

## RECENT RIVER ARCHAEOLOGICAL RESEARCH: POST-MEDIEVAL SHIPWRECKS ALONG THE DANUBE

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*In summer 2015, the water level of Hungarian rivers decreased significantly owing to the hot, dry weather. As a result of low water levels, several previously unknown archaeological sites yielding remarkable finds were discovered. A report on the finds exposed by a similarly low water level in winter 2010/11 appeared in the 2013 issue of Hungarian Archaeology.<sup>2</sup> In addition to the low water level, our research was also aided by the decision of the municipal council of Ráckeve to expand the archaeological collecting activity of the Árpád Museal Collection with the express goal of turning the museum into a regional museum (now Árpád Museum).*

We identified a site north of the ferry on the outskirts of Ercsi, following a notification from one of the local residents.<sup>3</sup> The wreck of a flat bottom ship lay perpendicular to the Danube channel, some 200 m North the Ercsi ferry. The two sides of the vessel and its damaged bow or stern lay on dry land. A part of its brick cargo was scattered, covering the area in a downstream direction. We also found two planks on the shore, which probably originated from the barge and had been most likely been removed by modern visitors. The ship's measurable length was 9.4 m. Its width could be relatively accurately measured because the lower planks of the barge's hull outlined its width along a few metres long section on both sides. The greatest width was 3.9 m, tapering to 3.5 meters at the end farther from the river. The tapering width also implied that only the end of the barge was missing. We also noted that the planks curved inward towards the barge's end lying nearer the river, suggesting that a sizeable large portion of the barge's bottom had survived and that its original length was 11–13 m. Given that the condition of the barge did not enable the identification of which tapering end was the bow and which the stern, the sides of the barge are in the following denoted as "upstream" and "downstream" side instead of left and right.

The barge's structure was reinforced with strakes. We found four ribs in a row on the upstream side, which were spaced 0.8, 0.22 and 0.56 m apart. One of the wooden elements that protruded more from the pebble sediment was carved from a single log and was originally L-shaped, a common practice in the pre-modern period. We only found a single rib on the downstream side as well as wooden treenails for securing the frame. We noted that the frames were secured to the bottom with iron nails with clenched over ends and treenails. Treenails protruded from the edge of the thick wooden planks of the bottom, while the inboard was smooth. Moss was used for caulking between the planks and we found the broken ends of iron sintels or their corroded imprint on the outer surface. An oval iron sintel lay beside the wreck. The cargo was packed on a ceiling of planks that was laid over the strakes.



*Figure 1: Wreck of an eighteenth-century barge and its cargo of bricks at Ercsi (author's photo)*

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<sup>2</sup> Attila J. Tóth: Medieval Shipwreck from Ráckeve. *Magyar Régészet*, Spring 2013.

<sup>3</sup> The finds were reported by Tibor Zolta, a resident of Ercsi. The research took place on August 17, 2015.



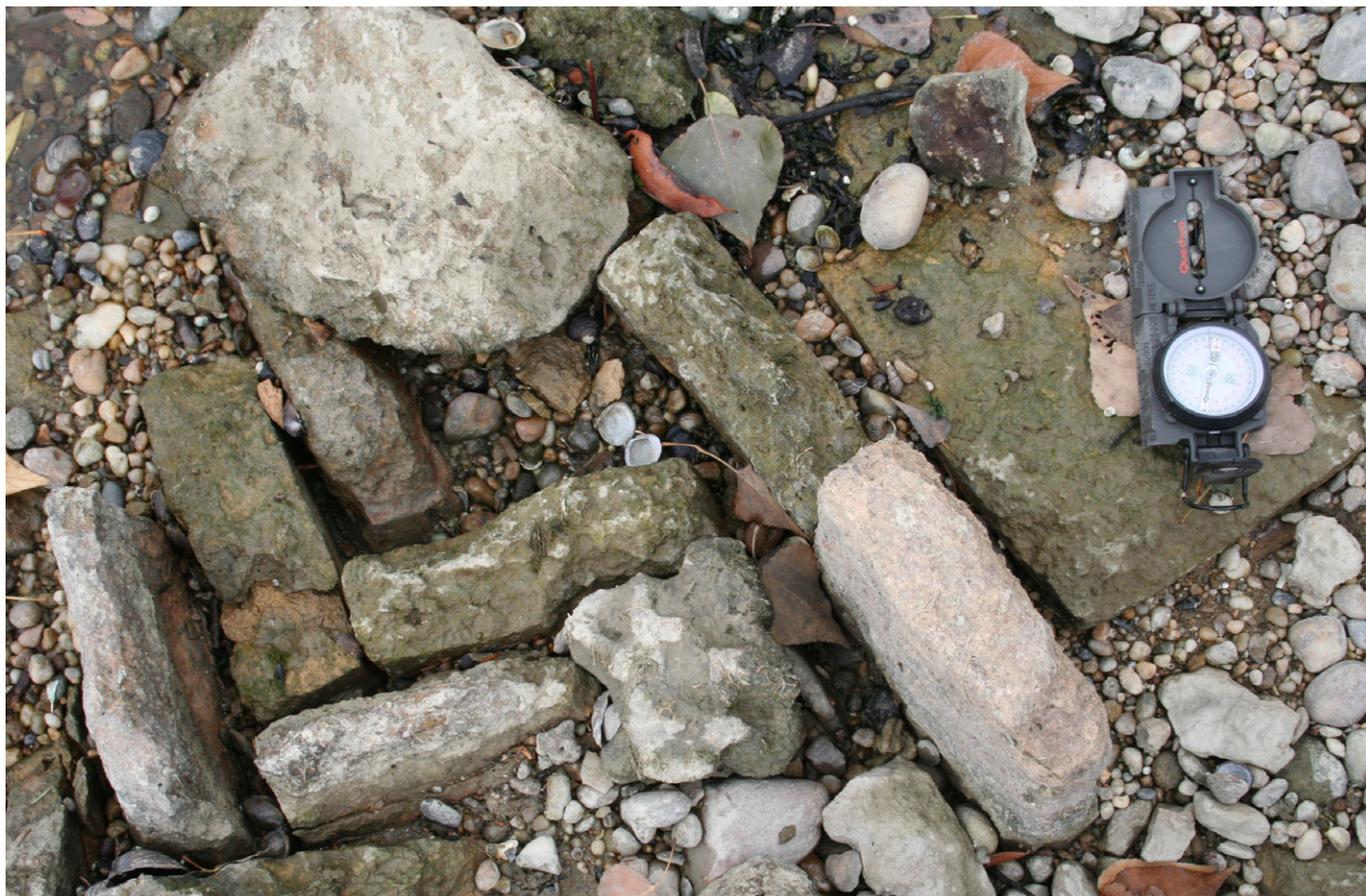
Figure 2: A treenail for securing the strakes on the inboard of one of the planks found at Ercsi (author's photo)

The two planks lying in a secondary position beside the barge could be examined in greater detail. One was 3.8 m long and both its ends were damaged. Its width was 26 cm, its thickness was 3.8 cm. The hole of a treenail lay 0.8 m from its end, those of a treenail and iron nail at a distance of 1.48 m, those of a treenail and an iron nail at a distance of 2.33 m and that of an iron nail at a distance of 3.04 m. The head of the nail at a distance of 1.48 m was still in the hole. This would suggest that the side-frames were spaced 70–80 cm apart. A row of small treenails and the holes for them were noted on one edge of the plank, lying at distances of 1.24, 1.76, 2.1, 2.5, 3.04 m apart, suggesting that these had been used for fixing neighbouring strakes and had been spaced 40–50 cm apart.

The other plank was 3.43 m long, 6 cm thick and narrows from 27 cm to 25 cm in width. The narrower end was cut obliquely, suggesting that it came from the bow or stern of the barge. We found the holes of 2.5 cm treenails on the plank spaced at distances of 0.89, 1.62, 2.18 and 2.75 m from the narrower end, corresponding to side-frames spaced 50–70 cm apart. There were treenails with a diameter of 2 cm in both edges of this plank. Three treenails were spaced at distances of 1.07, 2.18 and 3.26 m from the narrow end on one side, indicating that they lay 1.1–1.2 m apart, while the four treenails on the other edge were at distances of 0.77, 1.5, 2.24 and 3.02 m, i.e. 70–80 cm apart. The fixing of the latter four treenails was quite interesting: a wedge-shaped slot (triangular cross-section, elongated trapeze in top view) was cut into the surface of the plank down to about 2 cm from the plank's edge. A hole was bored from the wider side to the plank's edge into which the treenail was fitted by driving it into the hole through the wedge-shaped slot and the protruding end of the treenail was then cut to make it flush with the plank's surface. A similar solution was documented on the planks of a wreck found at Drávatamási, the single difference being that the nail driven into the plank's edge was made of iron.<sup>4</sup> A treenail was driven into the planks in a similar manner on a ship found at Altenwörth in Austria, dated to 1810.<sup>5</sup>

<sup>4</sup> Attila J. Tóth: New data to the history of ships and boats in Hungary. In: I. R Radic – A. Gaspari – A. Pydyn: *Proceedings of the 13th Annual Meeting of the European Association of Archaeologists* (Zadar, Croatia, 18–23 September 2007) (Zagreb, 2008), 299, Fig. 15.

<sup>5</sup> K. Schaefer: Der Schiffsfund von Altenwörth, 1810. *Das Logbuch* 21 (1985), 67–71.



*Figure 3: The brick cargo of the Ercsi barge (author's photo)*

There was no apparent connection between the positions of the nails used for securing the strakes and the nails protruding from the side of the plank.

We examined the upstream side of the barge after removing the few centimetres thick sediment covering it. We found that the barge's bottom and side were joined by two planks, with the strake overlapping the edge of the floor plank of the barge. We identified one of the iron nails that fixed and secured the two planks. The joint was caulked on the inboard, the joint was covered with a caulking batten and secured with narrow sintels from the inside. The outer edge of the barge's bottom was a narrow plank beside which there was a narrow member with square section, and the 25 cm wide floor plank. The end of the outer floor plank narrows, again suggesting that it came from near the damaged bow or stern of the wreck.

The use of trenails and oval iron sintels is an archaic manner as in the case of the Ráckeve barge dating from the mid-seventeenth century (this barge was earlier assigned to the late medieval period on typological grounds, but the dendrochronological analyses indicated that it dates from the seventeenth century, reflecting the survival of local archaic elements during the Ottoman period in Danubian shipbuilding). The joining of the side-strakes and the floor planks by the means of two planks is a later feature (documented by the close of the seventeenth century at Madocsa<sup>6</sup>). The use of trenails for securing the edge of the planks has been documented in several locations and during different periods in the Danube Basin. These traits suggest that the barge can be dated no earlier than the late seventeenth century and no later than the early nineteenth century.

The cargo of bricks was disturbed, but still lay in its original position in some spots, especially in the areas closer to deeper water. The bricks measured 30 cm by 15 cm and had a thickness of 5–6 cm. One

<sup>6</sup> Attila J. Tóth: Adatok a kora újkori közép-Duna-medencei hajók régészetéhez (Data to the archaeology of Early-Modern ships in the Middle-Danube-Basin) In: E. Benkő – Gy. Kovács: *A középkor és a kora újkor régészete Magyarországon* (Archaeology of Medieval and Early-Modern Periods in Hungary) (Budapest, 2010), 873–874.

side of the bricks was more or less smooth, the other was uneven, while three edges were smooth and the fourth was uneven. The bricks were tempered with grit and they were fired to a mottled reddish-brownish colour. They were stacked in the middle part of the barge: the bricks were set on their edge and arranged in V-shaped rows, with the neighbouring rows wedged into one another, an arrangement that doubtless stabilised the cargo, but probably slowed down loading and unloading. This would suggest that the cargo was to be transported to some farther-lying destination. The bricks lying nearer to the wreck's end towards to river bed were stacked in rows.

A rubble of bricks, brick fragments and broken iron nails covered the pebbly shore for some 50–60 m in a downstream direction. These artefacts were scattered following the decay of the barge's upper planks, washed down by the river current and the winter ice. In the case of marine wrecks, this is known as a “wreck trail”, created by currents as the sinking vessel breaks up and its remains and its cargo are scattered. We



*Figure 4: Millstone found on the Danube shore at Makád (author's photo)*

collected two broken iron nails, a sintel fragment and the fragments of three pottery vessels, whose location was recorded using GPS. The pottery fragments included two collared, high-drawn pot rims covered with a thin yellowish-brown glaze in the interior and the fragment of a vessel with greenish-white trailed glaze on the exterior and yellowish-brown glaze on the interior. The ceramics can be dated to the mid-eighteenth century or later.<sup>7</sup>

We sampled one of the planks lying farther from the wreck. András Grynaeus examined the sample and found that it came from spruce and that it compared well with samples from north-west Austria. The sample indicated a date after 1777 for the barge (although further sampling is necessary for a more precise date).

The current evidence indicates that the barge sunk sometime in the last decades of the eighteenth century and that it had been made (or repaired) in a shipyard lying along the Danube's Austrian section.

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<sup>7</sup> I am grateful to Gyöngyi Kovács for this information.



Figure 5: Oakwood element of an extended monoxyton ship found on the Danube shore at Szigetcsép (author's photo)

The discovery of a millstone found on the shore of the main Danube channel at Makád lying on the southern tip of Csepel Island was reported.<sup>8</sup> The millstone lay on the shore, unassociated with any other finds. The worn, chipped millstone probably originated from a boat mill. We know that there were several active boat mills in this region during the eighteenth and the nineteenth century.

We were also notified of an iron boat element found on the outskirts of Szigetmonostor, on the shore of the Szentendre Danube channel.<sup>9</sup> After inspecting the site and the find, it became clear that it came from a floating pontoon, which lay at the end of a loading dock area whose use is documented from the nineteenth century. The pontoon element was made using the riveting technique, typical for boats and barges constructed in the late nineteenth and early twentieth century. During the cleaning of the remains, we discovered the remains of another pontoon wreck. It is possible that the two wrecks were sunk as part of events during World War 2.

We discovered four new sites while surveying the edge of the “shoal of Csép” (a sand bar) towards the Danube channel on the western side of Csepel Island.<sup>10</sup> These sites, originally lying along the river shore, became exposed as a result of erosion. An oakwood element, part of the right rear portion of an expanded monoxyton vessel hull, was found at the Csépi-zátony 2 site. We could observe the remains of treenails securing the ribs on the monoxyton elements bottom (we did not find any iron nails). The monoxyton form and the use of treenails are paralleled by the Angevin period (13th c.) boat from Dunaföldvár and the sixteenth-century boats from Ráckeve. Given that the vessel's stern was straight, it compares well with the remains from Dunaföldvár (probably from a boat mill).

The collection of the Árpád Museum in Ráckeve mentioned above will play a major role in the discovery, excavation and preservation of the underwater archaeological heritage. The activities of a regional museum will be adapted to the nature of its collection area, and thus archaeological finds dating from various periods recovered from or still lying undetected in the Danube are of particular importance. The museum's planned

<sup>8</sup> The find was reported by Zoltán Balázs, a commercial diver working in Dunaújváros.

<sup>9</sup> The find was reported by Tibor Alt who works at the Budakalász ferry.

<sup>10</sup> The goal of the survey was to locate the findspot of the Roman coins presented by László Balsa to the Ráckeve museum.

activity area incorporates the southern part of Csepel Island, downstream of Szigetcsép, i.e. a significant portion of the main river channel along the Danube's middle section and the Ráckeve Danube channel. There are plans to develop the museum into a research centre for underwater archaeology that would undertake collaborative projects with other Hungarian museums and research institutions as well as with European institutions engaged in river archaeology. The initial agreements on collaboration have already been signed with the Szentendre and Dunaújváros museums.

### EXPANDED MONOXYLON BOATS AND BARGES

Boats or barges carved from a single log are called dug-out boats or logboats. The technical term for these vessels is monoxylon (from Greek, meaning "one tree"). From the Late Iron Age to the Middle Ages, the bottom and the hull's lower side were joined with an element with an L-shaped section carved from a single log instead of fastening two planks in the case of flat-bottomed cargo boats. The planks of the bottom were laid between the monoxylon elements to increase the width of the boat or barge. Expanded monoxylon boats and barges were widespread in Europe during the Middle Ages.

#### RECOMMENDED READINGS

SCHAEFER, K.

Der Schiffsfund von Altenwörth, 1810. *Das Logbuch* 21 (1985) 67–71.

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