Homemade? An early 16th century carvel ship found in Oslo harbour, Norway

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Abstract: Bispevika 8 is the only wreck out of the 50 wrecks found in Oslo's late medieval/early modern harbour that was carvel-built. Through documentation and analysis, it became clear that it is a 16th century Dutch-Flush built vessel. While the natural assumption would be that the ship was built in the Netherlands, elements of the construction, the provenance of the timber, results of the analysis of the waterproofing material, and written sources strongly indicate a local, Norwegian, place of origin.

Keywords: Dutch-Flush, Norway, 16th century, shipbuilding, Bispevika 8

1. Introduction

Excavated in 2015, Bispevika 8 is one of over 50 wrecks from late medieval/early modern times found in Oslo's harbour. The 50 vessels sank, or were sunk, close to timber wharves dated to the same period. None of the vessels are fully preserved with their cargo, decks, or rigs, but a majority have the main parts of their hulls intact. Bispevika 8 differs from the other vessels by having a flush-laid hull, while the rest have overlapping strakes.

This paper presents the preliminary results from the excavation and documentation of Bispevika 8. With a focus on the ship's, construction, shape, dating, and provenance, we will attempt to answer questions concerning where this early carvel ship was built, and by who.

2. Carvel construction

Bispevika 8 was constructed in a transitional period of shipbuilding in Northern Europe. Lapstrake vessels were gradually replaced by carvel-constructed ships. This transition has been a popular field of study (e.g.: Adams 2003; 2013; Bill, Gøtche 2006; van Duivenvoorde 2008; Lemée 2006; Maarleveld 1998; Uldum 1999), but with few surviving Northern European carvel-constructed vessels from the late 15th to the early 16th century, more data is essential to elucidate this period of change.

By now, it is well established that there were different ways to construct a carvel vessel. One of these methods is the Dutch-Flush manner presented by Thijs Maarleveld (1991; 1998), or 'bottom-built' as defined by Fred Hocker (1991). Dutch-Flush is a style of building that has been described in 17th century Dutch writing (Hoving 2012), and the majority of finds of the earlier Dutch-Flush ships have been ascribed to the Netherlands or specifically the Wadden Sea area (Hocker 1991; Kühn 1997; Lemée 2006; Logan 2013). The Dutch-Flush method could include two to three master frames but the majority of the shaping of the hull took place during the planking process, before the framing was added. The hull planks were initially held together with clamps and cleats; small lengths of wood nailed to the planking, that were removed as the framing was added to the hull.

Fig. 1 What remained of Bispevika 8 had been damaged by fire, dredging, and the insertion of a cofferdam (photo: Norwegian Maritime Museum).

Fig. 2 The boat parts that did survive included a keel, a stern post with stern knee, a keelson, frames, strakes, graving pieces, ceiling planks as well as the foot of a bilge pump (photo: Norwegian Maritime Museum).

3. The construction of Bispevika 8

Only 6.4 × 5 m of Bispevika 8 was preserved, and those remains had been badly damaged by a fire. More than half of the hull's length was dredged away sometime in the 19th century (Fig. 1). Among the boat parts preserved were a rabbeted keel, a three-part stern post with stern knee, a keelson, 73 frames, parts of nine strakes, seven graving pieces, and small pieces of ceiling planks, as well as the foot of a bilge pump (Fig. 2). What remained of the Bispevika 8 keel was rabbeted, 34.9 cm sided and 26 cm moulded. This is a deeper keel than many of the Dutch-Flush ships, but it is not unique, with the later B&W 2 and B&W 5 Christianshavn vessels having a similar ratio of sided to moulded dimensions (Lemée 2006). The aft stem was made of three parts, securely fastened to the ship with treenails and iron bolts.

3.1. Hull planking

Few of the hull planks were preserved to their full length, but those that were had lengths of 3.23–5 m, widths of 22.6–32.3 cm, and thicknesses of 3–6.7 cm. The planks were scarfed with diagonal nibbed scarfs, except for the garboard strakes which were butt-ended. The length and shape of the scarfs varied somewhat, but the placement of the scarfs in the planking were roughly mirrored on either side of the keel, suggesting some pre-design of the hull. In at least one place, the second strake on the port side, and possibly on the eight strake starboard, the planks encroach into the overlying strake. This might be an indication of a more symbiotic way of making the hull, where planks to a certain degree were individually shaped, or at the very least adjusted, as they were being installed. This ongoing adjustment of the planks is indicated by the seven graving pieces in the hull, which were probably inserted where cracked or knotted wood was removed. This apparently occurred during the construction phase, as the caulking material is identical to the caulking in the rest of the hull (Kubrik-Maartens 2020).

During the insertion and fastening of the frames in a Dutch-Flush ship construction, temporary cleats were used to hold the strakes together. When the cleats were removed, their nail holes were filled with small wooden plugs called spike-plugs. During the 1:1 documentation of the Bispevika 8's planks, spike-plugs were documented on the inside and outside of the hull planking, with evidence for cleats from the keel to the seventh strake, approaching the turn of the bilge.

Fig. 3 One of the many spike-plugs found in the hull planking of Bispevika 8. Also visible in the picture is an arrow shaped stop-mark, used to stop the progression of a crack (photo: Norwegian Maritime Museum).

3.2. Framing

The placement and organization of the frames in Bispevika 8 is best described as unsystematic. The shape of the frames varies considerably, with sided dimensions of 10–23.5 cm. While some of the frames are almost straight as seen from above, others are more S-shaped. The way the frames were joined to one another also varied considerably. Some have no joints at all, others were somewhat randomly shaped to make them fit into the hull. There were a few examples of butt-ended joints, otherwise the majority of joints were found on the fore and aft faces of the frames, mostly L-shaped, but others S-shaped to accommodate the natural curve of the timbers.

There were no surviving frames connected to each other with any sort of fasteners, except for one small iron nail between a floor timber and a futtock. From what remains of the aft end of the vessel, there is no evidence of pre-assembled frames, or a pre-designed system of framing of Bispevika 8. It seems as if the focus of the framing was to strengthen the hull as much as possible with frames, whilst utilizing what curved timbers were available. Apart from the lack of joggles, the floor timbers are quite similar in shape to the frames of 16th century lapstrake floor timbers, even sporting identical triangular limber holes, which sit above either side of the keel. However, treenails were hammered through some of the limber holes, making them obsolete (Fig. 4). Both the degree of different solutions in the shaping and joints between the framing, and the treenails in the limber holes, might be a result of a rebuilding of the vessel, or quite possibly the result of two forms of ship-building techniques colliding.

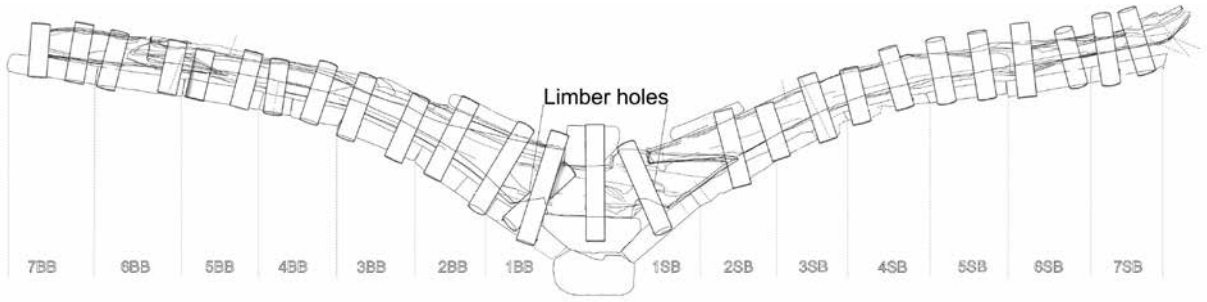

Fig. 4 Treenails were hammered through some of the limber holes, making them obsolete (drawing: Norwegian Maritime Museum).

4. Original shape of the vessel

Bispevika 8 was narrow at the stern, had a deep rabbeted keel, and plenty of deadrise at the surviving aft end. In this, its shape was not dissimilar to the beamy lapstrake vessels found in Oslo's harbour from the 16th century, all of which sported deep keels and V-shaped bottoms. Bispevika 8, however, had a 'chine', where the bottom of the hull changes sharply and obviously to the side of the hull. In this, Bispevika 8 differs from the rounded bilges of the lapstrake vessels (Fig. 5). Bispevika 8 does not mirror the flat-bottomed style of other 'Dutch-Flush' type vessels either. Its underside still retains some deadrise at the furthest surviving point forward in the vessel. Nor is its chine as sharp as those of many of the other Dutch-Flush type vessels. One vessel that did transition from having more deadrise in the aft third of the ship to a flat-bottomed, barge-like lower hull, mid and forward was the Dutch B&W5 ship dating to 1625, found in Christianshavn, Copenhagen. However, the B&W5 is not a perfect match either, as it had rounded bilges at its aft end, with the chine only appearing further forward as the bottom of the hull flattened out (Lemée 2006: 182, Fig. 4.2.54). So, although the Bispevika 8 ship differs from the others by being built in Dutch-Flush carvel technique, the reconstruction of the hull shows similarities to the shape of clinker-built hulls found in Oslo from the same period.

5. Dendrochronology

Eleven dendrochronology samples were sent to Aoife Daly at Dendro.dk for analyses: seven from the planking between the second and seventh strakes, two floor timbers, and two futtocks. One of the samples, from plank x150, had six sapwood rings remaining, so the felling date of the tree could be narrowed down to between 1534 and 1539 (Daly 2019: 34). Six of the planking samples matched with three data sets from Southern Norway, while the remaining planking sample, x126, best matched to a dataset from Denmark. The frames date to the winter of 1557–1558, suggesting a second phase of building (Daly 2022: 38). Three of the frame samples match with datasets from southern Norway and one to a dataset from Western Sweden. More dendrochronology samples need to be analysed to fully understand the different construction phases of the vessels.

Bispevika 8 predates many of the other excavated Dutch-Flush wrecks. The Dutch-Flush wreck with the closest felling date is the Dutch OE34 found in Flevoland, the Netherlands (Logan 2013), with a felling date of 1553 (van Holk 2014: 39). Many other excavated vessels built in the same style are dated to between the late 16th century and the middle of the 17th century. Such as Oost Flevoland B71 (OB71) (Hocker 1991: 184), the aforementioned B&W wrecks (Lemée 2006: 255, 217, 164), Scheurrak T24 (Maarleveld 2013: 7), and Paléhaven 1 dating between 1636 and 1643 (Borvik *et al.* 2015: 21).

Fig. 5 Bispevika 8 shown in the foreground of the picture is similar in shape to other 16th century vessels that were excavated in Oslo harbour. Although its chine differentiates it from these lapstrake vessels. From the left, Bispevika 8, Barcode 14, Barcode 8, Barcode 2, Barcode 6, Barcode 5 (drawings: Norwegian Maritime Museum)

6. Caulking analysis

Sixteen caulking samples were taken from Bispevika 8. The samples were taken from a variety of locations in the hull: from the first to the fourth strake, between strakes and the keel, between strakes and stem, and under graving pieces. A simple visual inspection of the samples revealed that the caulking material consisted mainly of moss. Six samples were sent to Lucy Kubiak-Martens at Biax-consult for further analysis. Almost all the caulking samples from the Bispevika 8 were composed exclusively of two moss species, *Warnstorfia fluitans* and *Calliergon cordifolium*. Similar inclusions in all the samples, of needles and scales from Scots pine (*Pinus sylvestris*), Norway spruce (*Picea abies*), and birch trees, suggest all of the waterproofing material was collected at the same location, on wet, nutrient-poor ground, possibly in fens or bands, or by shallow pools in coniferous forests. All of the trees and mosses are native to Norway but are also found widely in Europe. Norway spruce, however, is not found on the west coast of Norway or the south-east coast of Sweden, or in northern Germany, Denmark, or the Netherlands (Fig. 6) (Kubrik-Maartens 2020: 10). Assuming the caulking material was gathered close to where the ship was built, this narrows down the most likely construction location for Bispevika 8 to the south coast of Norway.

7. The black swan – contextualizing Bispevika 8

Bispevika 8 is believed to have been destroyed in the historically documented town fire of February 21, 1567, when Oslo's citizens were forced to burn down their houses, warehouses, and ships to dissuade the attacking Swedish army from taking shelter in the town. The ice laid thick on the fjord, and although the shipowners pleaded with the king's men that they needed to cut a passage through the ice and take the ships somewhere safe, they were denied the option, and the ships were burnt down with the rest of the harbour area. This also meant that the wealthy citizens had few means to rescue their goods in the 24 hours warning they were given. From these dramatic circumstances we get unusually rich information when the burnt wrecks were rediscovered 450 years after the fire. We know for sure that Bispevika 8 must have been anchored for the winter in Oslo's harbour, and since foreign merchants were not allowed to stay in town over winter, we can be quite certain that the ship was owned by Norwegians, most likely Oslo citizens. But where was the ship built, and by whom?

Despite the dearth of archaeological finds for this time period, historical records of carvel shipbuilding for the Danish/Norwegian crown in Norway certainly exist. In a letter dated November 1538 the Danish/Norwegian king Christian III ordered a large carvel-constructed ship to be built by the citizens of Oslo (NRR 1, 55). In another letter from the king, dated the same month and year, the king asks the Bohus lord Claus Bilde and Bernt Sasser to finish the bottom of a carvel ship and make sure to order enough ship timber before the timbermen and shipbuilders arrived (NRR 1, 56).

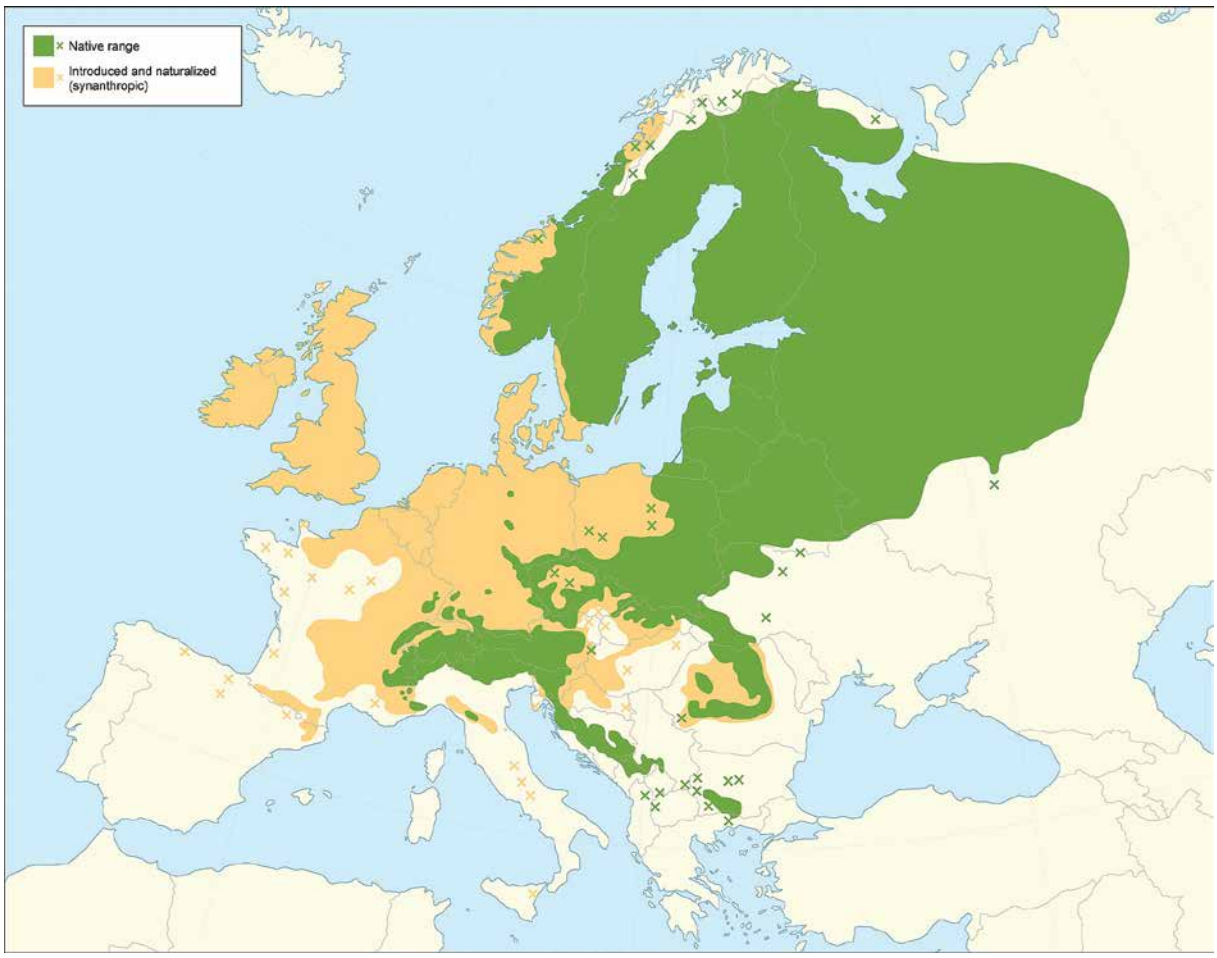

Fig. 6 Distribution of native Norway spruce shown in green (Picea abies) in Northern Europe (after Caudullo *et al.* 2017)

Shipbuilders of English, French and Dutch origin were working in Denmark and Norway, in the 16th century (Rasmussen 2008: 22; Lemée 2006: 47, 61, 62). It is reasonable to imagine that they brought their own craftsmen, but also that they employed local shipbuilders and craftsmen. We know from the 1570's the English master shipbuilder Hugo Beda built several large vessels for the king in a shipyard in Moss by the Oslofjord (NRR 2, 76, 125, 176, 180-181). Beda was responsible for building at least one ship, Gideon, in a Dutch-Flush style (Grue 2010: 54).

A century after the construction of Bispevika 8 a naval shipyard was established, on a small island named Hovedøya, close to Oslo. Some of the era's largest warships like Sophia Amalie (1650) were built here, and ship builders came from the king's shipyard Bremerholm in Copenhagen. The shipyard, believed to have been in use for around 50 years, may have been the site of an older shipyard but as of now no information about one has been found, so this is pure speculation. It is reasonable to assume that many of the boats and smaller clinker-built ships from the 16th century found in Oslo harbour were built in smaller, traditional shipyards in the Oslofjord region. Royal, and larger scale, shipbuilding may have been shorter lived popping up in timber-rich coastal areas and disappearing again some years later, along with the timber supply. Bispevika 8, with its different technological construction, must have been built at a shipyard exposed to new technological thought and by a group with the will and or need to use it. It is plausible that Bispevika 8 was constructed in a Royal or larger shipyard where the motivation for change was perhaps greater, and the connection to tradition somewhat less.

8. Conclusion

Bispevika 8 is one of the oldest excavated Dutch-Flush vessels and the people building Bispevika 8 were clearly well versed in how to build in the Dutch-Flush manner. The shape of the wreck, the provenance of the timbers, and the likely provenance of the caulking in addition to the context and written sources, must call a Dutch origin into question. While each parameter by itself might be circumstantial, together they form a picture of a ship that could have been built in the south-eastern part of Norway, owned, and commissioned, by tradesmen living in Oslo, or perhaps the Danish king. From written sources we know that the Danish king ordered a carvel to be built by the citizens of Oslo at the exact same time as the construction of Bispevika 8, and even if this ship is not actually Bispevika 8, it shows at least that carvel ships were being built in the area at this point in time. To understand more about shipbuilders and the society in which the ship was built, we need to gain more information about the short-lived Norwegian royal naval shipyards, as well as identify smaller, traditional boatbuilder's workshops. With an increasing number of wrecks from Oslo harbour, perhaps at some point in the future we will be able to identify characteristics that separate one shipyard from the other in the Oslofjord area in the 16th century.

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