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Boats from bogs in Arctic Norway: depositional contexts and explanatory frameworks in the Late Iron Age and Mediaeval period

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Abstract: A comprehensive assessment of boat-related bog finds from the collection of the Arctic University Museum of Norway (Norges Arktiske Universitetsmuseum, NAU) materialises the entanglement of boat technology and cultural meaning in northern Norway during the Iron Age. Nineteen boat parts and related equipment made of Scots pine (*Pinus sylvestris*) from 17 bog locations have been documented. As the Early Iron Age and pre-Iron Age bog finds have been discussed in an earlier publication (Wickler 2019), this chapter focusses on bog boat finds from the Late Iron Age. The documentation of bog boats has emphasised absolute dating using radiocarbon and dendrochronology, in addition to detailed descriptions and graphic documentation of the objects. Some finds are related to ritual activities which include votive bog offerings and a boat grave. Most of the Late Iron Age boats have sewn planking, a construction technique which predates the use of iron rivets first documented in the Roman Iron Age and which is also associated with indigenous Sámi boats. Hybrid vessels combining sewing with treenails and rivets are also represented. Bog boat remains are discussed in the context of relevant explanatory frameworks in order to evaluate their significance for the development of boat technology and as expressions of northern Norwegian maritime culture.

Introduction

This chapter describes a project undertaken by the author which analysed and dated wooden boat parts and boat-related equipment from bog contexts from the archaeological collections of the Arctic University Museum of Norway (NAU). All of the materials referenced are Mediaeval or earlier in age and originate from Arctic northern Norway. The project has emphasised obtaining reliable radiocarbon age estimates for as many finds as possible, in addition to collecting or creating detailed descriptions of the individual objects and their comparisons with relevant materials sourced from elsewhere in Scandinavia. As finds pre-dating the Late Iron Age were previously published (Wickler 2019), the present study focussed on bog boat material from Nordland and Troms dating to the Late Iron Age, along with several objects from the Mediaeval period (Figure 9.1; Table 9.1). No bog finds from the Late Iron Age have been found in the northernmost region of Finnmark. Most of the analysed objects were discovered while cutting peat for fuel and then given to the museum between the 1880s and 1950s. Two boat finds from the Viking Age, the Øksnes boat grave and Bårset votive offering, were documented by archaeological excavations in the 1930s (Gjessing 1941).

Boat finds are presented by context and type, including those from ritual contexts, boat planks with information on fastening techniques and miscellaneous boat parts and equipment. Also described are two spades initially identified as paddles. Overarching themes of relevance to bog boat finds are also reviewed and evaluated, including ritual deposition of boats in bogs and importance of sewn boats in Late Iron Age northern Norway. Also argued is the need to create models of boat development from a northern Norwegian perspective as an alternative to models with a predominantly southern Scandinavian bias.

Bog boats from ritual contexts

Three bog boat finds from northern Norway are interpreted as being associated with ritual activity. These include a boat grave intentionally placed in a bog at Øksnes in Vesterålen and votive boat offerings at Bårset in northern Troms and Rydningen on the island of Senja. In this section, these contexts are discussed and compared as bases for modelling the importance of bogs as a liminal entity mediating between landscapes and waterscapes of ritual significance.

The Øksnes boat grave

During road construction at the Øksnes vicarage on Skogøya Island in Vesterålen in 1934, the remains of a wooden boat with an estimated original length of 8.0–10.0 m and width of 1.5 m were discovered in a bog *c.* 4.5–5.0 m above sea level (a.s.l.) and *c.* 60.0–70.0 m from the shoreline. Subsequent excavation revealed the boat was buried in the latter part of the Viking Age in a low grave mound with a ring of stones placed around the outer margin (Figure 9.2A). The results of the boat grave excavation were published by Gjessing (1941), who described the burial as the grave of a Norse male,

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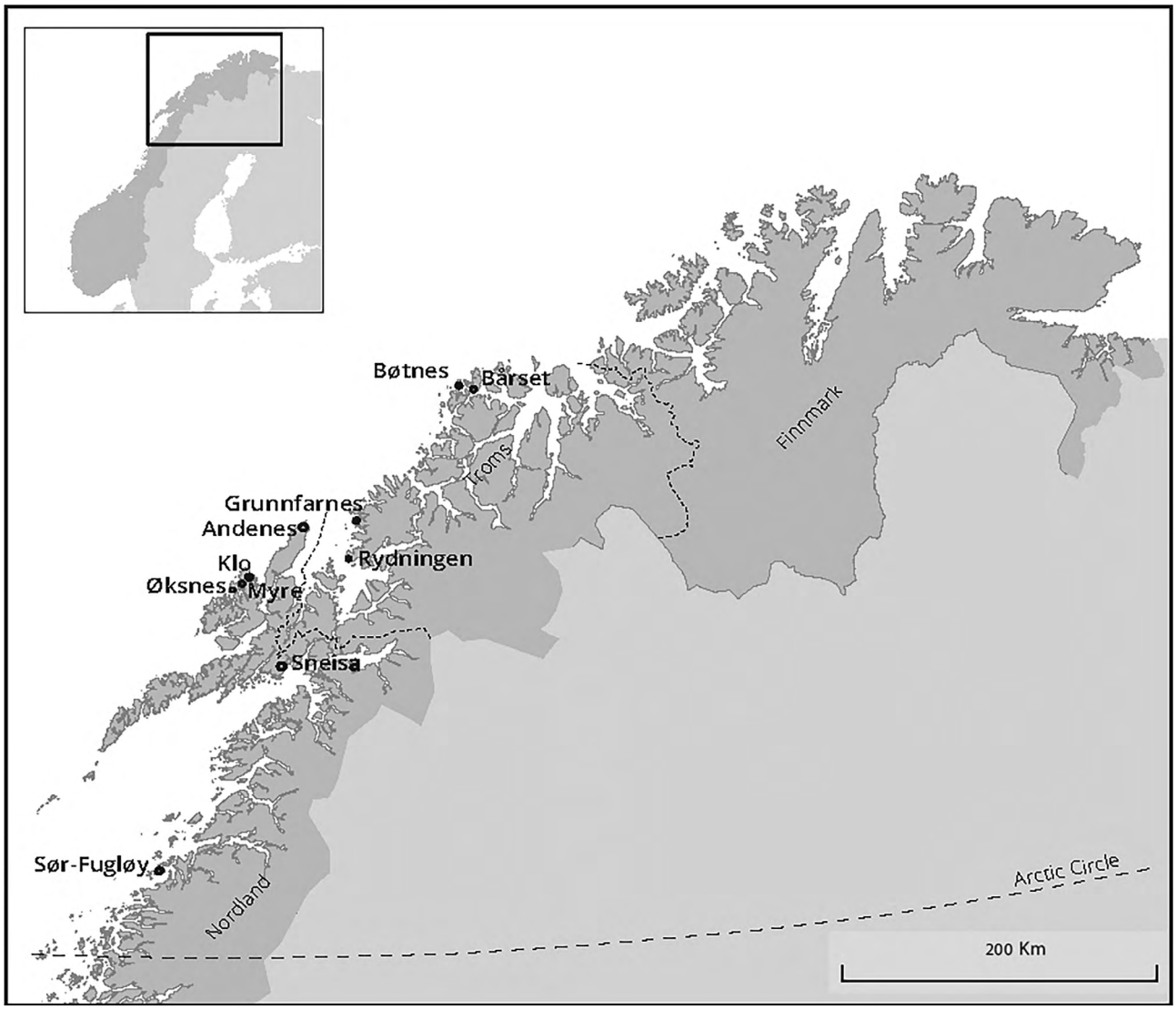

Figure 9.1. Map showing the bog boat find locations mentioned in the text. Illustration: Arctic University Museum of Norway and used with permission.

based on the presence of an axe. Although the bow and stern sections of the boat had been removed by earlier turf cutting, the keel, lower planking and a displaced frame were preserved. Pieces of birch bark found under the boat planks suggested the entire vessel may have been covered with this material (Gjessing 1941: 41). Although skeletal remains were absent, a pillow with feather fill and a woven wool textile pillowcase were found with adhering animal hair originating from a cowhide which had wrapped the body (Figure 9.2B). A radiocarbon date of 888–994 cal AD from the pillowcase agrees well with the typological assignment of the axe found in the grave to the tenth century.

Microscopic analysis of feathers from the pillow fill identified three avian orders: *Anseriformes* (eider); *Suliformes* (cormorant) and *Charadriiformes* (unspecified gull). Downy feathers from gulls (*Laridae*) composed most of the material (Dove and Wickler 2016). Archaeoentomological analysis of the pillow fill revealed remains from a variety of insect species (Panagiotakopulu *et al.* 2018). These included the blowfly, which indicates exposure of the body and the probable timing of the burial. The quantity of fleas among the feathers suggests the pillow under the corpse had been in use for some time before being placed in the grave. The presence of a beetle species which feeds on flowers suggests that flowers were placed on the corpse as part of the burial ritual. The absence of a body and any associated post-burial decay fauna implies it was intentionally removed and disposed of elsewhere.

A 3.1 m section of the boat keel was preserved with a 5.0 cm long scarf for the fore stem on one side. There were no treenail holes for fastening the garboard strake, but a set of eight large treenail holes were placed along the centre of the keel about 10.0–48.0 cm apart, presumably for fastening frames. A single displaced frame fragment with an 8.5 × 4.5 cm profile was found with deep notches for planks and fragments of treenails for fastening the garboard strake. The remains of three strakes on the port side and two on the starboard side were also preserved. Long strands of twisted-wool caulking from additional

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Table 9.1. Bog boat radiocarbon and dendrochronological dates.

Catalogue no. (Ts.)	Description	Year	Location	Municipality	Material	Lab no.	Conventional age (BP)	Calibrated ^{14}C age (2 δ)**
3499	broken boat parts—votive offering	1931	Bårset	Karlsøy	pine	T-3802 dendro.—10 planks	1080 ± 80	772–1158 AD dendro. >845 AD
3981b	boat grave	1934	Øksnes vicarage	Øksnes	pine	TRa-2953*(wool textile)	1100 ± 25	889–995 AD
5141	boat keel with sewn bottom plank—votive offering	1954	Rydningen	Senja	pine	TRa-2428* (charcoal) Beta-363164*^{x} (wool)	1760 ± 30 1480 ± 30	234–381 AD 550–644 AD
4145b	thwart	1939	Bøtnes	Karlsøy	pine	Beta-363163*	1510 ± 30	534–640 AD
4145a	rowing oar blade	1939	Bøtnes	Karlsøy	pine	TRa-2425*	1180 ± 25	772–895 AD
3845	boat plank	1936	Sør-Fugløya	Gildeskål	oak	Beta-363162*	1380 ± 30	601–680 AD
6366	multiple boat planks	1962	Grunnfarnes	Torsken	pine	Wk-30117 Beta-363166* dendro.	1627 ± 37 1520 ± 30	365–546 AD 530–608 AD dendro. >800 AD
4682	flooring board	1951	Andenes	Andøy	birch	TRa-2426*	960 ± 25	1027–1158 AD
5412	bailer	1955	Andenes	Andøy	pine	Wk-30113*	752 ± 30	1225–1289 AD
5414a	bailer	1950s	Myre (settlement mound)	Øksnes	pine	—	—	—
Non-boat finds								
709	spade	1886	Sneisa	Lødingen	willow/ aspen	TRa-2424*	805 ± 25	1213–1276 AD
1697	spade	1906	Andenes	Andøy	willow/ aspen	Wk-30112*	572 ± 28	1308–1363 AD

Note: wood samples unless otherwise indicated.
* AMS / ^{x} solvent extraction
** See Bronk Ramsey 2009; Reimer *et al.* 2020. Calibrated with OxCal.

planks show the boat would have had at least five strakes on each side. The planks were thin and about 20 cm wide. Although Gjessing (1941: 46, 72) claims the planks were fastened to one another with reindeer sinews, subsequent analysis has shown that plant fibres were used, potentially from tree roots. Fibre threads were placed through pairs of drilled vertical holes spaced 1.0 cm apart and knotted on the interior (Figure 9.3A). Spacing between hole pairs was about 18.0 cm. The garboard strake was sewn to both the keel and stem, and strakes were fastened to frames with treenails.

Gjessing (1941: 72–73) argued that the boat was built by the indigenous Sámi, partially because he associated sewing which used reindeer sinew with traditional Sámi boat building; this has since been shown to be inaccurate. Gjessing (1941: 74) concluded that the boat could have been a Sámi vessel made to order for a Norse community. Although the basis for this assertion about the ethnic origin of the boat has been questioned (Wickler 2010: 353), elements of the Øksnes grave do suggest a mixture of Norse and Sámi traits, illustrating the hybridised nature of ethnic identity and cultural interaction in the Vesterålen region during the Late Iron Age. Although birchbark is commonly used for wrapping corpses in Sámi burials, the practice was widespread and thus not restricted to the Sámi. Grave mounds and boat burials are commonly associated with Norse burial practices. Sewing has also been used as a basis for identifying the Øksnes boat as Sámi (Westerdahl 1987: 28–31). The potential blend of Norse and Sámi elements in the Øksnes burial challenges commonly held assumptions about material expressions of ethnicity and reveals the complexity of ethnic identity in the region. Entomological evidence that the body was exhumed from the grave may also be linked to ritual practices with ethnic associations, such as the avoidance of haunting by the spirit of the deceased (Jakobsson 2017).

The Bårset boat

In 1931, the remains of a boat were exposed by peat cutting in a bog at Bårset on the large island of Nord-Kvaløy, one of many offshore islands along the outer coast of northern Troms. The find was reported to the Tromsø Museum, and zoologist Soot-Ryan conducted an excavation which was later published by Gjessing (1941). The boat was a rowed

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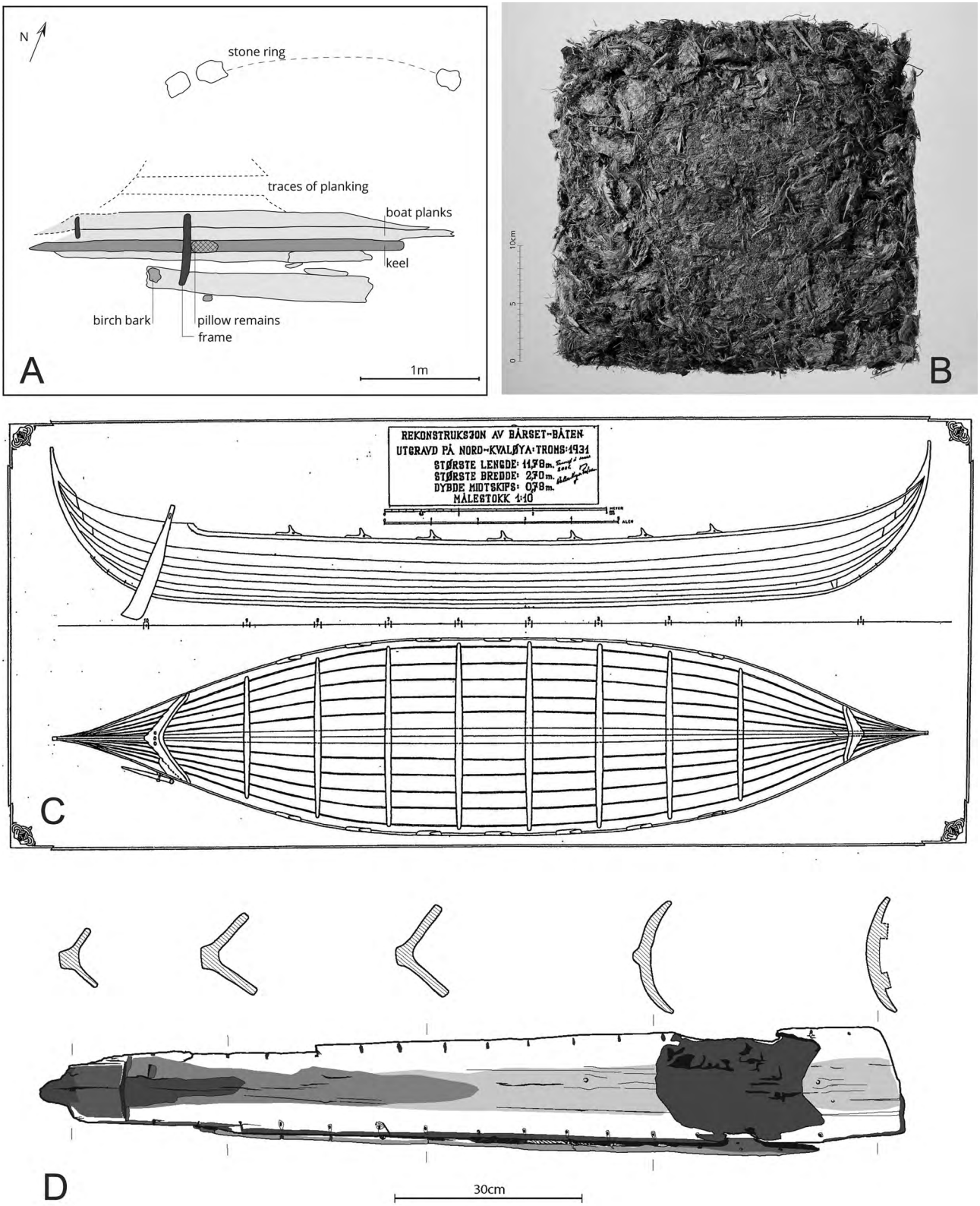

Figure 9.2. Bog boats from ritual contexts: A) plan drawing of the Øksnes boat grave redrawn from Gjessing 1941, Fig. 31; B) feather pillow fill from Øksnes boat grave; C) drawing of 1931 Bårset boat reconstruction; D) top view of Rydningen boat keel with cross-section profiles. Illustrations: Arctic University Museum of Norway and used with permission.

vessel with no evidence of a sail. It was estimated to have been 13.1 m long with a maximum width of 2.6 m and a midships height of 5.7 m. An initial radiocarbon date of 722–1158 cal AD was followed by a dendrochronological analysis of 10 planks, producing an age estimate for boat construction in the ninth century, sometime after 845 AD (Kirchhefer 2000). Although only *c.* 20–25% of the boat was preserved, a reconstruction was drawn at a scale of 1:20 (Figure 9.2C); in 1937, this drawing was used as the basis for constructing a 1:5 scale model. In 1993, a

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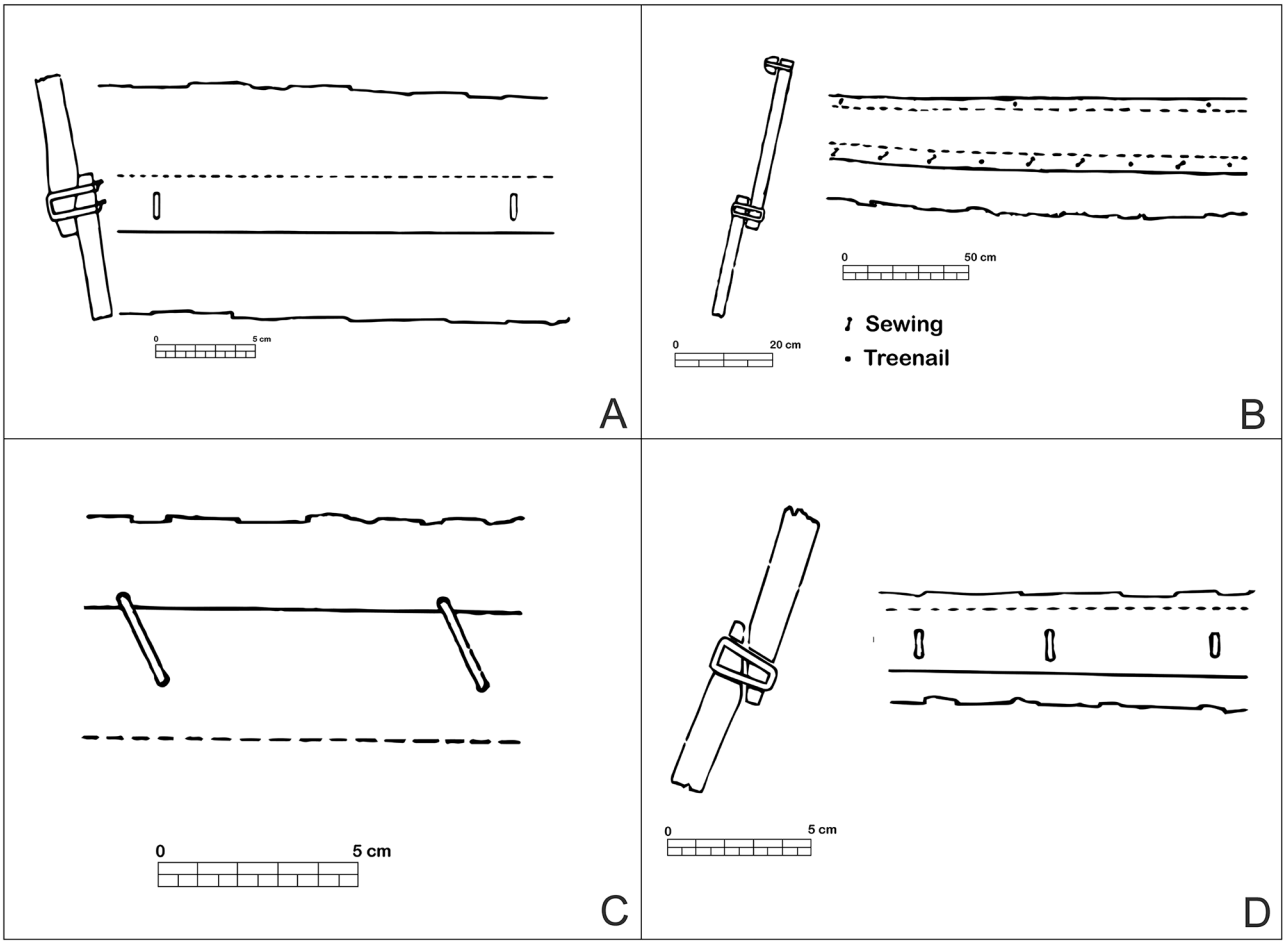

Figure 9.3. Boat stitching seams: A) Øksnes boat plank stitching seam; B) stitching and treenails fastening the upper two strakes on the Bårset boat; C) continuous stitching fastening keel to bottom plank on the Rydningen boat; D) plank stitching seam on the Halsnøy boat. Redrawn from Prins 1986: Figs. 9, 11, 12 and 14 with permission from H. H. T. Prins.

group of experts reanalysed the boat remains to assess the validity of the 1937 reconstruction; this led to a number of its construction details being questioned. A more recent reassessment of the vessel (Pedersen 2002) yielded an alternative reconstruction which added a seventh strake, a feature which harmonises the design to a greater degree with Viking vessels from the same period such as the Oseberg ship and the largest of the small boats from Gokstad.

The following description of the Bårset boat construction focusses on fastening techniques which are relevant for its comparison with other bog boat finds. The frames are *c.* 90.0 cm apart and lashed to raised cleats on the strakes through single holes. The planks are thin (1.5–2.5 cm) with widths ranging from 22.0 to 29.0 cm. Apart from the top two strakes, the boat planks are fastened to one another and to the keel with rivets and caulked with long strands of twisted wool, not hemp rope as claimed by Gjessing (1941: 36). The two upper strakes are fastened together with a combination of stitches and treenails, although rivets are present near the fore and aft stems. The stitches are sewn with plant fibres, potentially from tree roots, between paired holes set at an angle and spaced 1.0–2.0 cm apart (Figure 9.3B). The interval between the stitches/treenails varies 18.0–22.0 cm, although distances of 11.0 cm and 13.0 cm also occur. The gunwale is attached to the interior of the sheerstrake with treenails.

The Bårset boat was intentionally placed in a bog, most likely as a votive offering, and thus is unlikely to have been an abandoned vessel or a wreck which washed ashore. Clearly visible axe marks show the boat to have been partially chopped up and broken apart, with individual pieces subsequently spread over a relatively large area. Loose objects were apparently removed prior to the ritual deposition, including boat parts such as thwarts and floorboards, although one complete oar was recovered. Gjessing (1941: 64–65) remarked on the presence of light-coloured, mostly white, water-rounded stones spread among the boat remains, which he suggested had been thrown at the broken vessel as part of a ritual in which white stones had a magical meaning.

A bog boat votive offering from Rydningen, Senja

A boat keel with fragments of a sewn bottom plank was found in 1954 about one kilometre from the coast at *c.* 150.0 m a.s.l. near the farmstead at Rydningen along the southwest coast of Senja, Norway's second-largest island.

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The boat remains had been placed in a large bog hole *c.* 30.0 m wide surrounded by bedrock at a depth of 80.0 cm and 40.0 cm above the base of the bog. The bog hole may have had standing water in it when the boat was deposited. The aft end of the keel section was chopped off, and a 24.0 × 16.5 cm area of the interior surface was carbonized, suggesting a fire was intentionally lit in the area (Figure 9.2D). It can be argued that these actions were associated with a ritual event in which the keel segment was cut to size in advance and ritually deposited in a small bog pool as a votive offering while a fire burned in the keel. Two radiocarbon samples from the vessel were dated. An initial sample taken from the carbonized wood produced a date of 234–381 cal AD. A sample of twisted-wool caulking material produced a significantly younger age range of 550–644 cal AD. The second date is undoubtedly more reliable, given the significant problem of 'old wood' when dating heartwood from long-lived species such as pine, as Wickler (2019: 190) discussed in connection with bog boat finds.

The keel segment is 1.4 m long and was carved out of a pine log extending from a pointed end where the fore stem was attached to a point where remnants of two cleats for lashing frames are visible at the opposite end (see Figure 9.2D). The width of the keel board narrows from 18.6 cm at the aft end where the cleats are located to 18.5–16.1 cm in the midsection and 10.7 cm where there is a scarf for attaching the fore stem. The stem was likely lashed in some manner to the keel scarf, which is 8.0 cm long with a notch 0.5 cm high, although there are no lashing holes. The lashing cleat fragments are 14.0 × 2.5 cm with 4.0 cm between them, but one has been almost completely removed, and the upper portion where the lashing hole would have been is missing from both cleats. The cleats may have been intentionally removed when the aft section of the keel was chopped off. The keel board has a raised keel 2.7 cm wide and 2.0 cm high at the stem scarf; this gradually reduces and transforms into a rounded bottom 30.0 cm from the aft end. The interior height of the keel board is 3.3–3.5 cm.

There are remains of the first strake on one side, which is sewn to the keel board with angled pairs of 0.3 cm holes placed 1.1 cm apart in the plank and single 0.5 cm holes in the keel (Figure 9.3C). The distance between stitching holes varies from 6.0 to 8.5 cm. Wedge-shaped pegs for holding the thread in place are preserved along the interior margins of the stitching holes. The stitching is continuous, using plant fibres twisted together to form a thread which is still in place and well preserved, along with strands of twisted wool used as caulking. The caulking material does not appear to have been impregnated with a sealant such as pine tar.

Boat remains with similarities to the Rydningen keel which are either contemporaneous or date to the Merovingian Period (550–800 AD) are generally scarce. The closest parallel in terms of construction techniques may be the fragmentary remains of the Halsnøy bog boat from western Norway found in 1896 (Shetelig 1903). A single radiocarbon date of 340–557 cal AD provides a rough age estimate for the boat (Myhre 1980), but as was noted for the Rydningen keel date, this estimate may be too early given the significant problem of inbuilt age for pine. The Halsnøy vessel is a small rowboat around 5.2 m long with a broad bottom board and frames lashed to the planks with 'thin fibres of wood' (Shetelig 1903: 20), likely from roots, through cleats with single holes which are 22.0–24.0 cm long and 2.5 cm high. The planks were sewn together through vertically aligned, paired holes which are 0.2 cm diameter and spaced 4.0–5.0 cm apart; the stitches are discontinuous, and wedge-shaped pegs were used to hold them in place (Figure 9.3D). Planks were scarfed and sewn to the stem with stitching holes perpendicular to the stem and a thick tar impregnated thread fastening planks on both sides through the stem. Strips of a woven wool textile impregnated with tar were used for caulking between the planks and planks and stem. The tar used as a sealant is most likely from pinewood. A recent full-scale reconstruction of the boat represents one possible interpretation of how the boat may have been constructed (Sørnes 2012).

Ritual deposition of boats in bogs: contexts and explanatory models

The ritually associated bog boats from northern Norway can be grouped into two distinct categories: boat graves such as the one from Øksnes and votive boat offerings such as those found at Bårset and Rydningen. Although the intentional interment of individuals in bogs is uncommon, other bog burials have been documented in northern Norway, including the eleventh-century Skoldehamn grave discovered in 1936 on the southern tip of Andøya, not far from Øksnes (Gjessing 1938). Analyses of the well-preserved clothing and other grave items reveal a blend of Norse and Sámi features, features which have been interpreted as an expression of ethnic interaction and coexistence at the time when Christianity was gaining influence in the region (Svestad 2021). Although several boat graves located in bogs are known from western Norway (Gjessing 1941: 40), the Øksnes bog boat grave is unique in northern Norway. Multiple aspects of the grave reflect ethnic hybridisation, and evidence for exhumation of the body represents a highly unusual secondary ritual event. The widely held belief that bogs represent liminal entities which could transcend and mediate the boundary between water and land provides a meaningful context for understanding both Sámi and Norse beliefs and burial practices in the Iron Age.

Although the ritual contexts for the votive offerings of boats in bogs at Bårset and Rydningen may reflect beliefs similar to those associated with bog burials, the intentions and objectives of the ritual acts involved are dissimilar. Votive offerings involve the deposition of objects in specific locations for ritual purposes. As noted earlier, at Bårset, a boat was intentionally broken apart, chopped into pieces with an axe and spread across the bog. Water-

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rounded stones appear to have been placed among the boat fragments as part of a ritual act. All loose items and equipment, apart from a single rowing oar, were apparently removed from the boat prior to performance of the ritual. In contrast, the votive offering at Rydningen involved a different process, one which prepared a boat keel and attached plank fragment by chopping off the aft end prior to the ritual deposition. The boat keel was carried about a kilometre inland to an elevated bog hole *c.* 150.0 m above the shoreline, where there may have been standing water at the time. A fire appears to have been lit in the keel before it was lowered into the bog hole.

Other votive offerings of boats include the Early Iron Age Danish bog offerings at Hjortspring and Nydam, where boats, weapons and other war booty were sacrificed in a small pond about 3.5 km inland at Hjortspring and a freshwater lake at Nydam (Rieck 1995: 127–128; Crumlin-Pedersen and Trakadas 2003; Holst and Nielsen 2020). In western Norway, the Kvalsund bog offering of a ship and a boat, excavated in the 1920s (Shetelig and Johannesen 1929) and recently dendrochronologically dated to *c.* 780–800 AD (Nordeide *et al*. 2020), highlights the importance of water as a central ritual element with a pit dug into the bog and filled with water to form an artificial pool in which the vessels were deposited. The boats were broken into pieces by hand and placed in the pit along with sharpened wooden objects thrust into the bottom of the pit. Although some scholars still view Kvalsund as a war-related victory offering in the same category as Hjortspring and Nydam (Christensen 2022: 75), the ritual context is distinct. Nordeide (2015: 178–180; Nordeide *et al*. 2020: 7) interprets the find as an offering of a vessel to prevent shipwrecks along an exposed coastline, ritual activity which also has elements of a fertility cult.

Although unlike the Danish offerings and Kvalsund in terms of context, the finds at Bårset and Rydningen highlight the importance of water as a medium of ritual communication. In the case of Bårset, water might link the bog to the sea as part of an extended seascape, whereas the bog pool at Rydningen could have provided a spiritual conduit between the mountains of the interior and the ocean below. Both sites may also be strategically located within a shared Sámi-Norse ritual landscape.

Boat planks with evidence of fastening techniques

Individual boat planks from the Late Iron Age have been found at two bog locations in northern Norway. Although restricted to a single boat part type, these finds provide valuable information on aspects of boat construction such as vessel size and origin, in addition to critical details regarding how planks were fastened to one another and to frames and scarfs.

Gildeskål oak plank

An oak boat plank, originally *c.* 2.2 m in length but now broken into three fragments ranging 58.0–98.0 cm in length, was found at the bottom of a bog at Indre Klauven, Sør-Fugløya, Gildeskål in 1936. The plank has a row of small treenail holes, *c.* 0.7 cm in diameter and 18.9–21.0 cm apart, located on a 1.5 cm wide smoothed surface for the lap between strakes. The plank is 0.7–1.0 cm thick and up to 11.0 cm wide, but it was originally wider, as one edge has been broken off. The plank thickness indicates that it was from a boat about 5.0 metres in length. A single radiocarbon date of 601–680 cal AD provides a rough age estimate, and the number of growth rings is insufficient for dendrochronological assessment. The use of oak indicates that the plank originated from a vessel which was built further south. Although the depositional context is unclear, the lack of waterworn surfaces argues against it being washed ashore.

Grunnfarnes boat planks

At Grunnfarnes on the island of Senja, a group of fragmentary boat planks were exposed by peat cutting in 1962. While the planks are not adjoining, they appear to be from the same vessel, and they were intentionally placed together, potentially for later reuse, at a depth of 27.0–28.0 cm in a 70.0 cm thick peat bog overlying beach sand and stones. A boat frame radiocarbon dated to the Bronze Age–Iron Age transition (598–402 cal BC) was found *c.* 10.0 m to the northwest (Wickler 2019: 192–193). Two plank fragments yielded overlapping radiocarbon dates with a collective age range of 332–574 cal AD spanning the Migration Period. Dendrochronological analysis of a third plank fragment recorded growth rings up until 709 AD, but given the lack of sapwood and the outermost rings of heartwood, it is reasonable to assess the plank as originating from a boat built no earlier than *c.* 800 AD (Kirchhefer 2013). The dendrochronological age estimate suggests that the two earlier radiocarbon dates reflect the ‘old wood’ problem for planks which were used several centuries later. This interpretation is supported by similarities in form and construction details between the planks.

The three main plank fragments are 1.9, 3.3 and 3.6 m in length (Figure 9.4A). Plank segments with intact edges range 20.0–23.0 cm in width and 1.0–1.5 cm in thickness. Plank thickness indicates they are from a small boat about 5.0–6.0 metres long. Vertical paired stitching holes 0.5–0.6 cm in diameter and spaced 0.7–1.0 cm apart extend along both plank edges with average distances ranging 15.0–17.5 cm between pairs. Although remains of ‘rope’ were reported in the stitching holes when the planks were found, no definite evidence of this was observed during later examination. However, plant fibres were likely used for stitching. Small wedge-shaped plugs used to hold the thread in place remain in some stitching holes. A concave lap moulding 2.5–3.0 cm wide where caulking was placed is present along the edge of three plank fragments. Rectangular cleats up to 13.0 × 7.5 cm in diameter and 1.5 cm high with single treenail holes *c.* 1.5 cm in diameter for fastening frames are preserved on several planks (Figure 9.4B). The

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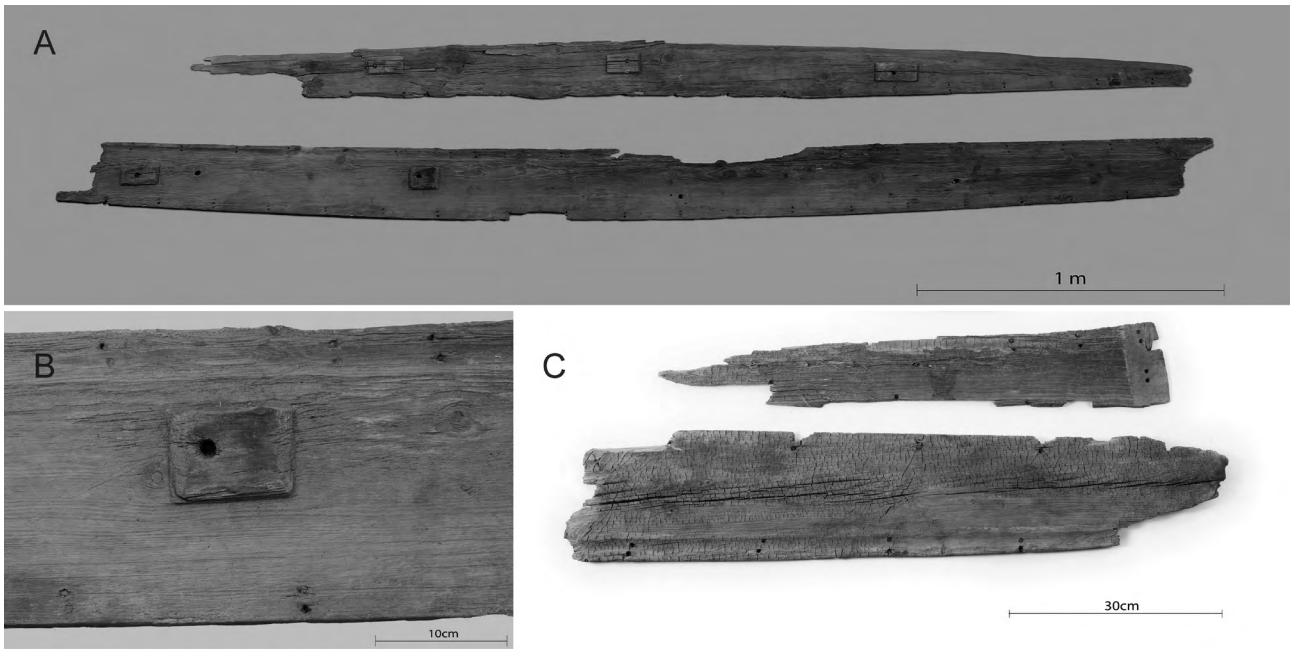

Figure 9.4. Grunnfarnes boat planks: A) the two largest plank fragments; B) closeup view of a cleat with treenail hole and paired stitching holes on the largest plank; C) smaller plank fragments, including a scarf with two pairs of stitching holes. Photos by Adnan Icagic, Arctic University Museum of Norway and used with permission.

distance between cleats is *c.* 82.0 cm, and two additional treenail holes without cleats spaced 77.0–85.0 cm apart were used for fastening frames closer to the stem, which did not require cleats. Scarfs are present on three plank fragments. The most complete is 5.2 cm long with two pairs of stitching holes 0.5–0.6 cm in diameter and 0.7 cm apart (Figure 9.4C).

Sewn boats in the Late Iron Age: northern cultural conservatism or nautical adaptability?

Four of the northern Norwegian bog boat finds from the Late Iron Age have evidence of sewing and other fastening techniques which provide insights into technological innovation and transformation (Table 9.2). The use of rivets as an alternative to sewing for fastening boat planks in Scandinavia is first documented at the Danish Nydam ship votive offering dated to *c.* 190 AD. Although the use of rivets may have expanded during the Early Iron Age in southern Scandinavia, sewing was still common, and it has been suggested that rivets were used in the ships of elite chieftains long before they became common in everyday boats (Christensen 2022: 59). As discussed above, the fragmentary Halsnøy boat, one of a handful of Early Iron Age boat remains in Norway, has sewn planks and lashed frames. While there is some evidence of riveted boats from boat burials in northern Norway by the early Merovingian Period, a significant percentage of these are hybrid vessels which combined the use of rivets with sewing. Hybridized boats of this type continue to be present in burials throughout the Viking Age, along with fully riveted vessels (Lund 2019). Bårset is currently the only bog boat within this category, although sewing is combined with the use of treenails and restricted to fastening the top two strakes.

The other three bog boat finds from northern Norway have sewn planks. The earliest is the Rydningen boat from Senja, which has been dated to the early Merovingian Period. This find is unique and represents the earliest known securely dated evidence for the use of continuous stitching in Scandinavia and Northern Fennoscandia. This type of stitching is also a distinguishing characteristic of traditional Sámi boats such as the bask used in eastern Finnmark (Westerdahl 2010: 331–333; Alava and Rantamäki 2016). The planks from Halsnøy, Grunnfarnes, Øksnes and Bårset are sewn with discrete discontinuous stitches through paired holes, which are vertical with the exception of the Bårset boat, where the paired holes are set at an angle. Small wedge-shaped pegs are driven into the stitching holes to hold the plant fibre thread in place, except for the Øksnes boat, where the stitches are knotted on the interior and lack pegs. The thread used for stitching appears to be exclusively from plant fibres which may be from tree roots, as is common in traditional Sámi boats, although this has yet to be confirmed by archaeobotanical identification. Caulking between planks consists of twisted/twined strands of wool in three of the boats and a tar-impregnated, woven-wool textile in the Halsnøy boat.

There are raised cleats with single holes for lashing frames on the planks of the Halsnøy and Bårset boats, and fragments of similar cleats are found on the Rydningen keel board. In contrast, the planks from Grunnfarnes and Øksnes were fastened to frames with treenails. The Grunnfarnes planks were fastened with treenails through holes both with and without raised cleats. Use of treenails is also a feature on strakes above the waterline on the Kvalsund ship, as well as the small boats from Kvalsund and Gokstad dating to approximately the same period as the northern Norwegian boats, although rivets are

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Table 9.2. Construction details of selected bog boat finds in Norway with evidence of sewing.

Boat find	Frame fastening	Plank fastening	Sewing material	Caulking material	Scarf fastening
Halsnøy, western Norway	Single hole lashing	Discontinuous stitch, paired vertical holes	Bast string for rowlock, plant (root?) fibre	Wool textile: (pine) tar impregnated	Stitched to stem with (pine) tar impregnated fibre
Rydningen, Senja	Probable lashing	Continuous stitch, paired angled holes on plank / single hole on keel	Plant fibre (root?)	Twisted wool	Unknown
Grunnfarnes planks, Senja	Treenails	Discontinuous stitch, paired vertical holes	Unknown	Unknown	Sewn: double set of paired holes
Øksnes, Vesterålen	Treenails	Discontinuous stitch, paired vertical holes	Plant fibre (root?): knotted on interior	Twisted wool	Sewn: keel and stem
Bårset, northern Troms	Single hole lashing	Discontinuous stitch, paired angled holes / treenails / rivets	Plant fibre (root?)	Twisted wool	Rivets

used for fastening planks. Integrated cleats are used for reinforcement to insure sufficient plank thickness for treenails, particularly on the lower strakes (Shetelig and Johannessen 1929: 59; Planke *et al*. 2021: 289).

The replacement of frame lashing with treenails during the Late Iron Age is generally viewed as a technological advancement, while retention of support cleats for treenails is regarded as a vestige of an earlier developmental stage in which cleats were lashed to frames. This assessment fits with the notion that light rowed vessels such as those from Kvalsund and Bårset were old-fashioned relics, compared to real Viking ships with sails (Christensen 2022: 118–121). The significant number of sewn boats and the combination of sewing and treenails in northern Norway during the Late Iron Age do not fit the southern Scandinavian model, where sewing first disappears and lashing subsequently appears (Prins 1986: 35). The continuation of sewing in the north has been explained both as a consequence of iron being too costly and scarce for rivet production and as an expression of the conservative nature of northern society (Gjessing 1941: 54, 72; Christensen 2022: 60).

In some analyses, the association of sewing with the Sámi has been used to reinforce the idea that sewing is a primitive trait maintained in northern Norway long after it was abandoned in the south (see criticism in Wickler 2010: 353–354). Iron Age sewn boats with a running seam or continuous stitching found in areas with a predominantly Sámi population also tend to be interpreted as Sámi in origin (Larsson 2007: Ch. 5.4, 2015). Gjessing viewed sewing as a trait rooted in the ancient coastal Sámi culture (Norwegian *sjøfinnekulturen*), and this influenced his interpretation of both the Bårset and Øksnes boats. Westerdahl (1987: 28–31, 2010: 336) has suggested that both the Øksnes and Bårset boats were built by the Sámi. On the other hand, Pedersen (2002: 82–91) found no evidence of Sámi influence in the construction of either the Bårset or Øksnes boats, citing the use of separate rather than continuous stitching, which he claims to be a distinctive Norse trait. These views reflect a false dichotomy between Sámi and Norse boatbuilding traditions based on specific traits which misrepresent the true nature of ethnic interaction and coexistence in northern Norway.

The collective evidence suggests that Iron Age boats in Arctic Norway which are sewn and hybrid boats which combine sewing and rivets are both expressions of a shared Sámi-Norse boat building tradition which extends back to the Early Iron Age. The continued use of sewing in the Late Iron Age was neither conservative nor primitive, but rather, a reflection of active choices made by boatbuilders within multi-ethnic contexts for constructing watercraft which were seaworthy and best adapted to the seafaring conditions in the north.

Miscellaneous boat items

Some boat parts and boat-related objects are relatively small and not fastened down in the boat. These include thwarts placed on frames and floorboards on the bottom of the hull which can be removed easily. Bailers are also essential boat gear. These items are not commonly associated with archaeological boat finds, and their presence in bogs provides a rare opportunity to explore continuity and change in essential items still commonly used in traditional Norwegian clinker-built boats (Figure 9.5A).

Bøtnes thwart

In 1939, a rowing oar blade and a thwart were found about 1 m deep in a bog near the shoreline at Bøtnes on the island of Grøtøya along the outer coast of northern Troms. The finds have been mentioned in several earlier publications (*e.g*. Gjessing 1941: 61–62; Bratrein 1989: 148). The oar blade has been radiocarbon dated to 772–895 cal AD, and although Gjessing (1941: 62) identified it as a steering oar, it is an example of standardisation in rowing oar blade form during the Viking Age (Wickler 2019: 199). The thwart is made of radially cut pine and has been radiocarbon dated to the Merovingian Period (534–640 cal AD). It is 89.0 cm long, 15.0 cm wide and 2.0–2.5 cm thick, with a sub-rectangular cross-section and 8.0 cm end notches with 2.0–5.0 cm bevels on the underside to fit a frame (Figure 9.5B).

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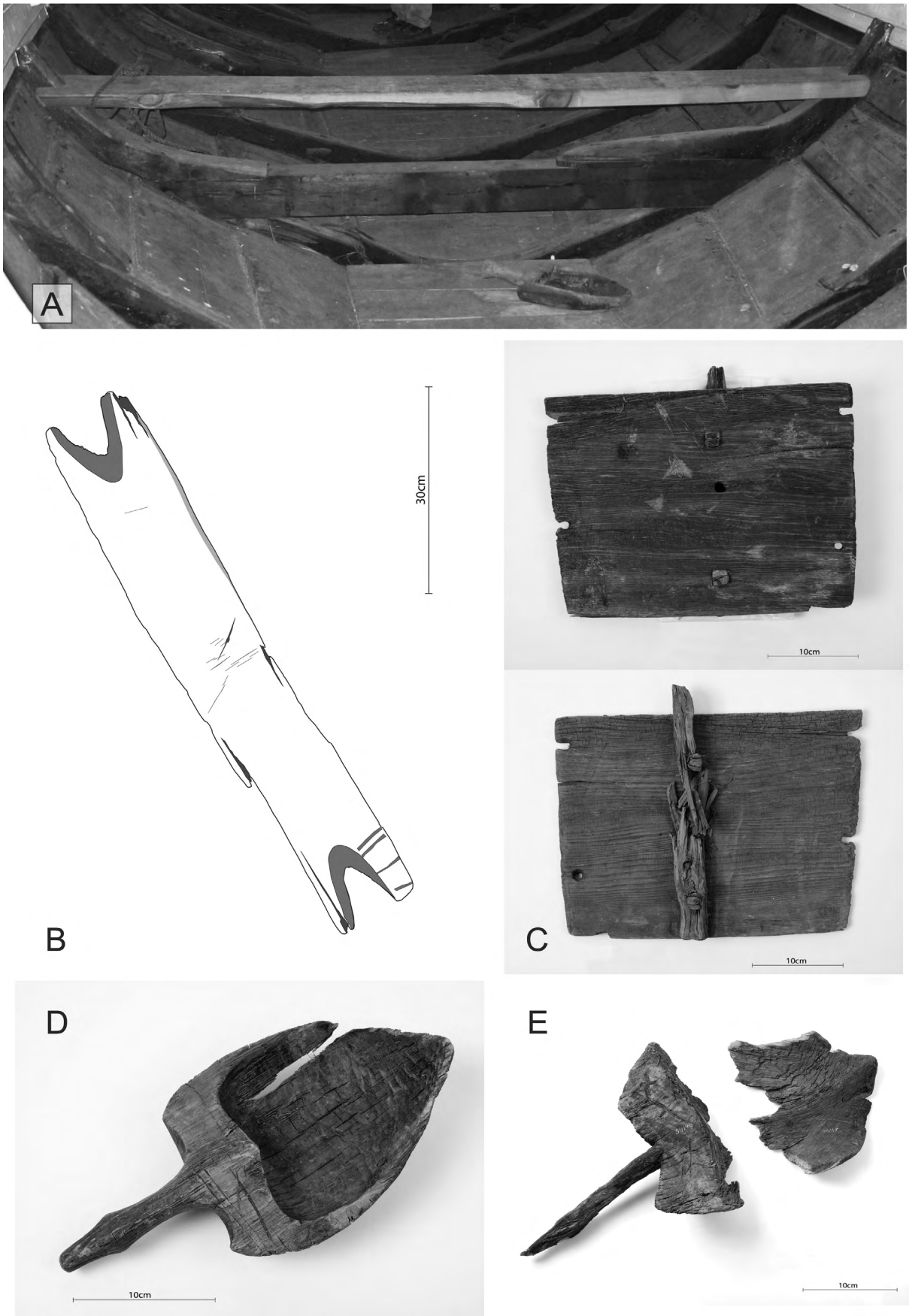

Figure 9.5. Miscellaneous boat items: A) traditional Norwegian clinker-built rowboat with a thwart, floorboards and bailer; B) underside of thwart from Bøtnes with beveled end notches and cut marks in the midsection; C) flooring board from Andenes viewed from top and bottom; D) boat bailer from Andenes; E) boat bailer from Myre settlement mound in Vesterålen. Photo A from Wikimedia Commons distributed under a Creative Commons license; Photos B–E by Adnan Icagic, Arctic University Museum of Norway and used with permission.

The thwart dimensions indicate that it was used in a small boat such as a *færing* with two sets of oars and frames about 1.3 m wide. Knife cut marks on the underside are suggestive of fishing bait preparation. Thwarts are rarely found with boat remains, as they are loose and easily removed. One exception is the two thwarts found in the tumulus over the grave chamber of the Gokstad ship burial from the early tenth century (Nicolaysen 1882: Pl. VII). These are associated with two of the three smaller boats found with the ship. The larger of the thwarts is from the mid-size 8.0 m long boat recently described by Planke *et al*. (2021: 290, Fig. 22). The smaller thwart is from the smallest boat, a 6.6 m long *færing* (Christensen 1959). This thwart is 106.0 × 15.0 × 3.0 cm with a 22.0 cm bevelled notch that closely resembles the Bøtnes thwart.

Andenes flooring board

A pine boat flooring board (Norwegian *plikt*) fragment was found 1.0 m deep at the bottom of a bog near Andenes on the island of Andøya in 1951. A radiocarbon date of 1025–1155 cal AD was obtained from a birch beam attached to the board. Based on the original description of the find, the object was larger and had more intact pieces when it was found than at present. The length was originally 47.0 cm but is now 24.0 cm (Figure 9.5C). It is interpreted as the floorboard from the compartment closest to the fore or aft stem (Norwegian *skottplikt*), and it tapers from 33.5 to 30.7 cm in width towards the stem. The board is 1.4 cm thick, and a fragmentary birch beam 27.5 cm long, 3.3 cm wide and 2.5 cm high is fastened to the centre of the floorboard with treenails. The inner end of the beam is broken off, and the outer end is cut flush with edge of the board. It was originally fastened with three treenails, and two remain in place. Both treenails are 1.5 cm in diameter and 3.0 cm high with wooden expansion wedges driven into them on the underside of the board. They have square 1.5 cm diameter heads flush with the upper surface of the board. There are two treenail holes with a diameter of 1.3 cm along both outer edges where two additional beams were previously located. The upper surface of the board has been smoothed by use wear.

The size of the flooring board indicates that it was used in a small boat. In traditional clinker-built vessels such as the Nordland boat, the flooring boards are placed with the beams resting on a lap joint between planks and against the plank above, although some are placed with the beams resting on the middle of a plank such as a broad garboard strake. Floorboards in Nordland boats were often made of recycled boat planks, and there was always a hole so they could be lifted, often a small one at the end (Eldjarn and Godal 1990: 157). The location of beams on the Andenes floorboard is unusual as there is a centre beam which must have been placed over the keel; this contrasts with traditional boats, where there are two beams closer to the edges which rested on planks.

As with thwarts, very few boat finds have floorboards present, as these were often loose and easily removed or displaced. The numerous floorboards from the Oseberg and Gokstad ships were fastened to the cross beams. There is a single loose flooring board associated with one of the smaller Gokstad boats (Planke *et al*. 2021: 290, Fig. 22). It has two equally spaced beams in the midsection and part of a hole taken out in the middle to lift the board as well as graffiti of stem profiles cut into the upper surface.

Boat bailers

In 1955, a pinewood boat bailer was found about 1.2 m deep in a bog near Andenes on the island of Andøya. It has been radiocarbon dated to 1210–1290 cal AD in the high Mediaeval period. The bailer has a total length of 31.5 cm, width of 15.5 cm and height of 6.5 cm. The handle is 11.0 cm long, 2.0 cm wide and 2.5 cm thick in the centre (Figure 9.5D). It was made from a split log and has a heart shaped rim with rounded bottom and a pointed end which is slightly upcurved in profile. The heart-shaped form has two chambers which reduces the energy required to bail out water. The handle has a semi-circular profile angled slightly downward to optimise grip and avoid slipping during use. A slight bulge near the end of the handle creates the impression of the head and bill of a large goose-like bird in flight. The bailer displays a high level of craftmanship which is both aesthetically pleasing and highly functional. There is also evidence of considerable use wear around the sides of the bailer tip from contact with lap joints between planks on both sides of keel at the same time. Traditional boatbuilder Gunnar Eldjarn (2002) provides a detailed description of the bailer, and he notes that similar early finds are known from Bergen and the Danish Viking Age trading centre of Hedeby.

A second bailer most likely dating to the Mediaeval period was found in a settlement mound cultural deposit at Myre in Øksnes, Vesterålen around 1955. Although this is not a bog find, preservation conditions in settlement mound deposits resemble bogs due to the significant quantities of peat used in house construction. The bailer consists of fragments from the front and back end with a long, thin handle. The back end is 24.0 cm long, 20.5 cm wide and 6.7 cm high with an 18.0 cm long handle. The front-end fragment is 15.5 cm long and 17.5 cm wide (Figure 9.5E). Two owner's mark symbols are carved into the top of the back-end fragment. The first consists of three prongs with lengths of 2.5–3.0 cm radiating from a central point. The prongs are crossed by short perpendicular lines *c.* 1.0 cm from the ends, forming three joined crosses. The second mark is a cross form with two angled lines extending from the lower end to form a three-pronged fork. The use of owners' marks reached its greatest extent in Europe in the late sixteenth century and declined in the seventeenth century, as the use of initials became more common (Cappelen 2005).

Spades originally identified as paddles

Several objects found in bogs appeared to be associated with boats but proved to be unrelated following more

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detailed examinations. These include spades originally identified as paddles. Although not boat-related, their description is useful as it points out traits which enable spades, as objects sometimes associated with boat finds, to be distinguished from paddles. Spades are utilitarian objects associated with peat cutting and other tasks typically associated with bog contexts. Wooden spades roughly resemble paddles in their shapes and sizes, so the two are easily confused.

Two spades were found at the bottom of bogs. They were most likely made of willow (*Salix caprea*), although botanical identification cannot rule out aspen (*Populus tremula*). Although originally identified as paddles, the tree species used, general appearance and blade shape make this assignment unlikely. The spades are both radiocarbon dated to the high Mediaeval period, while the most recent pre-modern paddle known from northern Norway is dated to the second millennium BC (Wickler 2019: 190–191). Historically, willow wood (Norwegian *selja*) was used for skis, rake handles and other utilitarian objects, but are not for paddles. The spades are similar to each other in appearance, and both were made from tree trunks with the heartwood centrally placed. The larger of the two spades was found in 1906 at the base of a bog about 2.0 m below the surface in the vicinity of Andenes on Andøya Island, and it has been radiocarbon dated to 1300–1370 cal AD. It is complete, with a total length of 114.0 cm and a 43.0 × 12.0 cm blade (Figure 9.6A). The second spade was found in 1886 below a bog deposit at a depth of 81.0 cm at Sneisa, Lødingen. It is 67.0 cm long with a 23.5 × 10.0 cm blade and an incomplete handle 39.0 cm long (Figure 9.6B).

It is unclear how the spades were deposited, but deposition must have occurred at the start of bog formation in locations some distance from the shoreline. The spades may have been used for turf cutting or moving soil in the general area. Although spades have been found in bogs at other locations, these are the only examples known from northern Norway. Well-preserved oak spades were recovered from the Viking Age ship burials at Oseberg, Gokstad and Tune. These include several from the original burial contexts and a substantial number from grave plundering of the Oseberg and Gokstad mounds during the tenth century (Bill and Daly 2012). At least one of the spades from the Oseberg break-in closely resembles the spade from Andenes, with a total length of 100.0 cm and a blade that is 40.0 × 16.0 cm (Bill and Daly 2012: Fig. 2).

Conclusion

The abundance of well-preserved bog boat finds in northern Norway dating to the Late Iron Age provides a rare opportunity to document a wide variety of boat-related material which is not otherwise present in the archaeological record. It is also striking to consider how many additional bog finds of considerable age were undoubted lost over the years, as they were neither retrieved by the finders nor added to museum collections; this may be due in part to their excellent preservation in bog conditions, which gives objects a misleadingly modern appearance. The study presented here opens a window not only on the extent of the variation in boat construction during the Iron Age in Norway, but also the technological continuity over time. Most importantly, this study expands the material evidence of what boats were like and how they were used in the north.

Arctic Norway has long been viewed as a peripheral and passive recipient of boat knowledge from the south, rather than recognised as a centre of maritime innovation and adaptability in its own right, a status clearly supported by the bog boat evidence. Northern boat-building has also been subject to inaccurate and prejudicial misconceptions, such as the claim that the continued prevalence of sewing was due to a lack of economic resources for boat rivets coupled with societal conservatism. Contrary to these assumptions, the continued practice of sewing and the hybridisation which combined sewing with treenails and rivets were expressions of maritime proficiency and skill, in which vessels were adapted to features along an exposed coastline with demanding seafaring conditions. Boat-building technologies also reflect a shared Sámi-Norse tradition developed over many centuries. Acknowledging this shared identity is more productive than continuing to label specific traits as ethnic identifiers.

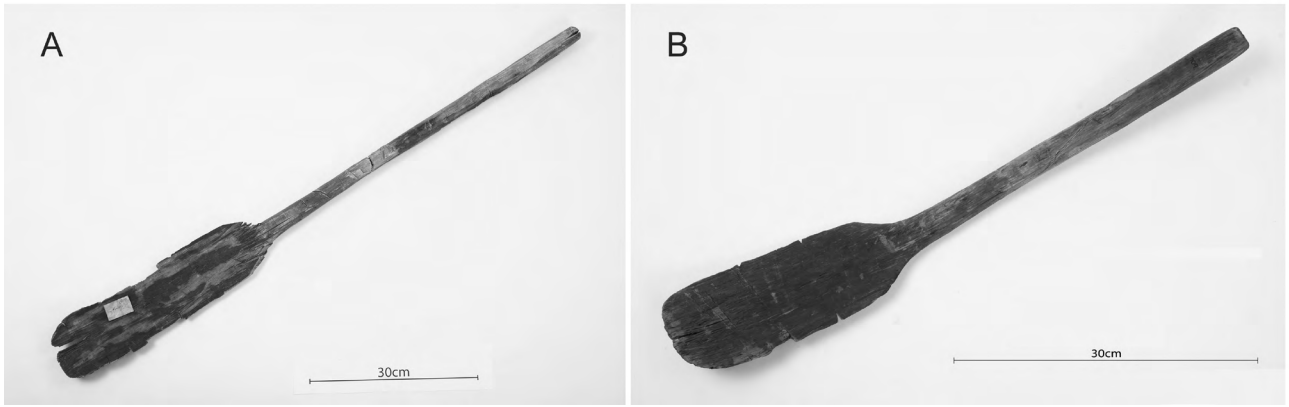

Figure 9.6. Spades found in bogs: A) Andenes, Andøya; B) Sneisa, Lødingen. Photos by Adnan Icagic, Arctic University Museum of Norway and used with permission.

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The well-preserved bog boat finds discussed here provide a wealth of new insights into the importance of boats for maritime communities in the north, revealing how elements of nautical technology were interwoven to meet the challenges of the sea.

The key role of boats in both mundane and spiritual aspects of life in Arctic Norway is demonstrated by their ritual deposition in bogs. Insights into the meaning of boat burials and votive offerings of boats are the major contributions of the evidence presented here. A mixture of Sámi and Norse ethnic identities played an important role in ritual expressions such as the Bårset and Rydningen votive offerings. Although boat offerings from the early Iron Age in Denmark and Kvalsund in western Norway represent distinctly different ritual contexts, water is the shared element of central importance in all these contexts.

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Delivering the Deep

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COVER IMAGE *The House of Four Winds (Neljän Tuulen Tupa) in Hanko, Finland, by Pekka Tuuri*

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Foreword

This peer-reviewed edited volume is based on research presented at the 7th International Congress for Underwater Archaeology (IKUWA 7), which was organised by the University of Helsinki, the Finnish Maritime Archaeological Society and the Finnish Heritage Agency and took place 6–9 June 2022 in Helsinki, Finland. This was the first time an IKUWA conference had been planned to convene in one of the Nordic countries, and it had to be postponed twice from its original date of June 2020 due to the COVID-19 pandemic. Only after most of the obstacles of the pandemic had been overcome were around 250 maritime archaeologists from different continents and countries able to meet in June 2022 in Helsinki to participate in the seventh IKUWA-series conference.

The theme of IKUWA 7 was *Delivering the Deep—Visions for the Future of Maritime Archaeology*. This thematic choice envisioned a productive amalgamation of underwater and maritime cultural heritage studies with research on the challenges the world faces at present, including climate change, erosion threats, water pollution, mismanagement and other types of human-related activities that make the future of maritime archaeology and the conservation of maritime resources uncertain. Overall, the theme urged participants to engage in discussions about the potential for our field to help shape a more promising future for all members of society.

The scientific program consisted of three days and nearly 130 presentations, along with a two-day poster session. The presentations explored maritime perspectives on topics such as climate change, trade, inland waterways, lake and wetland dwelling, war, material reuse and ritualistic and cognitive signs, as well as maritime cultural landscapes. Additionally, maritime cultural heritage was examined as an integral part of 'Blue Growth' and marine science, for generating new knowledge on historical use of marine resources and human relationship with the sea. Subsequently, maritime archaeological research was signified as extremely relevant on an international scale at present, particularly because the United Nations recently proclaimed the 2021–2030 period as the Decade of Ocean Science for Sustainable Development. This edited volume embodies that relevance by displaying the diversity of research topics and approaches as presented during the conference and highlighting the versatility of our field and its relevance to the wider field of archaeology and heritage studies.

Besides the scientific program, one of the objectives of IKUWA 7 was to accentuate the importance of the United Nations Educational, Scientific and Cultural Organization (UNESCO) 2001 Convention for the Protection of Underwater Cultural Heritage (CPUCH), which Finland has not yet ratified. A panel discussion organized by the UNESCO CPUCH Secretariat at the beginning of the conference highlighted the responsibility for protecting and researching maritime heritage beyond national borders. The Baltic Sea region, with its unique preservation of shipwrecks from various time periods and origins, and our small group of experts dedicated to their protection and research, present an opportunity to utilise international agreements such as the UNESCO 2001 Convention for preserving a rich heritage which largely lies on the seabed hidden from view. A glimpse into the remarkable underwater heritage of Finland was provided to all conference speakers through Pekka Tuuri's book *Vedenalainen Suomi [The underwater world of Finland]*, which was gifted to them as a memento of their visit and a thanks for their contributions.

IKUWA 7 was made possible thanks to the infrastructure set up between the Finnish Maritime Archaeological Society, the Finnish Heritage Agency and the University of Helsinki. The conference received vital financial support from the Federation of Finnish Learned Societies, the Weisell Foundation and the Finnish Cultural Foundation. The University of Helsinki provided the conference facilities, while the Finnish Heritage Agency and the University of Helsinki also contributed through their staff's working hours. The volunteer support from student assistants and members of the Finnish Maritime Archaeological Society also contributed significantly to the success of IKUWA 7, and we are very grateful to them. Our most sincere thanks also go to our colleagues in the IKUWA Steering Committee, who were always ready to assist and advise us in the challenges we encountered.

In any conference, the opportunity for networking and getting together with colleagues is crucial. On this point, the feedback from the conference has been overwhelmingly appreciative. As we say in Finland, 'guests make the party,' and we believe this holds true for scientific conferences as well. We extend our most heartfelt gratitude to all the participants of the conference for the unforgettable encounters. We look forwards to seeing everyone again at the upcoming IKUWA 8 in Belgium!

On behalf of the organizing committee,

Vice-chair of the committee — Minna Koivikko

Chair of the committee — Kalle Virtanen