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NEW DIRECTIONS IN THE RESEARCH OF MEDIEVAL FISHING: USE-WEAR ANALYSIS OF BONE FISHING NET WEIGHTS

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Fishing has always been a vital aspect of life in the Carpathian Basin due to its geographical conditions. After the adoption of Christianity and the introduction of various fasting days, this activity was of increased importance. However, medieval fishing techniques and the tools and objects associated with it have been little researched. Use-wear analyses show that this topic is indeed unexplored and that, in order to identify possible new tools, it is worthwhile to include the examination of material remains of this kind in the range of applicable methods, beyond field research,.

Keywords: fishing, Middle Ages, use-wear analysis, bone tools, animal bone

INTRODUCTION

In recent decades, archaeological research into medieval fishing has primarily been based on landscape archaeology and field research (Ferenczi 2006; Zatykó 2011). In recent years, researchers have tried to make up for the previous lack of examination of medieval sources. They have linked data from written sources with the types of fishing sites identified by field research, thus making certain fishing techniques more understandable. In addition, the focus has also been on better examining the economic role of fishing (Ferenczi 2008; K. Németh 2014). However, the study of fishing equipment has not been a significant archaeological research objective. In this respect, the lead net weights collected and published by Attila Czövek during his systematic metal detectoring in the vicinity of Fadd constitute an exception (Czövek 2024). The fact that the study of material finds has not been in the forefront of examinations is partly because we usually have very few such objects at one site. Field surveys and excavations do not necessarily focus on fishing sites where larger quantities of finds could be expected, or such results have not yet been published. In addition, there may be tools whose exact use has not yet been determined or is questionable, therefore, they are excluded from this type of research. Furthermore, research into fishing from an archaeozoological perspective is also difficult, as fish bones are highly perishable and, due to their small size they are often missing from excavation finds. It needs to be added that no animal bones were collected during the early excavations, and more recent excavations done without flotation techniques have not collected them either. (Bartosiewicz 2021, 433–435).

ETHNOGRAPHIC BACKGROUND

Fishing artefacts are most likely to be found in museum storage. A large number of finds must have been accumulated during excavations over the past decades, now the researchers' task is to identify and examine them. The ethnographic literature and the study of collection items may be of great help in this undertaking. Since the end of the 19th century, numerous ethnographers have devoted particular attention to the study of fishing in the Carpathian Basin. Ottó Herman's double-volume book on Hungarian fishing. (*A magyar halászat könyve 1-2,* Herman 1887), is of outstanding significance. He examined fishing methods and catchable fish throughout the Kingdom of Hungary and compiled a glossary of terms. Herman introduced the term "ősfoglalkozás" (arche-occupation) that covered fishing, herding, and hunting. Since he interpreted fishing as an arche-occupation, he outlined its importance from the very beginning. The work of János Jankó is also decisive to this day. His work about the origins of Hungarian fishing may serve as a

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starting point for research into fishing artefacts (*A magyar halászat eredete*, Jankó 1900). Later, ambitious monographs were produced about fishing on the river Tisza (Szilágyi 1995) and the Danube (Solymos 1965; 2005), and there are also shorter studies on fishing on the Maros (Felföldi 1993), the Fehér-Körös (Solymos 1960), the Alsó-Szamos (Morvay 1937), and even on fishing in specific sections of the Danube or Tisza (Ecsedi 1934; Füssy 1995; Ferkov 2006; 2008).

USE-WEAR ANALYSIS

In use-wear analysis, we observe the marks left by materials when they come into contact with each other. Based on these traces, we can draw conclusions about the nature and direction of the contact, as well as the materials involved. This may give us an idea of how a particular tool was used in the past. Use-wear analysis is done through microscopic observations (LeMoine 1994, 317; Tóth 2013, 255).

The latest research shows that a large number of previously unidentified fishing-related tools are found among archaeological finds. In my earlier research, I have applied use-wear analysis to distinguish bone skates from similar-looking fishing net weights (Szathmári, 2024). Both types of objects were made from the metacarpal and metatarsal bones and radii of large ungulate animals, primarily horses and possibly cattle. Since the net weights were always attached, and in some cases so were the skates, there are holes at the ends of the bones. Therefore, they appear very similar.

THE FINDS EXAMINED

The archaeological finds examined include tools from the three sites of Tiszaug – Kis-ér partja (medieval settlement of Ság), Visegrád – Vízibástya, and the Kisnána – Vár sites, which were previously thought to be *kece* bones (i.e., weights for a type of fishing net called *kuszakece*) or skates (57 items in total), along with additional bone skates and sledge runners (Szathmári, 2025). The ethnographic objects examined for comparison were net weights (27 items) from the Fishing Collection of the Museum of Ethnography's Farming Collection. Gábor Sz. Wilhelm conducted excavations at the medieval settlement of Ság in 2020-2021 (Sz. Wilhelm 2023). Ság is mentioned in the interpolated founding charter of the Garamszentbenedek Abbey, founded in 1075, which contains a detailed description of the border inspection of Ság (Laszlovszky 1986, 9-17). For the abbey, the Ság, which it possessed, provided an excellent fishing spot on the Tisza. During the excavation, a large number of fishing-related tools were unearthed (ceramic, lead, and bone net weights and hooks), of which the bone tools, initially thought to be net weights or bone skates, were examined (Sz. Wilhelm 2023; Szathmári 2025). A smaller number of finds from the other two sites were also the subject of the research. From the Visegrád – Vízibástya site, a standalone find was recovered, which, due to the losses the museum suffered in World War II, cannot be dated

Fig. 1. Weights for seine made from whole cattle metatarsals (2022.60.13) and halved horse metacarpals (2022.60.15) from the Ság site

more precisely than to the 13th-17th centuries. The tower itself was part of Visegrád's 13th-century defense system on the banks of the Danube. Six bones from the castle in Kisnána came from Nóra Pámer's excavations in the 1960s (Pámer 1970). The Kisnána castle lies at the confluence of two streams. Of the bones included in the research, 33 were subjected to detailed use-wear analysis, while the remaining 51 were subjected to brief microscopic observation (*Fig. 1*).

POSSIBILITIES OF IDENTIFICATION

Based on microscopic observations, we could distinguish bone skates and sledge runners, which have a flat, shiny surface with narrow longitudinal striations, from net weights, which have a heavily worn surface with wider striations (Szathmári 2025). The accepted method for identifying wear is to experimentally create a pattern identical to the use-wear observed on archaeological finds (Tóth 2013, 256). In the case of bone skates, we succeeded in doing the experiement. In order to reconstruct the medieval technique of skating and to produce use-wear similar to what we observed on the archaeological finds, an experiment in several stages was conducted. In the case of fishing tools, we have been unable to set up an experiment, as fishing is regulated by law in Hungary. In the case of these bones, it is with the help of ethnographic parallels that we can get closer to identifying the traces. Since the ethnographic studies reviewed above thoroughly examined the different types of fishing techniques and the tools used, we have detailed knowledge of the use and design of certain tools, such as the *kuszakece* (fishing net), that can be compared to the archaeological finds, based on their appearance. These objects also feature in ethnographic collections. Artefacts similar in form may serve as a starting point for understanding the use of certain tools, but it is important to remember that similar appearance does not necessarily mean identical use (Stone 2011, 28).

Previous archaeological literature rarely, and often only tentatively, mentions that some of the objects considered bone skates were in fact fishing net weights. However, in almost all such cases, they were considered to be weights (*kececsont*) for a special fishing tool called a *kuszakece* (Laszlovszky 1982, 27–28; Daróczi-Szabó & Daróczi-Szabó 2015, 224–225; Laszlovszky & Siklódi 2022, 63–64). The use of *kuszakece* can be documented in the case of larger Hungarian rivers in recent centuries. They were used in cold periods when fish movement slows down. The structure of the *kuszakece* is a smaller-mesh net placed between two larger-mesh nets suspended on an A-shaped frame. The net cord runs along the bottom of the nets, attached to the ends of the two arms of the frame. The *kece* bones, or weights of the net, are placed on this cord. Horse bones and, occasionally, cattle bones were used for this purpose. A *radius* was placed in the middle, with *metacarpals* and *metatarsals* symmetrically placed on either side. The bones were attached to the cord through holes at both ends. The net was dragged along the riverbed in the direction opposite to the movement of the fish, startling the fish burrowing in the mud and causing them to swim straight into the net and be caught (Herman 1887, 171–173; 1898, 14, 16; 1902, 29; Bálint 1976, 434; Ferkov 2006, 198) (*Fig. 2*).

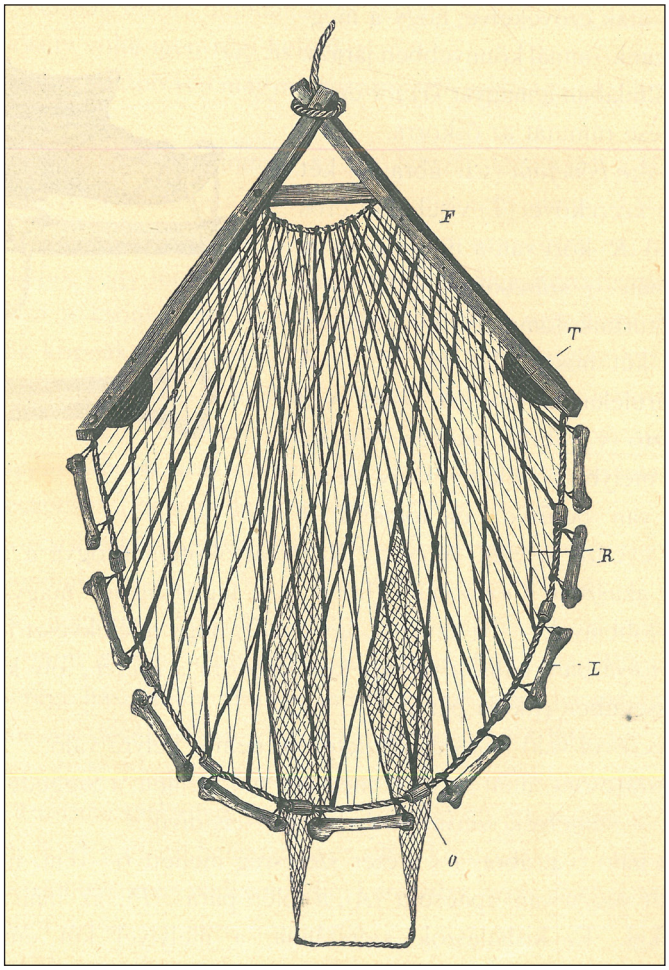

Fig. 2. Kuszakece (Herman 1887, 174, Figure 52)

RESULTS

As a result of use-wear analysis, it has been determined that some of the pieces previously thought to be *kece* bone were in fact associated with a completely different type of net. While in the case of *kece* bones, the striations on the bones are long, wide, and run in a direction nearly parallel to the longitudinal axis of the bones (*Figs. 3-4*), in several archaeological samples the striations are much wider and shorter, and are perpendicular to the longitudinal axis (*Figs. 5-6*). In both cases, the entire bone is heavily worn and shiny. Among the nets in the Museum of Ethnography's collection, there are items that were used for encircling fish and are equipped with bone weights. The examination of these bone weights has revealed that a significant proportion of the items found in archaeological contexts must have been used for encircling fishing. The use of these nets differs from the use of *kuszakece* described above. In the case of this technique, the aim is to encircle the fish and drag them ashore or into a boat. As seine nets came in many shapes

Fig. 3. Long, wide striations nearly parallel to the longitudinal axis of the bone on the kece bone with inventory number NM 68.150.66 at the Museum of Ethnography (10× magnification)

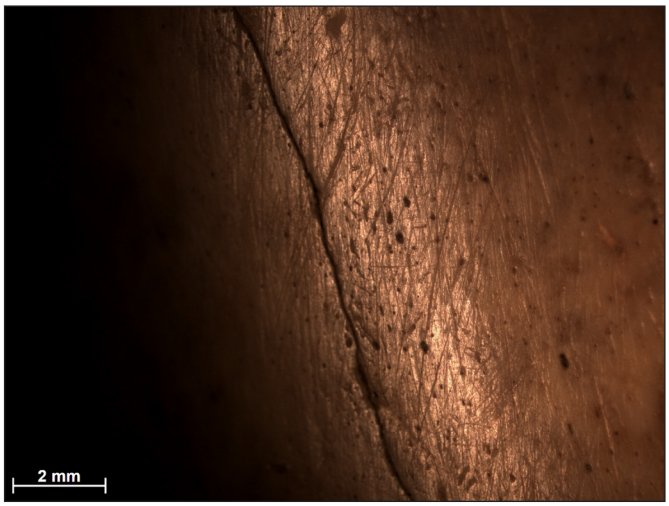

Fig. 4. Long, wide striations characteristic of kece bones, nearly parallel to the longitudinal axis of the bone or intersecting it at a shallow angle, on the dorsal side of a medieval bone with inventory number 2022.60.39 from the settlement of Ság (10× magnification)

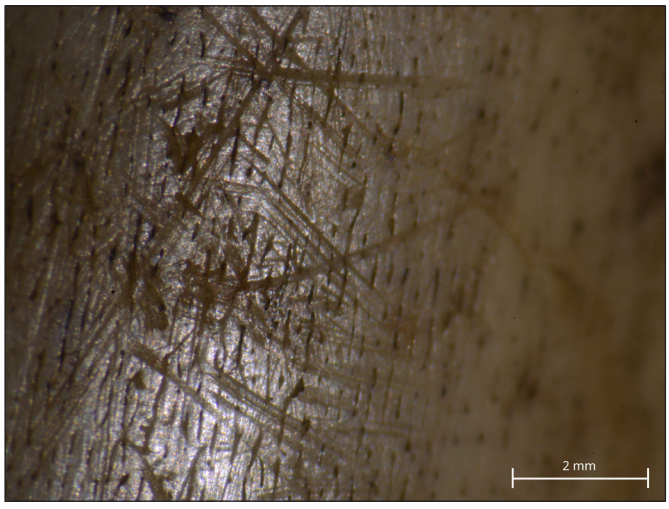

Fig. 5. Shorter, even wider striations perpendicular to the longitudinal axis of the bone and diagonal striations on the dorsal side of the second weight of the fishing net with inventory number NM 2020.82.36 from the Museum of Ethnography

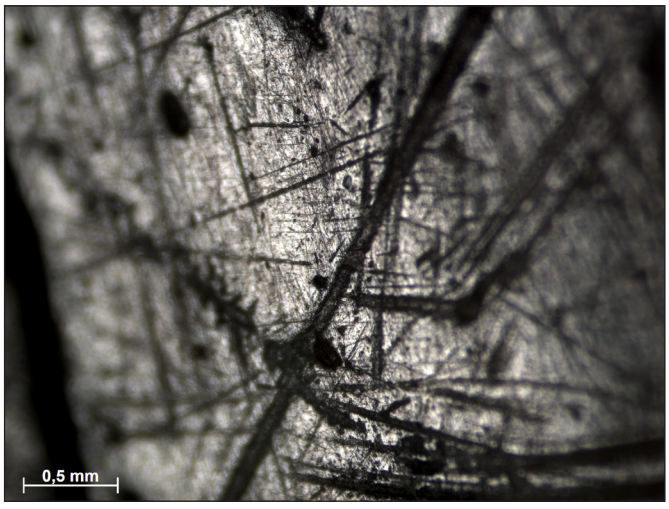

Fig. 6. Shorter, even wider, diagonal striations perpendicular to the longitudinal axis of the bone, characteristic of seine weights, on the medial side of a medieval bone with inventory number 2022.60.13 from the village of Ság (40× magnification)

and sizes, but their operating principle was almost identical, the use of each seine net can be described by explaining the use of the "*öregháló*" (old net). To cast a long seine net, which may be 80, 100, or even 200 meters long, a fishing "*bokor*" is needed (a bunch of up to ten fishermen). The top of the net is held above the water by floats made of rush or bark, while weights are placed on the bottom. One end of the net is held by a young man standing on the shore and using a harness (*laptáros*), while the entire length of the net is prepared for release. While the boat is leaving the shore, the net is let into the river away from the shore, then the men turn back towards the shore with the net released. The seine thus forms a D-shape with the line of the shore, and the fish are trapped in the enclosed area. The net is then dragged ashore (*Fig. 7*). The *öregháló* can be used in a similar way on water only, using two boats. In this case, the fish are dragged into boats rather than onto the shore (Herman 1887, 249–253; Bálint 1976, 431–432; Vajkai 1943, 146). Smaller nets work in a similar way in smaller waters, with the difference that it is sufficient to have only two fishermen to handle them. The seine nets examined at the Museum of Ethnography can also be classified in the latter group.

Fig. 7. "Tanyavetés", the use of seine in Komárom (Herman 1887, 449, Table III)

It is particularly interesting that a large proportion of the finds (31 excavated tools) show signs of use-wear characteristic of seine net weights. As few as only four bones can be assumed to have been used as *kece* bones in the Middle Ages. None of these pieces can be reliably dated to the Árpádian Age. Thus, it is also possible that this type of net, similarly to the *kuszakece*, only appeared later in Hungary, thus presumably in the entire Carpathian Basin. Ten bones show striations characteristic of both types, which requires further investigation.

FURTHER RESEARCH

The example presented highlights the general need to identify or possibly re-examine the use of such objects. In the case of many artefacts, the inclusion of ethnographic parallels may take researchers closer to understanding the former use of archaeological finds. In addition, the systematic collection of fishing tools and linking them to fishing methods may advance research into medieval fishing. In this way, fishing sites, fish ponds, and the tools used for fishing could be examined together, offering a more complex picture.

Examined archaeological and ethnographic finds

Katona József Museum of Kecskemét: inv.no. 2022.60.2–6, 2022.60.8–10, 2022.60.12–13, 2022.60.15, 2022.60.17–19, 2022.60.21–23, 2022.60.26–27, 2022.60.29, 2022.60.33–34, 2022.60.36, 2022.60.38–41, 2022.60.44–45, 2022.60.47–48, 2022.60.58–61, 2022.60.63, 2022,60.65, 2022.60.67–72, 2022.60.74–76, 2022.60.78, 2022.60.80–81, 2022.60.84.

King Matthias Museum of the Hungarian National Museum: inv.no. 1950.18.

Dobó István Museum, Medieval collection: inv.no. 71.1.175.0–5.

Museum of Ethnography, Fishing ollection: NM 68.150.66, NM 5903, NM 5905, NM 68.150.142, NM 68.150.158, NM 69.97.20, NM 5906, NM 68.150.144, NM 68.150.97, NM 68.150.80, NM 6008, NM 2020.82.36, NM 33634, NM 2020.82.23.

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