suspend the needle case from a chain, securing it to the wearer's clothing (Figure 4, 1.c). Since these cases hung horizontally, it was crucial that the round openings were positioned near the geometric center of the tube's length.

In the Carpathian Basin, the use of a simple, unperforated bone tube as a needle holder was common during the 10th century. It was carried in a vertical direction. A textile ribbon passed through it, the lower end of which was knotted so that it would not slip out. The upper end was tied to the belt of the garment. The needle was inserted into this textile ribbon.[64]

From the 11th century onward, a similar type of vertically worn needle case emerged, featuring two minor variations in form (Figure 5, 9-13). These objects were either tube-shaped when made from hollow bones (such as bird or small ruminant diaphysis) or containers narrowed and closed at one end when crafted from antler.[65] In rare cases, they were also made of iron, with examples found in Ryazan[66] and in a grave from the early Árpád era in the Szob-Vendelin cemetery in the Carpathian Basin (Figure 5, 13).[67] In all cases, the upper end of the needle case featured a pair of opposite perforations.[68] A ribbon was dragged through these circular suspension holes, securing the needle, and the entire case was then attached to clothing, hanging in a vertical position.[69] Considering these formal characteristics, archaeological findings indicate that 11th-13th century needle cases from regions east of the Carpathian Basin and in it can be distinguished from small bone tubes used for warping, the *yurks.*

In Hungarian research, previous interpretations of the objects identified as whistles from Kána have since changed. Erika Gáll and her colleagues have now classified these items, along with similar artifacts found at Debrecen-Tócó-part (Table 1, 8-9), as needle cases.[70]

Without proper context and signs of use, it is very difficult to determine this artifact type with certainty. If an object is found in a grave, it may provide a clue, but in the absence of a needle or traces of metal contact, the identification of Hungarian finds - often discovered as isolated pieces - remains justifiably uncertain. The presence of a smooth, polished surface is also common in this type, which could result from friction against clothing.

Outlook

In closing, we would like to draw attention to an interesting link. It is at the end of the 12th century and in the 13th century that we find in the Hungarian artefacts the polished surface vessels that we have been collecting in recent years.[71]

59 V.ö.: Arbman 1940, Taf. 169, 1-5; Mälarstedt 1984, 194, Abb 21:1.
60 Sergêêva 2011, 83.
61 Welander, Batey and Cowie 1987, 149-174.
62 Rurikovo (Nosov, Plokhov and Khvoshchiskaya 2017, Il. 19, 9.) Tsarevskoje site. The iron needle was still in the bone tube (Ednig 1928, 43, Tabl. IV. 7).
63 Sergêêva 2011, 82.
64 Révész 2000, 14-15; Pálóczi-Horváth 1971, 26-27. Fig. 22.
65 Sergêêva 2011. 81-82.
66 Mongajt 1955, 172-174.
67 Horváth 2022, 652, 140, table 4 (grave 104).
68 Flyorova 2001, Ris. 37; Sergêêva 2012b, Ris. 11, 2.
69 Sergêêva 2011, 81-82; Paltseva 2012, 212, Fig.. 4.2,3. Bone tubes without perforations are also found at the site Bilyar and other sites.
70 Gáll et al 2020, 207-208.
71 Szigeti and Rózsa 2023.

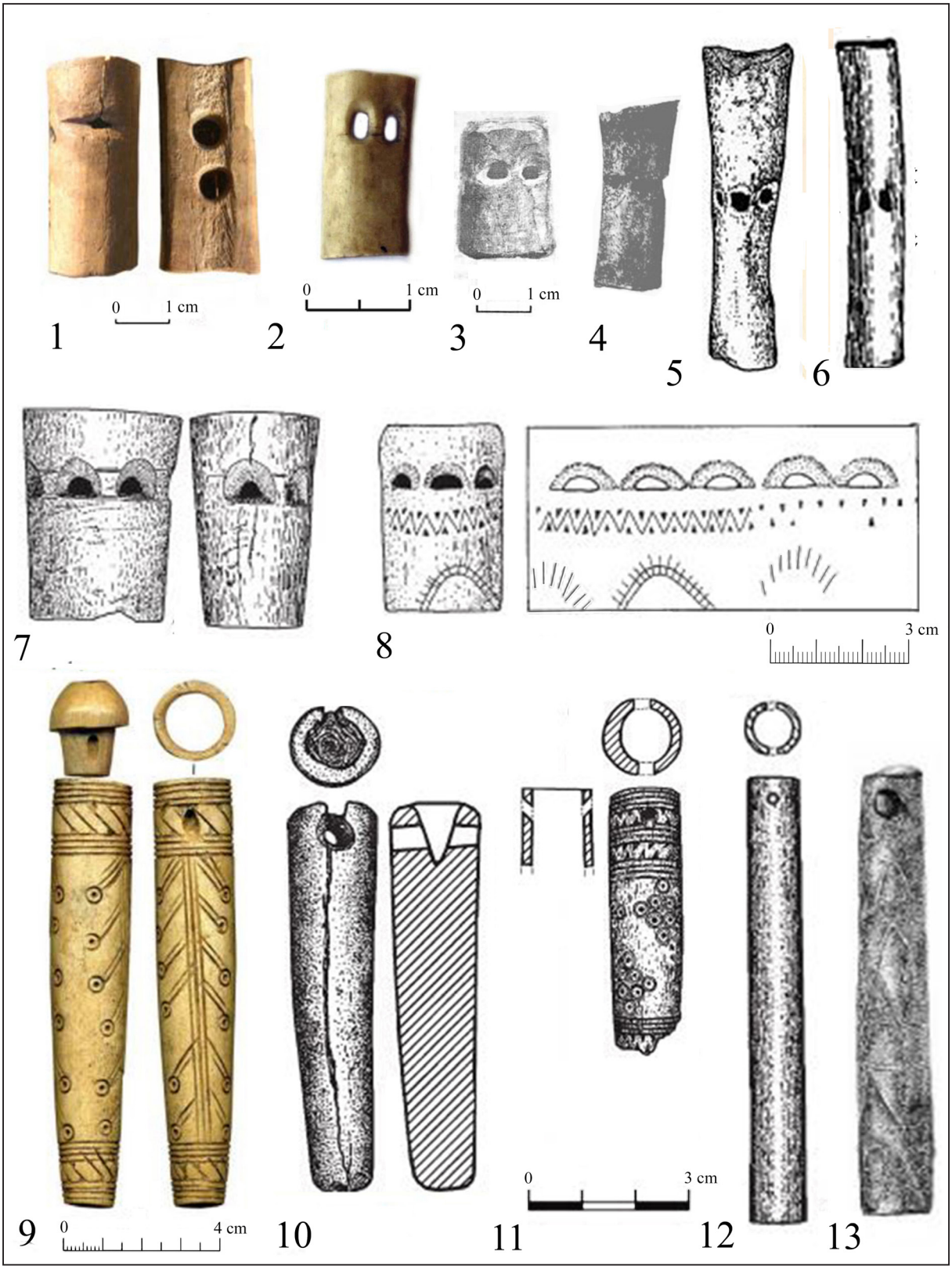


Fig. 5. Whistle: 1. Horodsk (Sergêêva 2020, 193-194, Ris. 1, 6). Yuroks: 2. Old Ohrei (Bacumenco-Pîrnău and Bejenaru 2018, Fig. 5, 6) 3. Chornivka (Voznij 1998, 72, Foto 47); 4. Murom (Mateeva and Kochkina 1998, 38); 5. Kiev (Sergêêva 2011, Ris. 9.6). 6. Novogrudok (Gurevich 1981, 120, Ris. 79, 4). 7-8. Kiev. (Sergêêva 2011, 79. Tabl. 25, 7-8) Needle cases: 9. Rurikovo (Nosov 2017, Il. 15,1). 10-12 Voin (Sergêêva 2015, Ris. 59, 7., 5.,2., 13. Szob-Vendelin. Horváth 2022, 652, 140. Table 4. (grave 104).

Our collection of perforated bone tubes in Hungary is not complete, but it is interesting to note that in the sites of Orosháza, Kardoskút, Budavár, Kána and Hajdúböszörmény polished surface ceramics and tubes with hole/s occur together.[72] In the other direction, there is only one site where we know of no polished pottery, only a tube with two holes, and that is the royal mansion at Segesd.

This intriguing connection suggests that polished ceramics and yuroks may have been related in some way in 12th-13th century communities of the Carpathian Basin. Based on the data from the sites of Orosháza, Kardoskút, Buda Castle, Kána, and Hajdúböszörmény, it appears that these two types of objects frequently occur together, which may indicate a shared functional or cultural background.

The only known exception is the royal mansion at Segesd, where no polished ceramics have been found, but a yurok with two openings has been uncovered - suggesting that the use of yuroks may have been related to weaving and textile processing. This supports the hypothesis that these tools played a role in textile craftsmanship and that their presence may have been connected to women's activities or the operation of craft centers.

Further research is needed to clarify how close this connection was and what social, economic, or cultural significance the joint occurrence of polished ceramics and yuroks held in medieval Hungary.

As we have seen, a perforated bone artifact was discovered at the Esztergom-Kovácsi site. Its functional classification most likely suggests it was a needle case, although the possibility that it was a yurok cannot be ruled out. This finding is particularly intriguing because this cemetery was the burial site of the moneyers, who were very likely the same Böszörmény Khwarezmians to whom the two recently examined Orosháza specimens are also linked.

What is especially thought-provoking is that, based on our current data, yuroks are unknown in the Khwarezmian homeland of the Khwarezmians.[73] However, this is not the case in Bilyar, the capital of Volga Bulgaria, where similar objects are known from the 12th-13th centuries.[74] This may provide further evidence supporting the theory that one of the Muslim communities in medieval Hungary originated from Volga Bulgaria, where a significant Khwarezmian colony existed.[75] It is also possible that the specimens were brought to the Carpathian Basin as part of the of the Hungarians' expanding eastwards connections in the 12th century.

Although crafting a simple yurok does not require extensive craftsmanship, the profession it is associated with does. Moreover, for a finely decorated or a drilled version with tiny holes the use of special knowledge and tools is essential. It is no coincidence, as we have repeatedly pointed out, that artifacts similar to the Orosháza specimens are often linked to sites where advanced industrial activities also took place (city forts). This could include the textile industry, but they may also be related to bone-processing industries. At the Orosháza site, where our examined artifacts originated, bone manufacturing workshop byproducts were discovered - an unusual find in a rural setting - which may not be entirely coincidental.[76]

At the beginning of our research, as a final thought in this short study, we would like to emphasize an important perspective. In previous Hungarian research, perforated tubes have been classified functionally as bone whistles or needle cases. With this study, we aimed to refine this view and present the two tubes from Orosháza as possible tools for guiding threads.

Acknowledgements

At the beginning of our research, we reached out to several colleagues through a circular inquiry. Our goal was twofold: to determine where similar artifacts had been found and to identify those who had never encountered such objects before. We would like to express our gratitude to everyone who responded to our request. In particular, we extend our thanks to Róbert Müller, who gave us the decisive push in investigating the Orosháza artifacts. He suggested that *these objects appeared as if a flexible material, such as a string, had been drawn through them repeatedly over an extended period*. We are delighted that so many people shared their insights with us. Although most reported negative results, their contributions still significantly aided our research: Bekzod Abdirimov, B. Aszt Ágnes, Bácsmegi Gábor, Balogh Csilla, Bárány Annamária, Bartosiewicz László, Sebastian Belbe, Béres

[72] We are grateful to László Daróczi-Szabó and György Terei for granting access to the bone object photographs found at Budapest, Tárnok utca 9. site.

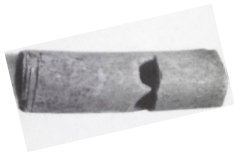
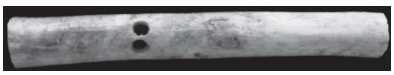
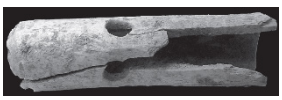
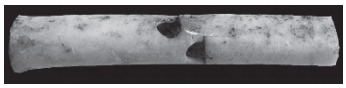
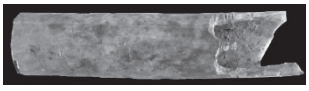
[73] We are grateful to Bekzod Abdirimov and Bahram Sadullaev for their help. Our colleguaes at Horezm has no knowledge of similar object recovered from the territory of Horezm.

[74] Paltseva, Shakirov and Hudyakov 2012, 211, Ris. 4, 5.

[75] http://www.holmi.org/2008/11/szucs-jeno-ket-tortenelmi-pelda-az-etnikai-csoportok-eletkepessegerol (Download date: 2023.01.21).

[76] Lichtenstein, Rózsa and Tugya 2006. Traces of drill use has been identified on the artefacts from the Orosháza site. Page 280. Fig.6.

Table 1.

No.	Site	definition	time	Literature	Picture
a	Esztergom-Kovácsi Grave 79	bone whistle	11. century	Zolnay 1965, 6. kép 25	
b	Jásztelek Obj. 37	bone whistle	11-13. century	Polgár 2003, 154-155	Without illustration
c	Kána Obj. 1744.	goose ulna	12-13. century	Terei and Vargha 2013, 4. fig. 21	
d	Nagycenk House 28	bone whistle non-identifiable bird tibiotarsus	12-13. century	Gömöri 2016, fig. 8.	
e	Budavár Tárnok street 9/11	bone whistle	13. century	Zolnay 1977, 29	
f	Budavár ’Északi előudvar’	bone whistle	13. century	Zolnay 1977, 29	Without illustration
1	Orosháza-Bónum House B/3	thread guider bird long bone	12-13. century	Richter and Rózsa 2025	
2	Orosháza-Bónum House B/38	thread guider goose humerus	12-13. century	Richter and Rózsa 2025	
3	Kardoskút-Hatablak	bone whistle	12-13. century	Méri 1964, 8. fig. 3	
4	Hajdúböszörmény Téglagyár	bone whistle	12-13. century	Szabó 2003, 12. tabl. 4	
5	Segesd	bone whistle	középkor	Magyar 1988, 18. fig. 4	
6	Kána Obj. 1647	bone whistle/ bone whistle/ needle case		Daróczi-Szabó 2013; Gáll et al 2020, fig. 8	
7	Kána Obj. 3516	bone whistle/ bone whistle/ needle case		Daróczi-Szabó 2013; Gáll et al 2020, fig. 8	
8	Debrecen-Tócó-part, Obj. 390	needle case goose ulna	10-14. century	Gáll et al 2020, fig. 7	
9	Debrecen-Tócó-part, Obj. 475	needle case goose femur	10-14. century	Gáll et al 2020, fig. 8	

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3. Warping procession on wall paintings: 1. Constance Canon House, 1320. Germany; 2. Bibliotheca Ambrosiana, 1424. Italy.

4. 1. a. Kneep. Scotland. National Museum of Scotland. X.IL848; b. Adelsö. Sweden. History Museum. Inv.N.: 35245; c. Hulterstad. Sweden. History Museum. Inv.N.: 21802; d. Adelsö. Sweden. History Museum. Inv.N.: 42904; e. Adelsö. Sweden. History Museum. Inv.N.: 50208/1513; f. Adelsö. Sweden. History Museum. Inv.N.: 5208/1510; 2.a. Santok. Poland. (Popławska et al. 2021.Fig.1. b.); 2.b. Giecz. Poland. (Popławska et al. 2021,Fig.4.)

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