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TWO SHIPS UNDER ROCKS: A GLIMPSE INTO RURAL SHIPBUILDING IN WESTERN POMERANIA

Jens AUER

Abstract

The wrecks of two clinker-built vessels were excavated and lifted off the coast of Mecklenburg-Western Pomerania in northern Germany as part of the archaeological mitigation procedures for the Nord Stream 2 gas pipeline project.

The ships formed part of an underwater barrier created by Swedish forces during the Great Northern War in 1715. As a result of the excavation carried out by the state authority for culture and monuments in Mecklenburg-Western Pomerania, both wrecks were documented underwater, disassembled, lifted and studied on the surface. All ship timbers were recorded in detail using a structured-light scanner and photogrammetry before the wrecks were moved into temporary wet storage.

After completion of the marine construction project, the wrecks will be re-deposited near their original locations.

Keywords

Excavation, 18th century, Great Northern War, Mecklenburg-Western Pomerania, shipwreck

Résumé

Les épaves de deux navires à clin ont été fouillées et renflouées au large des côtes du Mecklembourg-Poméranie occidentale dans le nord de l'Allemagne, dans le cadre des fouilles préventives réalisées pour le projet de gazoduc Nord Stream 2.

Les navires appartenaient à un barrage sous-marin édifié par les forces suédoises pendant la Grande guerre du Nord en 1715. À la suite des fouilles, réalisées sous la direction de l'autorité régionale en charge de la culture et du patrimoine de Mecklembourg-Poméranie occidentale, les deux épaves ont été documentées sous l'eau, démontées, renflouées et étudiées en surface. Tous les bois des navires ont été enregistrés en détail à l'aide d'un scanner à lumière structurée et d'une photogrammétrie avant que les épaves ne soient déplacées dans une zone de stockage humide temporaire. Une fois la construction du gazoduc achevée, les épaves seront ré-enfouies près de leur emplacement d'origine.

Mots clés

Fouille préventive, XVIII^e siècle, grande guerre du Nord, Mecklembourg-Poméranie-Occidentale, épave

1. HISTORICAL CONTEXT

The Great Northern War (1700-1721) was fought between Sweden and Denmark and its allies, Saxony-Poland, Prussia and Russia. In the early phases of the war Sweden was successful and forced both Denmark (1700) and Poland (1706) to peace agreements. However, after Swedish troops suffered a devastating defeat against the Russians at Poltava in 1709, both Denmark and Saxony-Poland re-entered the war. Between 1710 and 1716 the theatre of war shifted towards the Swedish territories in present-day northern Germany. Although initial attempts to take the Swedish strongholds along the northern German coast failed, the campaign gained impetus again when Prussia joined the alliance in 1714.

In May 1715, Swedish forces under Charles XII held Stralsund and Wismar, as well as Rügen and Usedom, and prepared for defence against the allies. Both sides were aware that control of Rügen and the Bay of Greifswald were the key to taking Stralsund. However, Charles XII was well prepared. The two entrances to the Bay of Greifswald, which were suitable for larger vessels, *Westertief* or *Neutief* and *Osttief*, were difficult to navigate at the best of times. The eastern passage could easily be covered by artillery from redoubts at Peenemünde and on the island of Ruden. The western passage was only partially covered by a battery on the southern tip of the island of Rügen.

In order to prevent the enemy from passing, the Swedes scuttled ships in the navigable channel and established the so-called

ship barrier (fig. 1). It is not known when exactly the ships were sunk, however, as the barrier is mentioned in historical sources from mid-July 1715 (Friedländer 1902, p. 343; Krüger, Schaake 2015, p. 278), it can be assumed that it was created earlier the same month. However, the barrier did not stop the allies. Guided by a renegade Swedish pilot named Peter Holländer, the Danish Admiral Sehestedt managed to thread his way through the western passage on September 25, 1715, and the Swedish navy was successfully attacked and defeated (Tuxen, With-Seidelin 1922, p. 160-162; Friedländer 1902, p. 388). Sehestedt's victory laid the foundation for the successful invasion of Rügen in November 1715 and finally also the fall of Stralsund on December 24, 1715.

After the events of 1715, the barrier remained in place. Reports from pilots in 1730 and 1734 show that it was considered a dangerous hazard to navigation (Dwars 1958, p. 21). It is unclear whether any salvage took place at all and the barrier remained charted until 1932, even though a new shipping channel, the *Landtief*, was in use from 1814 at the latest (Bierhals 1939, p. 18). The barrier was then forgotten until members of the local society for underwater archaeology (*Verein für Unterwasserarchäologie Mecklenburg-Vorpommern*) were made aware of its presence in 1995. Since then the barrier has been subject to a series of smaller surveys and excavations, with work intensifying in the planning phases for submarine power cables and the Nord Stream 1 gas pipeline (see, for example, Förster *et al.* 2002, p. 372; Scherer 2003; Schaake *et al.* 2012 and Belasus 2013).

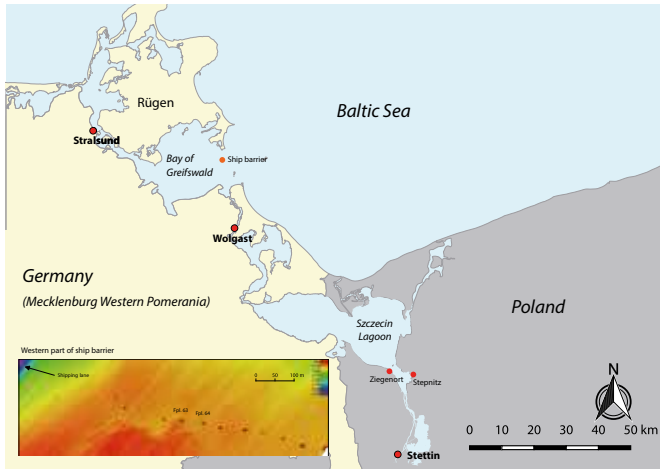


Fig. 1: Location map of the site showing the Bay of Greifswald and the surrounding area with places mentioned in the text. In the inset, the locations of wrecks Mönchgut, Ostsee VII, Fpl. 63 and Fpl. 64 are indicated over multibeam data of the western part of the barrier (author J. Auer 2019).

Based on the current state of knowledge, the ship barrier consists of 15 sites, stretching from Ostsee VII, Mönchgut, Fpl. 81 in the west (115 m east of the *Landtief* shipping channel) over a distance of 838 m in a W / ESE direction to Fpl. 73 in the east. On the two outermost sites (Fpl. 81 and Fpl. 73), only stone mounds without any visible timbers were encountered. It is currently unclear whether these stone mounds are the remains of shipwrecks in the barrier. They do, however, stand out from the surrounding seabed and are aligned with the other wrecks in the barrier. Most of the 13 wreck sites, which form the main part of the barrier, consist of the lower hulls of medium-sized wooden vessels with keel lengths between 11.5 m and 20 m, which are covered by stones and boulders. While the distance between individual sites generally varies between 40 m and 60 m, there are noticeable gaps between site Fpl. 81 in the west and site Fpl. 80 (155 m) and between site Fpl. 79 and site Fpl. 46 (102 m). The state of preservation of individual wreck sites varies, as does the state of investigation (fig. 2).

2. EXCAVATING TWO SHIPS UNDER ROCKS

During the archaeological mitigation procedures for the Nord Stream 2 gas pipeline from Ust-Luga in Russia to Lubmin in the Bay of Greifswald, the ship barrier came into focus again. With avoidance not an option, it was decided to excavate two of the wrecks in the barrier, Mönchgut, Ostsee VII, Fpl. 63 and Fpl. 64, and to remove them from the seabed. Detailed recording of all individual timbers was to be conducted on shore before the wrecks were to be wet-stored in preparation for a later re-deposition near their original location.

The project was carried out by a team of up to 14 marine archaeologists from the state authority for culture and monuments in Mecklenburg-Western Pomerania (Landesamt für Kultur und Denkmalpflege Mecklenburg-Vorpommern) and took a total of three months.

The team was based on a 27.7 m Multi Cat with two cranes and sufficient deck space for the dive control container and the recovered material. The shallow draught of the vessel allowed

for safe operations around the shipwrecks, which were located in only 3.5 m of water.

Timber recording took place in a temporary workshop, which was set up in the port of Lubmin in the Bay of Greifswald. Most of the diving was undertaken using surface air supply to full-face masks. As both wreck sites were covered by a mound of boulders up to 1 m high, the first phase of work entailed the removal of the stones (fig. 3). This was done manually in order not to damage the underlying timbers. A total of 74 tons of stones were recovered from both sites and lifted to the surface in big bags. Following the removal of the stone cover, the wreck timbers were carefully exposed with water dredges, labelled and subsequently removed. While ceiling planks could generally just be lifted up, as the wooden fasteners had deteriorated severely, frames had to be chocked up with plastic chocks. This created a gap of sufficient size to cut through the treenail joints with a handsaw. The timbers were then moved onto a dedicated cradle and lifted to the surface by crane. They were transported to the recording laboratory in the harbour, where wet-storage facilities in the form of 10 m × 15 m collapsible water basins were set up.

All underwater recording was done using computer vision photogrammetry. Depending on site conditions, data was either captured as high-resolution raw image files or 4K video footage. A network of control points around each site was used to align the different recording phases. After initial image enhancement, the photogrammetry reconstruction was done using Agisoft Photoscan Pro (now called Metashape Pro). Dense models and textures were generated in RealityCapture. Two-dimensional orthophotos and top view MatCap (Material Capture)¹ renders were used to visualise the wreck sites and served as a basis for the creation of technical site plans in 1:10 scale.

The detailed recording of ship timbers was done using a combination of structured-light scanning and computer vision photogrammetry. After cleaning and initial sampling, all ship timbers were recorded in detail using either an Artec EVA

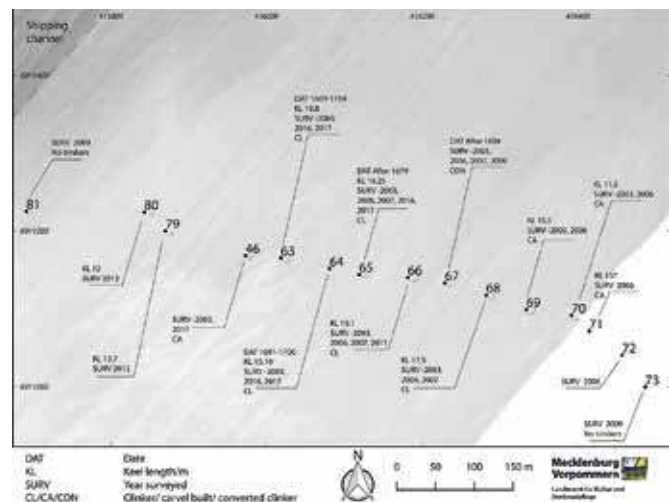
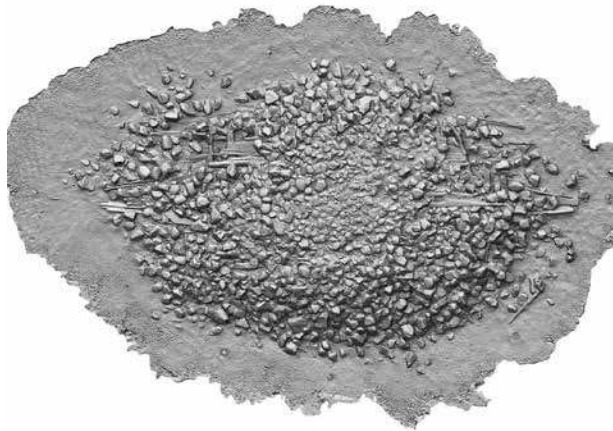
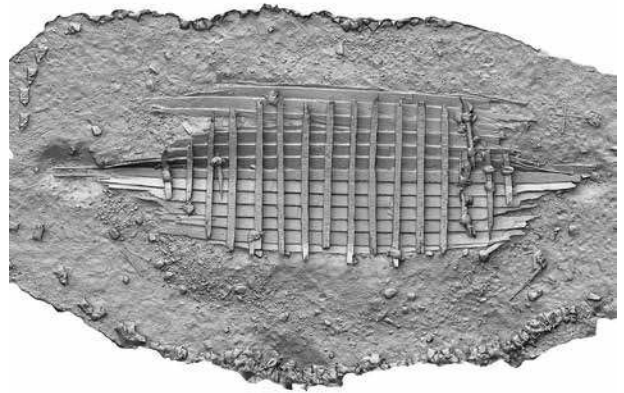


Fig. 2: Overview of the current state of knowledge on the ship barrier showing dendrochronological dating (DAT), keel length (KL), years of investigation (SURV) and construction type (Clinker (CL), Carvel (CA), Converted Clinker (CON)) (author J. Auer 2017).

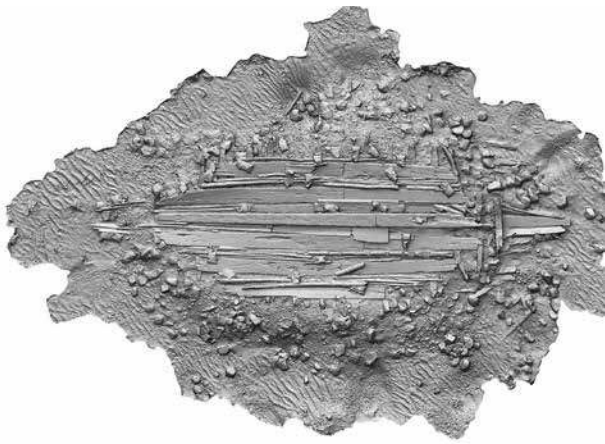
1. Material capture renders increase the three-dimensional impression of the scene and thus highlight small details.



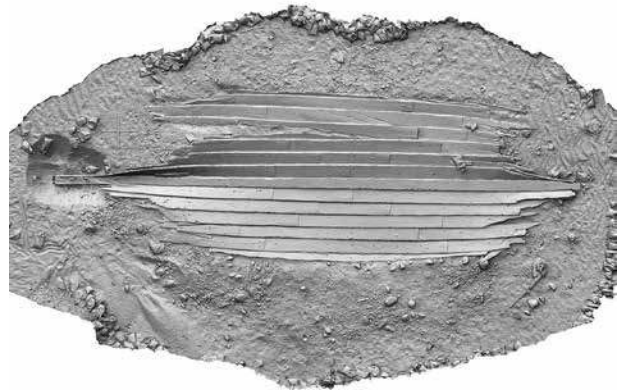
Stage 1: Before excavation



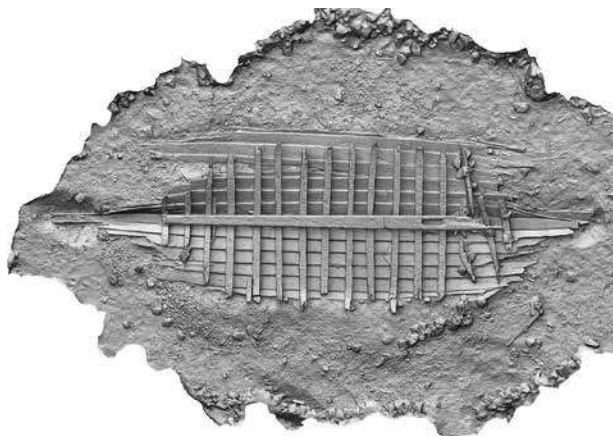
Stage 4: Framing



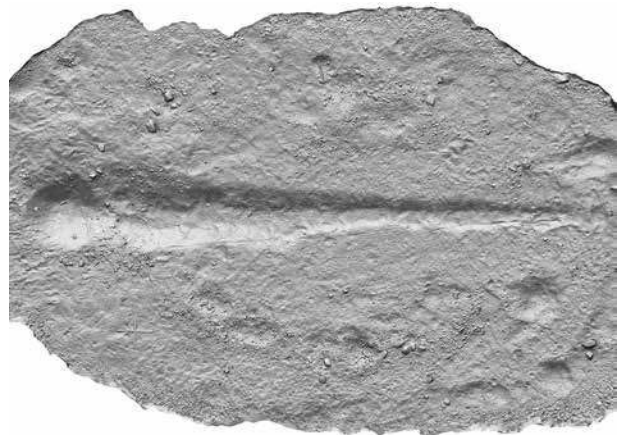
Stage 2: Ceiling planking



Stage 5: Outer planking



Stage 3: Keelson



Stage 6: Wreck fully removed

Fig. 3: Series of rendered images showing the sequence of excavation of wreck Fpl. 64 from the stone removal phase to full excavation and removal of the entire wreck (author J. Auer 2017, based on T. Van Damme 2017).

structured-light scanner or computer vision photogrammetry. With the timbers still present, the resulting scans were then annotated in the 3D modelling software Rhinoceros 3D. At the same time, a short catalogue description was compiled by the recorder. The description of each timber, as well as 2D outputs in the form of an annotated technical drawing and a textured image were then combined to form entries in the final timber catalogue (Auer *et al.* 2018, see also the paper of Thomas Van Damme in this volume for further information on this process).

3. THE SHIPS UNDER THE ROCKS

The two wreck sites were situated in the central part of the barrier at a depth of around 3.5 m. The slightly larger wreck, Mönchgut, Ostsee VII, Fpl. 63, was located approximately 40 m west of the smaller Fpl. 64. Both ships were lying on even keel mostly covered by large boulders and oriented with the bow facing west to southwest.

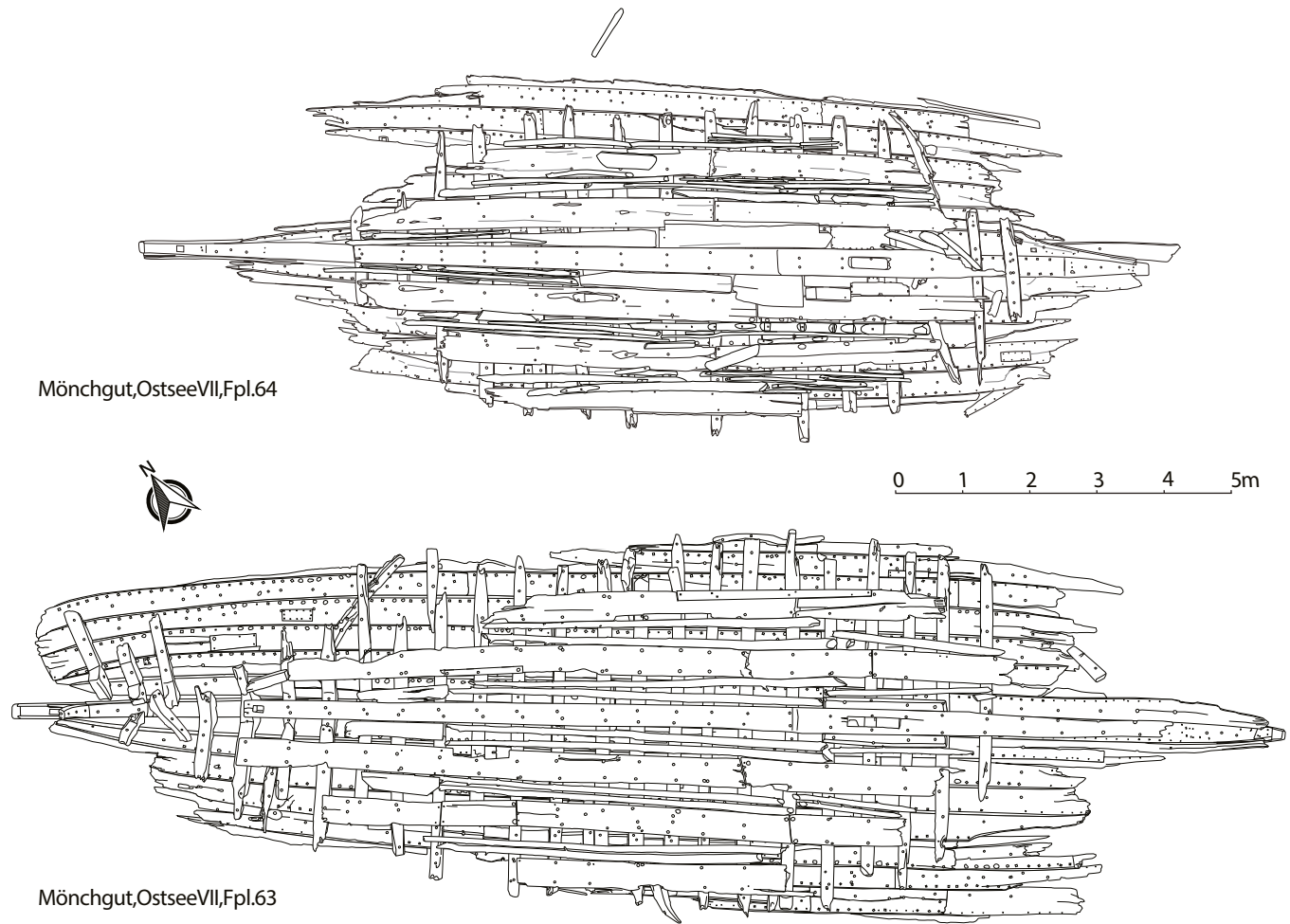


Fig. 4: Overview plans of wreck Fpl. 63 and Fpl. 64 with the ceiling in place (author M. Couwenberg 2017, based on tracings by M. Grabowski and T. Van Damme 2017).

Underneath the stone cover the ship timbers were preserved up to the turn of the bilge, while the rest of the vessel was lost to erosion. The preserved structure of both wrecks consists of an intact keel, outer planking, floor timbers and in a few cases the lower parts of futtocks, the keelson and a layer of ceiling planking (fig. 4).

Both ships were clinker built from oak. On the larger wreck Fpl. 63, the 19 m-long keel was composed of two parts which were joined with a flat diagonal scarf with vertical nibs. The keel of Fpl. 64 was heart-boxed from a single 15.1 m-long straight grown oak trunk. The keels differ slightly in shape but are generally fairly shallow². Both keels display a considerable degree of hogging. The posts are not preserved, but rectangular mortises in the upper aft surface of both keels show that the sternposts were stepped onto the keel on both wrecks. Both, stem- and sternpost were supported by knees, which were fastened to the inboard surfaces of the keels with treenails.

The outer planks of both wrecks were sawn from oak. Planks within a strake were joined with long flat diagonal scarfs³, which were sealed with sphagnum and tar. Adjoining strakes were fastened to one another at the lands with square-shafted

iron clinker nails with round heads. The nails were clenched over rectangular roves on the inboard side. A mixture of animal hair and tar was used as waterproofing in the lands.

The substantial framing elements were either boxed or box-halved from compass oak. The frames were sawn out and the joggles on the outboard surface were cut with axes and adzes. The majority of the floor timbers on both sites were generously recessed to fit over the keel. Care was taken to leave enough space for the bilge water to pass through the gaps on either side of the keel. Only the forwardmost and aftmost floor timbers were positioned on top of the keel and feature pronounced limber holes. Floor timbers were evenly spaced at an average distance of 57 cm (Fpl. 63) and 66 cm (Fpl. 64). During construction, large iron nails were placed in roughly cut notches along the forward and aft surfaces of the floor timbers to keep them in place until they could be permanently fastened to the hull planking with treenails of 30 mm diameter. Some of the treenails extended to the ceiling planking and were secured with wedges on the inboard side. Only about one third of all treenails were secured with wedges on the outboard side.

The keelsons were preserved on both wrecks. On the larger Fpl. 63, the 13.89 m-long keelson was made from a single piece of heart-boxed oak and furnished with two mast steps. The keelson of Fpl. 64 is likewise made from oak. It is only preserved over a length of 9.7 m and has a single mast step cut into the inboard surface 1.1 m aft of the eroded forward end. Both keelsons were notched on

2. Fpl. 63: maximum sided dimension 34 cm, maximum moulded dimension 24 cm; Fpl. 64: maximum sided dimension 32 cm, maximum moulded dimension 20 cm.

3. The average length on Fpl. 63 is 75 cm, while the scarfs are on average 65 cm long on Fpl. 64.

the outboard side to fit over the floor timbers. The outboard face of the keelson was chamfered in the space between notches, likely to make access to the area below the keelson easier and to allow bilge water to flow freely from one side of the vessel to the other. The keelsons on both wrecks were fastened to the underlying floor timbers with blind treenails which did not penetrate into the keel. On wreck Fpl. 63 the main mast step was supported with two additional mast step supports on either side of the keelson.

The ceiling on both wrecks consisted of regular ceiling planks which were fastened to the floor timbers and loose timbers and roughly cut logs which were used to fill the gaps between the ceiling planks, probably in order to protect the hull structure from the weight of the stones which were piled into the hold of the vessel prior to scuttling.

Considering how the ships met their end, it is not surprising that very few artefacts were recovered during the excavation. One notable find, however, is a silver coin, a 1618 Pomerania-Wolgast Doppelschilling in the sternpost mortise on site Fpl. 64. The coin probably served as a token of good luck. The date range for the felling of the timbers used for the construction of the vessels was 1699-1704 (Fpl. 63) and 1691-1706 (Fpl. 64). The dendrochronological samples correspond best with tree-ring datasets for northern Germany, indicating that the construction timbers were sourced locally.

Even the brief overview of construction details in this section illustrates that although the two ships differ in size they show an interesting correspondence in construction, down to details such as the use of tools and practices of temporary fastening. It would therefore not seem unlikely that the same workforce was involved in the construction of both ships. To sum up, the two vessels, which were scuttled side by side, were clinker-built from oak timber sourced from northern Germany. Wreck Fpl. 63, the larger of the two ships, would have had a length of over 19 m and a beam of at least 5.7 m, likely more. The vessel was fairly flat-bottomed with a moderately fine entry and run, and a shallow, almost plank-like keel. The vessel was equipped with two masts, a main mast in the forward third of the ship and a smaller mizzen mast at the aft end of the keelson, only about 3.7 m from the aft end of the keel. The distribution of stones on top of the wreck does allow for some conclusions regarding the division of space or layout of the vessel. As there were hardly any stones on the forward part of the wreck, this area might have been covered by a half-deck and could have been the living quarters for the crew. The discovery of the remains of the ship's galley near the bow supports this assumption. Wreck Fpl. 64 was slightly smaller with a length of over 15.5 m and a beam of at least 5.2 m, probably almost 6 m. Just as Fpl. 63, it was flat-bottomed with a moderately fine entry and run. The keel was again fairly shallow, making the vessel suitable for use in shoal waters. Fpl. 64 only had a single mast in the forward third of the vessel.

Although designed for shallow water, both ships would have been capable of navigating the open sea as well. Size and construction point to a use as merchant vessels for the coastal and Baltic trade.

4. TIMBER TRADERS FROM SZCZECIN LAGOON?

Thus we have the archaeological evidence: questions however remain as to how the ships to be scuttled were chosen by the Swedes and what they were originally built and used for.

According to historical sources, two of the wrecks in the barrier were from Ziegenort (today Trzebież) in Pomerania on the western shore of Szczecin Lagoon and were used in the timber trade between western Pomerania and Copenhagen (Bierhals 1941, p. 24). In documents in the National Archives in Copenhagen, seven of the scuttled ships are described as galiots (Krüger, Schaake 2015, p. 281), however, as ship types were hardly ever clearly defined in the 18th century and terms such as galiot were used liberally for a wide range of vessels of differing size, rigging and construction, this denomination does not help with the characterisation of the ships in question. Nevertheless, the mention of Ziegenort as the home port of two of the scuttled vessels provides an interesting pointer. In his article on rural shipping in Pomerania (Bierhals 1941), Paul Bierhals describes the shipping activities of rural shipowners in the area around Szczecin Lagoon, both in the Swedish part on the western shore and in the Brandenburg part along the eastern shore. According to Bierhals, there was a rise in the construction of larger vessels in the villages around Stepenitz (today Stepnica) after this area came under Brandenburg control as a result of the Scanian War in 1679. The main reason seems to have been the profitable timber export trade, mostly to Copenhagen.

With prices for timber increasing, this trade expanded further in the 1690s. A complaint from the city of Stralsund from 1692 allows this timber exportation to be quantified. The city was in dire need of construction timber. In the complaint, records from the city of Wolgast are cited to prove that timber was being exported to Denmark rather than being sold in Stralsund. In the years 1689-1697, a total of 567 ships with a cargo of timber were cleared to sail abroad, mostly to Copenhagen (Bierhals 1941, p. 23). Many of these ships came from the villages around Szczecin Lagoon, not only from areas under Brandenburg control, such as Stepenitz, but also from villages in Swedish Pomerania, such as Ziegenort. The trade was in fact so lucrative that many rural villages, which did not have the right to build larger vessels, started to construct ships solely for the timber export. A complaint from the city of Stettin (Szczecin) mentions the construction of more than 100 ships of 60 to 100 last in the years 1696-1702, all built for the Copenhagen timber trade in villages around Szczecin Lagoon. Even Swedish embargoes did not stop the timber export, which continued with few interruptions until the Great Northern War reached Pomerania again in 1715.

Although the connection between the Pomeranian timber trade and the wrecks in the barrier relies on a single historical source stating that two ships from Ziegenort were scuttled in the *Westtief* in 1715, the archaeological evidence is consistent with the limited historical data available on provincial timber traders from Szczecin Lagoon. Fpl. 63 and Fpl. 64 were both clinker-built and fairly flat-bottomed sailing vessels of a size comparable to the larger clinker vessels mentioned by Bierhals. The larger vessel Fpl. 63 had at least a half-deck and two masts, while the smaller Fpl. 64 could have been open. Both vessels were built from northern German or western Polish timber. The link to the area is further reinforced by the coin from Pomerania-Wolgast in the mast step of Fpl. 64.

Altogether, the two wrecks under the rocks provide an interesting archaeological insight into the construction of small local and possibly rural merchant vessels in Pomerania at the end of the 17th century.

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