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Veröffentlichungsversion / Published Version

Zeitschriftenartikel / journal article

#### Empfohlene Zitierung / Suggested Citation:

Christensen, A. E. (2002). The "Big Ship" of Bryggen in Bergen: what can it tell us? *Deutsches Schifffahrtsarchiv*, 25, 87-95. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-50370-9>

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► ARNE EMIL CHRISTENSEN

## The “Big Ship” of Bryggen in Bergen: What can it tell us?

The 1960s were extremely busy years for the few archaeologists and ethnologists active in the maritime studies. Much new material was discovered, the *VASA*, Bremen Cog, Skuldelev ships and other finds were excavated, and a new generation of scholars began an active publishing campaign. The recipient of this Festschrift holds a prominent position in the group with his many publications, including his magnum opus of 1972 – “Frühmittelalterliche Handelsschifffahrt in Mittel- und Nordeuropa” – which has been a source of inspiration to the present author.

In 1955 a considerable portion of the old merchant’s quarter “Bryggen” in Bergen was destroyed by fire. The houses that burned had been built after another fire in 1702, but the site had been inhabited since Bergen was founded – by King Olav Kyrre in 1070, as tradition would have it – and it was with high expectations that archaeological excavations were started on the site. The excavation campaign lasted from 1955 to 1968 and resulted in a tremendous increase in the knowledge of life, settlement and trade in one of the major trading ports of medieval Europe.

Among the loose finds were numerous fragments of ships and boats (Christensen 1985). They were found partly in the debris used as infill material for new quays, partly as reused timbers in the foundations of quays and new houses. Slabs of planking, still riveted together, had been given a new function as flooring in the passages between the rows of houses. A number of fragments from one very large ship were excavated in the foundations constructed in the Gullskoen tenement after the fire of 1248. Initially, a few of the timbers found were identified as parts of a huge vessel; a separate excavation campaign was then undertaken in 1962 to locate and salvage as many pieces of the ship as possible.

The fragments had been reused as building beams, so there are few curved timbers among them (Fig. 1). Evidently, the builders reusing the materials selected the straight or nearly straight timbers. This circumstance severely limits our means of reconstructing the size and shape of the vessel. Another group of timbers found nearby were originally believed to be the remains of another quite similar ship, as the location of the find was judged to be on a building stratum of a different date (Christensen 1985, p. 182). More recent research has shown that the building strata are actually contemporary, both originating during the rebuilding following the 1248 fire (Hansen 2001). A dendrochronological analysis has proved that all the timbers are of the same date, and that the trees grew in the same area. The timbers must belong to the same ship (Bartholin 1999 and 2001). Even with this increase in the number of fragments, there is still too little material for a certain reconstruction, but it is possible to suggest figures for the size and loading capacity of the vessel (a new attempt at a sketch reconstruction is being undertaken at present, but the results are not yet available).



Fig. 1 Big Ship fragments in situ. One of the mast beams is seen on the left, the windlass in the middle and part of the keelson on the right. (Photo: Bergen Museum)

The keelson is preserved in two pieces, originally treenailed together. The full length is 12.5 m (Fig. 2). The keelson is shaped on the lower and upper side for floor timbers and low-set crossbeams. The outer ends of the crossbeams are notched for clinker strakes. Two especially sturdy crossbeams form the mast step. A couple of futtocks, two sharp floor timbers from the end of the ship and a huge windlass drum were reused, as were two crossbeams with heads, small fragments of planking and a few more fragments of the framing, damaged to various degrees in the process of reuse. All fragments are of pine. The cross section of the ship at the mast, shown in Fig. 3, is based on the crossbeam in front of the mast, a floor timber exhibiting a good fit beneath the crossbeam and keelson as well as a sensible curve up from the crossbeam, with support in the two futtocks found. The beam at the sheer strake will then have been about 9 m in length. With a beam/height ratio of 2:1 we can postulate a total depth from the sheer strake to the underside of the keel at approx. 4.2 to 4.5 m. The principle of low-set crossbeams over short floor timbers and especially strong beams forming the mast step is known from other, smaller wrecks from the Early and High Middle Ages; Lynæs, Sjøvollen, Elling Å and Galtabäck (Englert 2000, Christensen 1968, Crumlin-Pedersen 1991, Humbla 1937, Åkerlund 1943 & 1948).

On the basis of a beam/length ratio of 1:3, we arrive at a possible maximum length of the ship of around 27-30 m. The relatively flat surface of the crossbeam layer must have formed the "floor" of an open hold. Multiple crossbeams at the mast and the ends of the hold probably made up the transverse supports; the two crossbeams with "heads" are part of such a transverse support, most probably at one end of the open hold. A crossbeam with rabbets for loose deckboards shows that there were decks fore and aft, necessary for operating the ship. Whether the windlass was mounted in bollards as in the Elling Å ship (Crumlin 1991, fig. on p. 29), or in beam-supported verticals as in Kalmar I and the Bremen cog (Åkerlund 1951, Lahn 1992), cannot be determined, but latter is the most likely solution. If mounted in bollards, the windlass would have had



Fig. 2 Twelve strong men were needed to get the largest piece of the Big Ship keelson out of the excavation trench. (Photo: Bergen Museum)

to be placed very close to the end of the ship to reach across from bollard to bollard. Placing the windlass so close to the stem would be impractical, and has no parallel in the known sources. Two bollards with sockets for a windlass were found in Bryggen. They differ in size, and must be from two different vessels. The locations of the finds are so far from the Big Ship timbers that they cannot belong to this vessel (Christensen 1985). All available evidence points to the windlass being placed in the aft of the ship (Åkerlund 1951, Lahn 1993, Crumlin-Pedersen 1991). There is also iconographic evidence indicating the same, for instance the well-known town seal of Wincelsea (Ewe 1972, pp. 78 & 210). At some point, the windlass was moved from the aft to the foredeck position we are familiar with on more recent vessels, but the date of this transition is uncertain.

Rough calculations indicate a minimum cargo capacity of approx. 60 lasts by volume or about 120 tons for the ship (Christensen 1989). A capacity as great as that suggests a ship built to carry relatively light but bulky cargoes. Among the various wares exported from Norway in the Middle Ages, two stand out as typically bulky and light cargoes: stockfish and timber. When loading a ship, an experienced steersman would probably look for a mixed cargo where millstones, whetstones and barrels of fish oil would give his ship stability; he would then fill the hold with stockfish, pine boards, beams and rafters.

In 1999 dendrochronological samples were collected and analysed by Thomas Bartholin (Bartholin 1999 & 2001) as part of the background material for a doctoral thesis by Anton Engler (Engler 2000).

The felling date for the trees used was established to be the winter of 1187/88. The trees grew in Western Norway, Sogn – a well-forested area north of Bergen – being the most likely source. The construction of the ship was carried out in the Norse tradition of keeled vessels. Even if the keel is missing, the sharp floor timber at the mast, the use of the floor-timber/low-set-crossbeam principle and the general character of the fragments exclude the possibility of other building

methods. The ship was built well, attention having been paid to details, as seen, for example, in the nicely smoothed surfaces and decorative mouldings on most timbers. It is true that the two sharp floor timbers bear no mouldings, but the explanation is probably that they were below a deck and seldom seen. The moulding is the shallow rectangular groove found on medieval ships and houses. There are many examples in medieval wrecks; the examples on houses are mainly from Norway (Christensen 1985, p. 193ff.).

In the twelfth century, Norway was troubled by civil war, with several claimants fighting for the throne. Late in the century, two men competed for the Norwegian throne: Sverre, who claimed to be the son of king Sigurd Munn, and Magnus, son of the earl Erling Skakke. The latter's mother Kristina was the daughter of King Sigurd Jorsalfarer and, unlike Sverre, Magnus had been born to a married couple. Accordingly, Magnus had the support of the Church, even though he was not the son of a king. By tradition, any king's son could inherit the throne whether he was born within wedlock or not. Erling Jarl fell in battle against Sverre in 1179, Magnus in 1184, but Sverre nevertheless continued to be troubled by new uprisings under various leaders who claimed royal descent.

The war did not affect all of Norway all the time. Peaceful activities were carried out and trade flourished. War was primarily a summer activity, with the capture or recapture of the two big cities Trondheim and Bergen as an important goal. Apart from the fighting in and around the towns, most battles were at sea. Bergen was already established as the staple of Norway's most important export good: dried cod from Northern Norway. In addition, merchants from other districts near and far brought wares of all kinds to Bergen, from walrus tusks and expensive furs to butter and tallow. Shortly before 1200, two sources indicate the importance of Bergen. "The Journey of the Danes to Jerusalem," a Latin manuscript, tells of a visit to Bergen in 1191 on the way to the Holy Land. The city is described as a busy trading centre: "Many people live there, and the town is rich and has an abundance of many things. Of dried cod, which they call *skrei*, there is so much that it can not be counted or measured. Ships and men come there from all directions, Icelanders, Greenlanders, Englishmen, Germans, Danes, Swedes, Gotlanders and other nations that we cannot name here, all can be found if one takes the time to look. There is plenty of wine, honey, wheat, good clothes, silver and other merchandise, and a lively trade with all kinds of goods" (my translation from Salvesen 1969). In a speech held by King Sverre to the townspeople in 1186, he scolds them for excessive drinking and drunken brawls, and also criticises the German merchants who had brought so much wine to Bergen that it was as cheap as beer. As export goods taken back by the Germans, the king mentions dried cod and butter.

It is against this background of active international trade that we must judge the fragments of the large ship, built in spite of the wartime problems which must certainly have troubled the merchants who wanted to go on trading peacefully both at home and abroad.

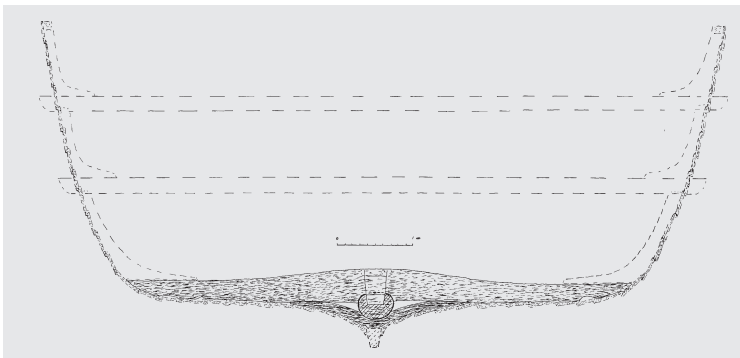


Fig. 3 Rough sketch reconstruction of the cross section of the Big Ship at the mast. (Drawing: A.E. Christensen)

The laws regulating trade in medieval Norway were evidently intended to regulate problems related to a system where many merchants with relatively small amounts of cargo bought freight from a ship owner by acting as crew members. The Old Norse term *farmann* for merchant, literally meaning “travelling man,” must indicate that merchants generally carried out trade by travelling with their goods. The local laws – the Gulatingsloven and Frostatingsloven – and the common law decreed by King Magnus “the Lawmender” all have the same content, with some variation in the text. The Frostating law, from Trøndelag, states: “Now, when a man makes a merchant vessel ready in his own *herad* and people take freight with him, he should make it so, that there is room for all who have taken freight. Now, if the ship is too heavily laden, the steersman (presumably the ship owner) should take his goods ashore first, while those who have hired freight-space shall keep it. But if they think that the ship is still too heavily laden, then those who took freight last shall take their goods ashore, until the ship is seaworthy. Then he shall pay those who took goods ashore as he has broken the agreement” (Frostatingslov, kjøpebolken, Chapter 24; my translation from Hagland & Sandnes).

Custom rolls of the early fourteenth century (about 120 years after the building of the Big Ship) from ports in eastern England provide information on trade from Bergen. There is mention of both Norwegian and foreign merchants with typical Bergen wares such as dried cod and fish oil. Among the ships named, one is called the “Gullskobussen.” It is evidently named after the tenement where the Big Ship was found, and probably owned by one or more of the merchants residing there. As most of the taxes and land rents in medieval Norway were paid in wares, the large landowners could trade their surplus for foreign goods. Of the ships mentioned in the custom rolls, some were owned by the archbishop or other bishops, one by the king, others by rich monasteries such as Utstein, Lyse or Dragsmark. When the sizes are given, we find that the largest Norwegian ship and the largest cog both carried between 80 and 100 medieval lasts (Nedkvitne 1977). Such large ships reflect another mode of trade than that regulated by the law quoted above. One large land owner, or several who formed a *felag* (company) for the trip, could fill a large ship with his/their wares. A professional crew would probably be hired to man the ship. Knut Helle is of the opinion that professional sailors existed in Bergen at this time (Helle 1982, p. 403). In 1341 a man by the name of Øyvind Bonde hired a ship from the bishop of Bergen. He evidently had enough goods to fill the ship, either alone or with his *felager*, as the bishop had to apologise to the nobleman Erling Vidkunsson, who wanted space on the ship for his goods: No room was available.

Shortly before 1200 a ship of 60 lasts or more must have been well above what an ordinary *farmann* could afford to build and maintain; it must have been the property of someone high up on the social ladder such as the archbishop, one of the bishops or the king himself. A large cargo of export goods could have provided the much-needed cash for keeping enough men armed and ready to maintain royal supremacy, so we can expect the king to have taken part in trade even in times of war.

We do not know the identity of the owner of the tenement Gullskoen, where the Big Ship was found in the stratum of the rebuilding after the 1248 fire. It cannot be proved with certainty, but the name “Gullskoen” (The Golden Shoe) may have been derived from Halvard Gullsko, who was King Håkon Håkonsson’s ambassador to Iceland in the 1260s (Helle 1982, p. 297). When and how he eventually acquired the tenement and it was named after him is not known, but it is tempting to guess that the tenement may have been royal property which was donated to Halvard. It is known that the king donated property nearby to other followers (Helle 1982).

The ship was built in 1187/88 and reused in 1248. 60 years is a long life for a large clinker-built hull, and the fragments found show remarkably few traces of wear and tear. The upper surfaces of the crossbeams are smooth, with sharp edges and clear mouldings. As these beams formed the “floor” of the hold, one would expect considerable wear from heavy cargo such as millstones, bar-

rels of fish oil and timber. Some of the fragments show traces of fire, and it is tempting to suggest that the ship was in the harbour during a fire in the city, was damaged beyond repair and broken up for secondary use. The deck beam exhibits fire damage which seems to have been caused by a shower of sparks, and this damage cannot have been inflicted by a later fire, when the beam was deep down in the foundations. If the ship was damaged in the fire of 1198, the lack of wear is understandable, but then the materials from the broken-up vessel must have been stored for 50 years before being reused. If the damage is the result of the 1248 fire, we must suppose that the ship was laid up or beached for many years before being dismantled. It is difficult to arrive at a fully convincing explanation.

As I have previously stated, the theory that Hanseatic supremacy was a result of better ships must be abandoned in the light of both ship finds such as that of the Big Ship and a new survey of the written sources (Christensen 1989). Other recent finds in both the Baltic and Western Europe show that large vessels built on a keel sailed side by side with the cogs. Undoubtedly, Norse and German shipbuilders borrowed a wide range of technical details from one another. The protruding crossbeams are an example of one detail of which it has been suggested that it was a loan from Hanseatic to Norse shipbuilding. The two oldest examples are the Big Ship and the Kolding cog. With dendrochronological dating at 1187 and 1188 respectively, it is difficult to say which way the impulse went (Englert 2001).

The Big Ship, fragmentary as it is, shows us many things: Norwegian shipbuilders around 1200 were able to build very large ships, indicating that the virtually incredible sizes cited in the sagas for some of the royal vessels are not pure military propaganda. The stockfish trade from Bergen was sufficiently developed even before 1200 to make it profitable and necessary to build such large ships.

Hanseatic supremacy had not yet been established around 1200. German merchants were surely present in Bergen at this time, but not as residents. The first German owner of a house in Bergen is Brun "the Old," sometime after 1259 (Helle 1982). When German supremacy came into full force, it was trade organisation and a monopoly in important wares such as grain and salt which gave the German merchants the upper hand, not the use of cogs. The very heavy setback which the Black Death of 1349 caused for the Norwegian society must also have had consequences for shipbuilding and trade, and it seems that the German merchants seized the opportunity to take over as much of the foreign trade from Bergen as possible. The "Kontor" was probably established at this time, and was provided with its own regulations some time after 1365, although the name was not used until about one hundred years later (Helle 1982).

Nevertheless, ships built in – or derived from – the Norse tradition continued to be built and used until the time when the carvel building technique became prevalent for big vessels, and until the end of the nineteenth century for coasters. Examples of late medieval keeled vessels found in Norway but not necessarily built here are the wrecks from Bøle (Molaug 1964), Folderøyhamn (Thowsen 1965) and Træna (Molaug 1958 & 1959). German examples are the Ebersdorf model (Steusloff 1983) and the wreck of Gellen (Lüth & Förster 1999).

Many town seals, especially those from England, show keeled vessels which seem to have been constructed in the Norse building tradition, regardless of whether they are of Anglo-Saxon or Viking origin, and the wreck of the early fifteenth-century *GRACE DIEU* still resting in the mud of the Hamble river shows how enormous late medieval keeled clinker vessels could be. The ship has an estimated keel length of 38–40 m.

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## Das »Große Schiff« von Bergen: Was verrät es?

### Zusammenfassung

1962 wurden in Bergen zahlreiche Teile eines großen mittelalterlichen Fahrzeugs ausgegraben, die nach dem Brand von 1248 zur Errichtung der Fundamente neuer Gebäude verwendet worden waren. Einige der Fundstücke weisen Brandspuren auf, so daß der Schluß naheliegt, daß das Schiff während des Feuers im Hafen gelegen hat und so stark beschädigt wurde, daß es abgewrackt werden mußte. In der Literatur wird das Fahrzeug für gewöhnlich das »Große Schiff« oder »Bergen-Schiff« genannt. Es war in nordischer Schiffbautradition aus Kiefernholz erbaut



worden. Die hierfür notwendigen Bäume waren im Winter 1187/88 in Westnorwegen gefällt worden, wie eine 1999 durchgeführte dendrochronologische Analyse ergab. Ausgangs des 12. Jahrhunderts herrschte zwar Bürgerkrieg in Norwegen, doch offensichtlich bestand trotz dieses Umstands Bedarf an großen Handelsschiffen. Für eine vollständige Rekonstruktion des Schiffes reichen die Fundstücke nicht aus, allerdings läßt sich eine grobe Schätzung vornehmen, wonach es ungefähr 30 m in der Länge gemessen und eine Tragfähigkeit von wenigstens 120 Tonnen gehabt haben wird. Die gefundenen Teile des Schiffes weisen darüber hinaus konstruktive Parallelen zu kleineren mittelalterlichen Wracks des 13. Jahrhunderts auf, die in Skandinavien gefunden wurden.

Um 1200 war der Export von getrocknetem Kabeljau aus Bergen bereits vollständig ausgeprägt, und da es sich hierbei um eine leichte, gleichwohl sperrige Ware handelt, ist davon auszugehen, daß das Schiff für den Stockfischhandel gebaut worden ist, und zwar für eine Person mit einem großen Warenüberschuß für den Verkauf, wie die Größe des Fahrzeugs nahelegt. Da alle landwirtschaftlichen Erzeugnisse und Fisch besteuert wurden, kämen der Erzbischof, der König, Bischöfe oder reiche Klöster als mögliche Besitzer des Schiffes in Frage. Für die Zeit etwa ein Jahrhundert nach dem Bau des »Großen Schiffes« ist diese Art des Exporthandels umfangreich dokumentiert, da aus dieser Zeit stammende englische Zolllisten die aus Norwegen kommende Fracht ausweisen und bisweilen auch die Namen von Schiffen und Händlern nennen.

Ein Problem besteht darin, daß die Schiffsfragmente erstaunlich geringe Abnutzungsspuren aufweisen. Wäre das »Bergen-Schiff« tatsächlich von seinem Bau 1188 bis zum Brand 1248 eingesetzt gewesen, müßte man stärkere Gebrauchsspuren erwarten. Eine Erklärung hierfür wäre, daß das Schiff bereits während eines früheren Feuers, 1198, beschädigt und abgewrackt worden ist. Seine Bestandteile könnten für eine spätere Verwendung zwischengelagert oder aber auch zweimal wiederverwendet worden sein. Die Häuserzeile in Bergen, wo die Stücke gefunden wurden, könnte königliches Eigentum gewesen sein.

Als das Schiff erbaut wurde, handelten deutsche Kaufleute mit Bergen, aber sie spielten noch nicht die dominierende Rolle, die die Hanse während des Spätmittelalters im Im- und Exporthandel mit Norwegen innehatte. Das »Große Schiff« von Bergen ist ein wichtiges Zeugnis für die großen, in nordischer Tradition gebauten Handelsschiffe und Beleg für die Größe der bereits um 1200 für den Handel bestimmten Fahrzeuge.

## Le «Grand Bateau» de Bergen. Que nous révèle-t-il?

### Résumé

En 1962, à Bergen, furent découverts de nombreux morceaux d'une grande embarcation moyen-nâgeuse, qui avaient servi aux fondations de nouveaux bâtiments après l'incendie de 1248. Certaines pièces montrent des traces de brûlures, ce qui amène à conclure que le navire se trouvait dans le port lors de l'incendie et qu'il y fut tellement endommagé qu'il dut être démolé. Dans la littérature, l'embarcation – réalisée en bois de pin selon la tradition de construction navale nordique – est connue sous le nom de «Großes Schiff» ou «Bergen-Schiff» (Grand Bateau ou Bateau de Bergen). Les arbres qui furent nécessaires à sa construction furent abattus au cours de l'hiver 1187/88 en Norvège occidentale, comme une analyse dendrochronologique effectuée en 1999 l'a démontré. Bien que la fin du 12<sup>ème</sup> siècle en Norvège ait été placée sous le signe de la guerre civile, il apparaît que le besoin en grands navires de commerce existait, et ceci malgré la situation. Les pièces découvertes ne suffisent pas à une reconstruction complète du navire, cepen-

dant, une estimation grossière indique qu'il devait mesurer environ 30m de longueur et posséder une capacité d'au moins 120 tonnes. Les pièces montrent de surcroît des parallèles dans la construction avec de plus petites épaves moyennâgeuses du 13<sup>ème</sup> siècle, trouvées en Scandinavie.

Aux alentours de 1200, l'exportation de morue séchée de Bergen était déjà complètement développée, et comme il s'agissait d'une marchandise légère autant que volumineuse, on peut supposer que le navire avait été construit pour le commerce du stockfish, et plus précisément pour une personne ayant un grand excédent de marchandise à vendre, ainsi que la taille du navire le laisse deviner. Comme tous les produits agricoles et le poisson étaient taxés, seuls l'archevêque, le roi, des évêques ou de riches cloîtres entrent en ligne de compte en tant qu'éventuels propriétaires du navire. Ce genre de commerce d'exportation est largement documenté à l'époque située environ un siècle après la construction du «Grand Bateau», puisque les listes de douane anglaise de cette période indiquent le fret en provenance de Norvège et parfois même le nom des navires et des négociants.

Il existe cependant un problème, car les fragments du navire, étonnamment, témoignent de peu de traces d'usure. Si le «Bateau de Bergen» avait bien été mis en service de sa construction en 1188 jusqu'à l'incendie en 1248, on serait en mesure de relever des traces de dégradation plus accentuées. Une explication à ceci est que le navire avait peut-être été déjà endommagé au cours d'un incendie précédent en 1198 et démolé. Ses éléments auraient pu être stockés pour un usage ultérieur ou bien même avoir été utilisés par deux fois. La rangée de maisons à Bergen, où les morceaux ont été trouvés, pourrait avoir été possession royale.

Lorsque le navire fut construit, les marchands allemands commerçaient avec Bergen, mais ils ne jouaient pas encore le rôle prépondérant que tenait la Hanse dans le commerce d'importation et d'exportation avec la Norvège, au cours de la fin du Moyen Âge. Le «Grand Bateau» de Bergen est un témoignage important sur les grands navires de commerce construits dans la tradition nordique et une preuve de la taille qu'atteignaient déjà les embarcations destinées au commerce aux environs de 1200.