

RESEARCH ARTICLE

## Between Sutton Hoo and Oseberg – dendrochronology and the origins of the ship burial tradition

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### ABSTRACT

New dendrochronological dates from Western Norway prompt an old question to be posed in a new way. They show that two ship burials on the island of Karmøy date from AD 780 and 790, that is, the very beginning of the Viking Age, and are therefore the very earliest known ship graves – with one exception: Sutton Hoo. So where did the ship burial tradition originate?

Sutton Hoo's early seventh century ship burials, in large, ocean-going vessels, are often compared with the boat graves of Vendel, Valgärde and other sites in the Lake Mälaren region of Sweden, while Oseberg and the other ship burials in the Oslofjord area have traditionally been interpreted as the precursors of, and models for, the Karmøy ship graves. In this paper, we aim to demonstrate that the use of ships and boats in burials was common practise around the North Sea and in the Western Baltic during the Late Migration period and was introduced to Eastern England with the same 'wave' of cultural influences that took new forms of brooches and a new dress code from Western Norway to Anglia in the late fifth century AD. And, furthermore, that the East Anglian ship graves of the early seventh century (Sutton Hoo 1 and 2) represent an elaboration of this common practice, related to political centralisation and Christianisation in the Anglo-Saxon kingdoms. We also suggest that this high-status, indeed royal, form of burial, that is, actual ship graves as opposed to the much more widespread practice of burial in relative small boats, was introduced to Scandinavia from Eastern England via Western Norway in the eighth century, culminating in the well-known Viking Age ship graves at Oseberg, Gokstad, Tune and Ladby.

### ARTICLE HISTORY

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The beloved leader laid they down there,  
Giver of rings, on the breast of the vessel,  
The famed by the mainmast. A many of jewels,  
Of fretted embossings, from far-lands brought over,  
Was placed near at hand then; and heard I not ever  
That a folk ever furnished a float more superbly  
With weapons of warfare, weeds for the battle,  
Bills and burnies; on his bosom sparkled  
Many a jewel that with him must travel  
(Beowulf 1892, I, 35-43).

In 1905, when archaeologist Haakon Schetelig – later known as Shetelig – told members of the Viking Club in London, and readers of the club's annual Saga-Book, of the archaeological discoveries made in Norway in the preceding year, he naturally concentrated on the excavation of the Oseberg ship. Only one other discovery is mentioned in his report: the stern of a ship found at Sunnanå in Rogaland, Western Norway. Schetelig considered the latter to

be 'a useful supplement to our knowledge about the ships of the Viking Age' (Schetelig 1906a, p. 66, 1906b). In the following, we argue that these two finds might actually be more closely related than Schetelig imagined.

### Dating the Viking ships of the Oslofjord area

In terms of the later part of the Iron Age in Scandinavia – the Viking period – dendrochronology has made it possible to make direct comparisons between written and archaeological sources, something which is impossible with 'traditional' dating methods, including other scientific techniques such as radiocarbon dating (Roesdahl 1994).

Dendrochronological research has proved crucial to Danish archaeological research into the later Iron Age – the Viking period – enabling important Viking Age sites to be placed in an historical context. For example, the dating of Trelleborg on Zealand to

AD 981 ended many years of sometimes very lively discussions (Bonde & Christensen 1984). Trelleborg belongs to the well-known group of Danish ring fortresses, which also includes Fyrkat and Aggersborg. Together with the dating of the earth-work complex Haithabu/Hedeby (Eckstein and Schietzel 1977), Dannevirke (Andersen 1995), the Kanhave ‘canal’ (Nørgård Jørgensen 1995), the royal site of Jelling (K. Christensen and Krogh 1987, Dingsø Jessen *et al.* 2014), the bridge at Raving Enge (K. Christensen 2003) and the Mammen grave (Andersen 1991), this has given a much better understanding of the Viking period, because systematic tree-ring dating offers an increasing number of fixed reference points for the history of the Viking Age (Axboe 1995).

Towards the end of the 1980s, the National Museum of Denmark began work on a Norwegian master chronology for oak (*Quercus* sp.) by sampling living oak trees along the coastal regions of Southern Norway. Tree-ring measurements from more than 300 trees showed that tree-ring curves for oak trees in Southern Scandinavia have similarities, making it possible to cross-date a curve based on data from trees growing in Southern Norway with the long-established oak master chronologies for Denmark and Southern Sweden (K. Christensen 1993). The results indicated, furthermore, that the produced data, comprising more or less the entire natural habitat for oak in Norway, falls into two large groups located, respectively, to the east, and to the north and west of Cape Lindesnes (Christensen and Havemann 1994). With a few gaps, the oak chronology for Denmark covers the entire period from the present back to the Neolithic (K. Christensen 2004, 2007), while two oak chronologies from Sweden extend back to the sixth century AD (Bråthen 1982, Thomas S. Bartholin *pers. comm.*).

When attempting to date the East Norwegian ship graves of Oseberg, Gokstad and Tune (Bonde and Christensen 1993, Bonde 1997a), the above situation meant that a well-replicated curve based on timbers from these three sites could be dated with the aid of the master chronologies from Denmark and Sweden (Figure 1). Samples were taken from the three timbered burial chambers, partly because it was assumed that the ships themselves might have already been old at the time of burial, and partly because the timbers used in the chambers – unlike those of the ships – were



**Figure 1.** The Oseberg ship under excavation in 1904. Photo: Museum of Cultural History, Oslo.

probably of local origin. Based on the chamber timbers alone (18 samples), a regional chronology covering the period AD 537–891 was established. This chronology cross-dated with the oak master chronologies for Denmark and Sweden and could therefore be dated absolutely. The chronology was then used in dating the three ships. The curves from the Tune and Gokstad ships cross-dated with the regional chronology, thereby proving that these two ships were built using timbers from the same general area as those used for the burial chambers (Bonde *et al.* 1997, Bonde 2005).

The curves from the Oseberg ship were, however, different. Although the chronology based on samples from the ship itself cross-dated with the Southern Scandinavian master chronologies and with the regional curve, the provenance (dendroprovenance) of the timbers could not be determined on this basis. This prompts the conclusion that the Oseberg ship was, in all probability, not built from timbers felled in the Oslofjord area – and probably not even in Eastern Norway.

### Ship graves in Western Norway

Apart from the three famous Viking Age ship graves in Eastern Norway, there are two similar, but much

less known, ship graves on the country's west coast, Storhaug and Grønhaug. These were found 1.5 km apart on the island of Karmøy in Rogaland and both were excavated more than a century ago. Even though the finds attracted some initial attention (Lorange 1887, Schetelig 1902), they were soon to be eclipsed by the magnificent Oseberg ship burial, the find which surpasses all else in Scandinavian archaeology.

The northern part of Karmøy, centred on Avaldsnes, is one of Norway's richest archaeological areas, containing monuments, sites and finds of international importance that relate to most periods from the Early Bronze Age to the Middle Ages. These include the large Bronze Age barrows in Reheia and the Late Roman period chieftain's grave at Flagghaug, as well as the ship graves at Storhaug and Grønhaug (Reiersen 2009, Opedal 1998, 2005, Nordenborg Myhre 2004, Stylegar *et al.* 2011). The sheer size of some of the monuments in this area is impressive. The barrow covering the Storhaug burial was originally at least 40 m in diameter and 5–6-m high, and both the nearby Salhusaugen and Flagghaug were of similar size. The monuments and finds in and around Avaldsnes most probably relate to an early, regional centre of power, perhaps even a monarchy (Bjørkvik 1999, Opedal 2005); a royal manor was situated there in the Early Medieval period.

The excavation of Storhaug in 1887 revealed that the barrow contained the remains of a large oak-built ship with a keel length of c. 22 m (Figure 2). The ship had been placed in a shallow natural depression and it was supported by large boulders. The remains of a small

boat, also of oak, and other parts of the ship's equipment were found nearby. The deceased, a man, judging from the furnishings, had been placed in a wooden chamber. Several objects were found with him, including two swords, two spears, a round quiver containing two dozen arrows, an entire set of blacksmith's tools, a hand-quern of coarse-grained granite, a small box containing a bronze ring and a large bird's feather, fire flint and steel, a large iron pot, two splendid sets of gaming pieces, one of glass, the other of amber, a wax disk, a gold arm ring and beads of glass and glass mosaic (Opedal 1998). As for the ship, it was classified as a rowing vessel as no traces of a mast were found. Storhaug is probably the only large Scandinavian ship grave not to have been plundered in antiquity.

Grønhaug was excavated in 1902. Inside the large barrow there was a kernel heap of stone and within this a depression holding a c. 15-m long burial ship made of oak (Schetelig 1902). Extensive remains of feather beds were found together with various textiles, including small pieces of silk fabric woven with figures, the colours of which were still fairly bright. Here too, the deceased – a man – was laid on a bed, clad in costly fabrics. With him were the remains of a glass beaker, various wooden vessels and again pieces of wax, indicating grave furniture of the same kind as that seen in the other great ship burials. There was also a burial chamber. As in the case of Storhaug, the Grønhaug ship was most probably only propelled by rowing.

It is difficult to date the Karmøy ship graves solely on the basis of the artefacts. Schetelig, referring to the much later kings' sagas from the twelfth and thirteenth

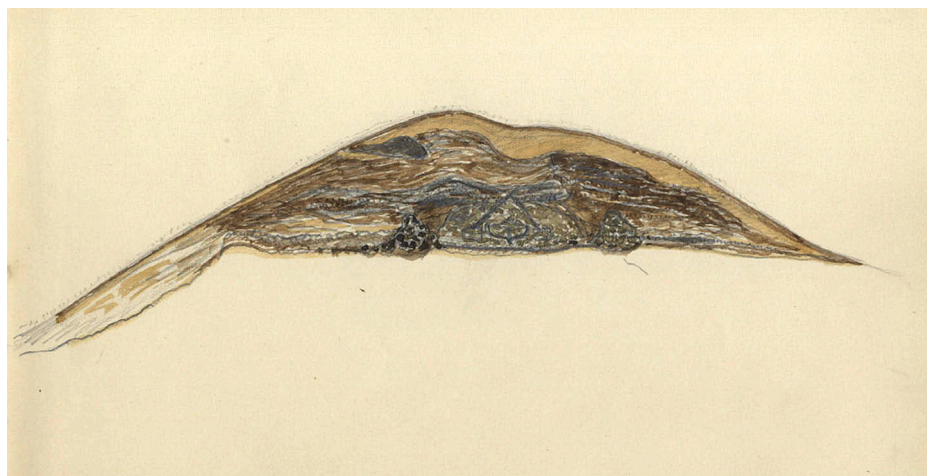


Figure 2. Storhaug, cross section. Water colour drawing by A. Lorange. Photo: University Museum, Bergen.



centuries, thought it obvious that they were later than Oseberg and the other ship graves in Eastern Norway (Shetelig 1917a, p. 226). In fact, the Karmøy ship graves could potentially date from any time between c. AD 700 and c. 900, and since their excavation they have variously been placed at either end of this time span (for more on their research history, see Bonde and Stylegar 2009). Consequently, the Storhaug and Grønhaug burials were obvious candidates for dendrochronological investigation in the 1990s, but initial attempts were unsuccessful due to a lack of comparative material, that is, an oak master chronology from Western Norway.

### The Oseberg connection

The dendrochronological study was carried out, even though no oak master chronology exists for Western Norway. The aim was to test the possibility of dating the Karmøy finds using the curve for Oslofjord and/or the basic Danish and Swedish chronologies.

The finds from Karmøy are kept at Bergen Museum and samples for dendrochronology – all of oak – were taken from all suitable material from both sites. In all, 24 samples were taken from the Storhaug material: 12 from the ship (all board planks), 7 from the small boat (board planks), 1 from a presumed keel and 5 from stray finds. Seven samples were taken from the Grønhaug ship. All the samples were taken as cross sections.

All the tree-ring curves from Storhaug and Grønhaug were compared with the Oslofjord curve and a local chronology for the Kaupang site (Bonde 2007) as well as with all the oak reference curves for Southern Scandinavia, that is, all relevant master chronologies and site chronologies. There was no match, but this was not surprising. Dendrochronological studies of samples from the Oseberg ship had similarly shown that the tree-ring curves did not match with either the Oslofjord or the Kaupang curve.

The idea then arose of comparing the tree-ring curves from Storhaug and Grønhaug with that from the Oseberg ship. Perhaps the three ships used in the burials had been built of timber that had grown under the same conditions and the tree-ring curves would cross-date. This would indicate that all three had been built in the same area, that is, they would have the same dendroprovenance (Bonde *et al.* 1997, Bonde 1997b).

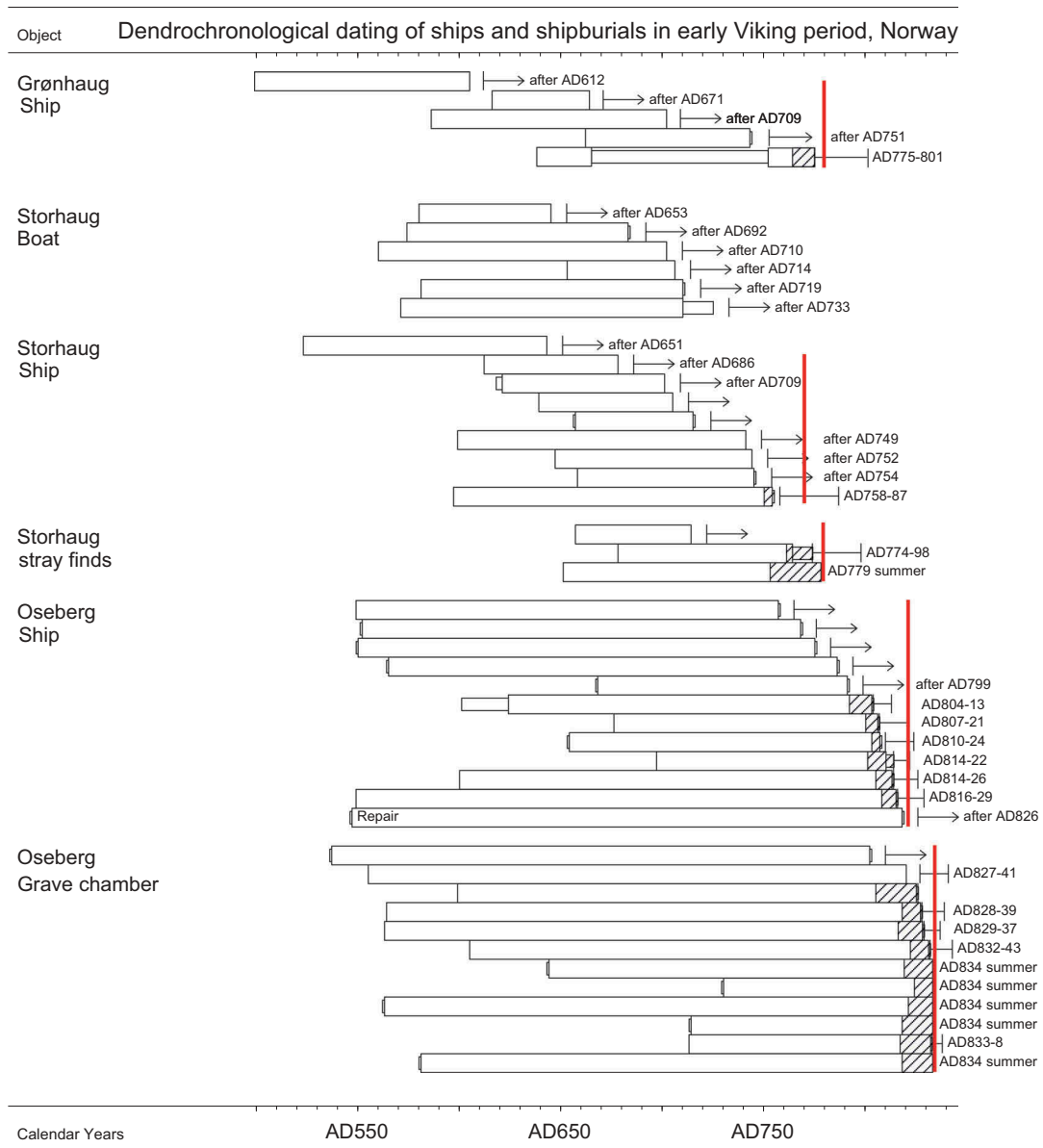
As it turned out, the curves from the Storhaug and Grønhaug ships gave an excellent cross-match with that from the Oseberg ship, meaning that 18 of the samples from Storhaug could be dated: 9 from the ship, 6 from the boat and 3 from stray finds. Four of the samples have sapwood preserved – two from the ship and two from the stray finds. Moreover, one of the latter even had an intact waney edge; that is, the last tree-ring formed by a tree (Kaennel and Schweingruber 1995: 380). The presence of sapwood made it possible to determine the felling date for the trees from which the samples came to within a narrow time frame. For the sample with the waney edge, it was even possible to determine the time of year (the season) the tree was felled.

The felling date can be estimated by adding the number of missing tree rings, due to rot or trimming of the timber, to the latest preserved tree ring in the sample. Surveys based on empirical studies of the number of sapwood rings in oak trees exist from several regions in Europe. The present study uses data from a Norwegian survey based on samples from living oak trees (Christensen and Havemann 1998). It shows that oak trees growing in Southern and Western Norway, on reaching the age of 100–200 years, can be expected to have between 8 and 37 sapwood rings, with an average of c. 18. After correction for the missing rings in the sample with intact sapwood from the Storhaug ship, it can be concluded that the tree was felled during the period AD 758–87, probably around AD 770; this also indicates the building date for the ship (Figure 3 + Tables 1 and 2).

None of the six dated samples from the small boat in Storhaug had sapwood preserved. It is therefore only possible to give a *terminus post quem* date for the felling of the trees used in building the boat, that is, after AD 733; this also indicates the construction date for the boat.

Five samples were taken from the stray finds in the Storhaug burial. With one exception, their function could not be determined but it seems likely they were connected with the construction of the burial mound. Three samples were dated, of which two had sapwood preserved and one of these had an intact waney edge. The felling date for the tree from which the latter came can therefore be determined as summer AD 779 (Bonde and Stylegar 2009, Figures 13 and 14).

In the case of the Grønhaug ship, very little of the vessel was preserved and the seven samples taken were of poor quality. Nevertheless, it was possible to



**Figure 3.** Bar diagram which shows the position of the dendro-dated samples from the three sites discussed in this article against the time scale. The length of the rectangles shows how many tree rings are preserved in each board. In total 46 samples dated of which 20 have sapwood preserved (hatched signature) and 6 with wany edge. The red lines indicate the interpretation for time of felling of the trees and building of the ships and the burials. Grønhaug ship: c. AD 780. Storhaug ship: c. AD 770. Storhaug burial: AD 779 summer. Oseberg ship: c. AD 820. Oseberg burial: AD 834 summer.

date five of them, primarily because the curves cross-date with those from Storhaug. One sample has a remnant of sapwood preserved with 11 tree rings, with the outermost tree-ring being formed in AD 775. Taking into account the missing tree-rings, it can be estimated that the tree from which the sample originated was felled in the period AD 775–801, probably around AD 780; this also indicates the construction date for the Grønhaug ship.

The dendrochronological study shows that burial mound at Storhaug was probably constructed in the

summer of AD 779, whereas the ship within the mound was built in c. AD 770 and was barely 10 years old when used for the burial, together with a small boat of the same age. As for the Grønhaug mound, the ship used for the grave was built around AD 780. Taking in to account the date of the Storhaug ship and the dendrochronologically dated ships in the graves at Oseberg, Gokstad and Tune, we can estimate the date of the burial, it is clear that these were all 10–15 year old vessels when used, not old and redundant. They were probably

**Table 1.** Triangular cross-dating matrix for *t*-values. *t*-value is a measure of similarity between two tree-ring series which show how well the series cross-date.

Curves	–	–	Grønhaug ship	Storhaug ship	Storhaug boat	Storhaug stray finds
–	start	dates	AD 586	AD 523	AD 560	AD 657
–	dates	end	AD 702	AD 754	AD 702	AD 715
Grønhaug ship	AD 586	AD 702	*	5.10	4.98	0.71
Storhaug ship	AD 523	AD 754	*	*	5.85	5.55
Storhaug boat	AD 560	AD 702	*	*	*	2.02
Storhaug stray finds	AD 657	AD 715	*	*	*	*

Values equal to or greater than 3.5 are regarded as significant indicators of a likely match. The higher, the better. For *t*-values, see Baillie and Pilcher (1973) and Baillie (1982, p. 80–85).

**Table 2.** Rectangular cross-dating matrix for *t*-values. *t*-value is a measure of similarity between two tree-ring series which show how well the series cross-date.

Site/object chronos	–	–	Grønhaug ship	Storhaug ship	Storhaug boat	Storhaug stray finds	Grønhaug + Storhaug	Oseberg grave
–	start	dates	AD 586	AD 523	AD 560	AD 657	AD 499	AD 537
–	dates	end	AD 702	AD 754	AD 702	AD 715	AD 778	AD 833
Oseberg ship	AD 549	AD 813	4.16	8.41	5.65	6.17	8.75	3.10

Values equal to or greater than 3.5 are regarded as significant indicators of a likely match. The higher, the better. For *t*-values, see Baillie and Pilcher (1973) and Baillie (1982, p. 80–85).

fully operational up to the time they were used in the burials (Bonde 1997b). It is therefore reasonable to date the Grønhaug burial to AD 790–5.

### Narrowing down the location of the shipbuilding site

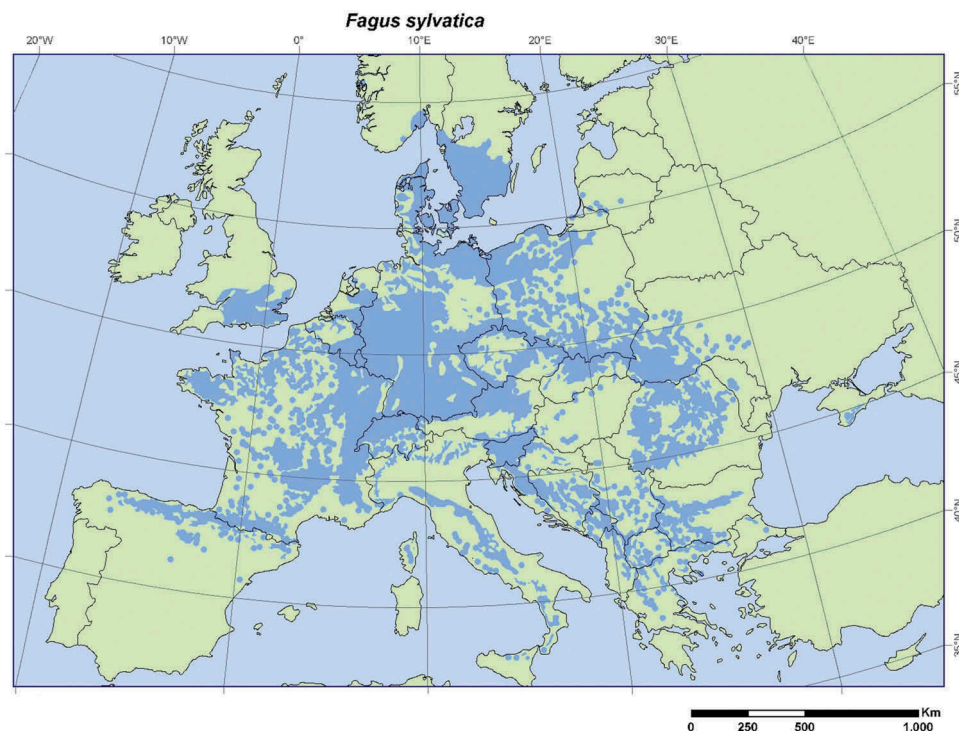
On the Oseberg ship, which was otherwise built of oak, use was surprisingly also made of beech (*Fagus sylvatica*). Part of the beautifully carved gunwale, at both stem and stern, is made of this species. These pieces do not constitute repairs but form an integrated part of the ship's ornamentation. The technical term for this in traditional Nordic shipbuilding is *brandara* (Shetelig 1917b, p. 330–1).

An overview of the natural distribution of beech in Europe shows that the northernmost beech woodlands are found in Norway and that the distribution pattern there is quite exceptional: Old beech woods are found exclusively in two places: on the Skagerak coast with a main concentration in the southern part of Vestfold and on Vollom at Lurefjord in Lindås/Seim, Hordaland (Hultén 1971) Figure 4. The latter – the world's northernmost ancient beech wood – has attracted the attention of scholars for almost two centuries. The beech woodland on Vollom lies so distant from the other occurrences that it seems very likely to have had a cultural origin, that is, the beechnuts were taken there by people. Pollen studies at Lurefjord show that the beech wood must have been established in the Viking Age, at roughly the

same time as those in Vestfold (Fægri 1954). New research has yielded further information on the Norwegian beech populations and indicates, on the basis of genetic studies, that beech very probably came to Norway from Denmark via trading links during the Iron Age (fifth–sixth centuries AD) (Myking *et al.* 2011).

As already mentioned above, the oak trees that produced the timbers for the Oseberg ship did not grow in the vicinity of where the vessel was found in Vestfold, but somewhere in Western Norway. Beech wood has also been used in shipbuilding in the Oslo area. The Klåstad ship found at Sandefjord has top frames made of beech (Christensen and Leiro 1976; A.E. Christensen *pers. comm.*), and the timber involved very probably originated from the beech woods in Vestfold. This cannot, however, be the case for the beech timber in the Oseberg ship, unless it was repaired between its construction in *c.* AD 820 and when it was placed in the burial mound in AD 834, and there is nothing to suggest this was the case. There is a very real possibility that the beech timber in the Oseberg ship originated from trees that grew in the only beech wood in Western Norway, that at Lindås/Seim, north of Bergen. This conclusion contributes to narrowing down the place of construction for the Oseberg ship.

Another category of archaeological find can assist us in localising the construction site even more closely, as shown by a detailed study of the distribution of a type of archaeological find primarily associated



**Figure 4.** Map showing the natural distribution of Beech (*Fagus sylvatica*) EUFORGEN (2009).

with the west coast of Norway, that is, wooden blanks – or rough-outs – employed in ship and boatbuilding. The find sites for these are, without exception, associated with water or wetlands. The ship's stem from Sunnanå, mentioned by Schetelig in his 1906 report, belongs to this category of find (Figure 5). Oak blanks for keels, stems and frames were kept wet so they were easier to work when needed. This appears to have been standard practice in traditional wooden boatbuilding in Western Norway (Brøgger and Shetelig 1951, p. 66), but is also a phenomenon which is normally associated with the Iron Age's so-called wet wood technology (Vadstrup 1994). The dated finds belong to the Iron Age and the Viking period and most of the records come from the Norwegian west coast. There is a marked tendency towards concentrations of these finds in places that were important centres for the building of wooden boats in recent times. This is true, for example, for of two Viking Age ship's stems found at Sunnanå in Northern Rogaland which, both typologically and in terms of size, have been compared with the Gokstad ship. Similar finds are recorded from coastal districts in Central Norway, but here conifer wood was almost exclusively used. However, the finds here are also linked to the boatbuilding districts of later times



**Figure 5.** Oak stem from Sunnanå, Rogaland. Photo: Museum of Archaeology, Stavanger.



(Sylvester 2009). Finds of ship components of oak display clear concentrations around the fjords in the southern and central parts of Western Norway, that is, in Rogaland and Hordaland (Figure 6). It seems therefore reasonable to conclude that the construction site for the Oseberg ship is to be found in one of those places. To date, a shipbuilding site has only been discovered in association with blanks at one locality: at Mangersnes in Hordaland. This seems to have been active from around the birth of Christ and at least up until the eighth century (A.E. Christensen 1995). Larger boats/ships were also built there. With respect to the present article, it is obviously relevant that the

locality lies only 5–6 km from the beech wood at Vollom.

This study suggests that the construction site for the Oseberg ship and the two vessels from Karmøy can be narrowed down to the district of Hordaland, and presumably to the area just north of Bergen.

### Origins of the ship burial tradition

The dates for the burials at Karmøy also mean that Shetelig's old idea about the practice of ship burial being 'transplanted' from the Oslofjord area to

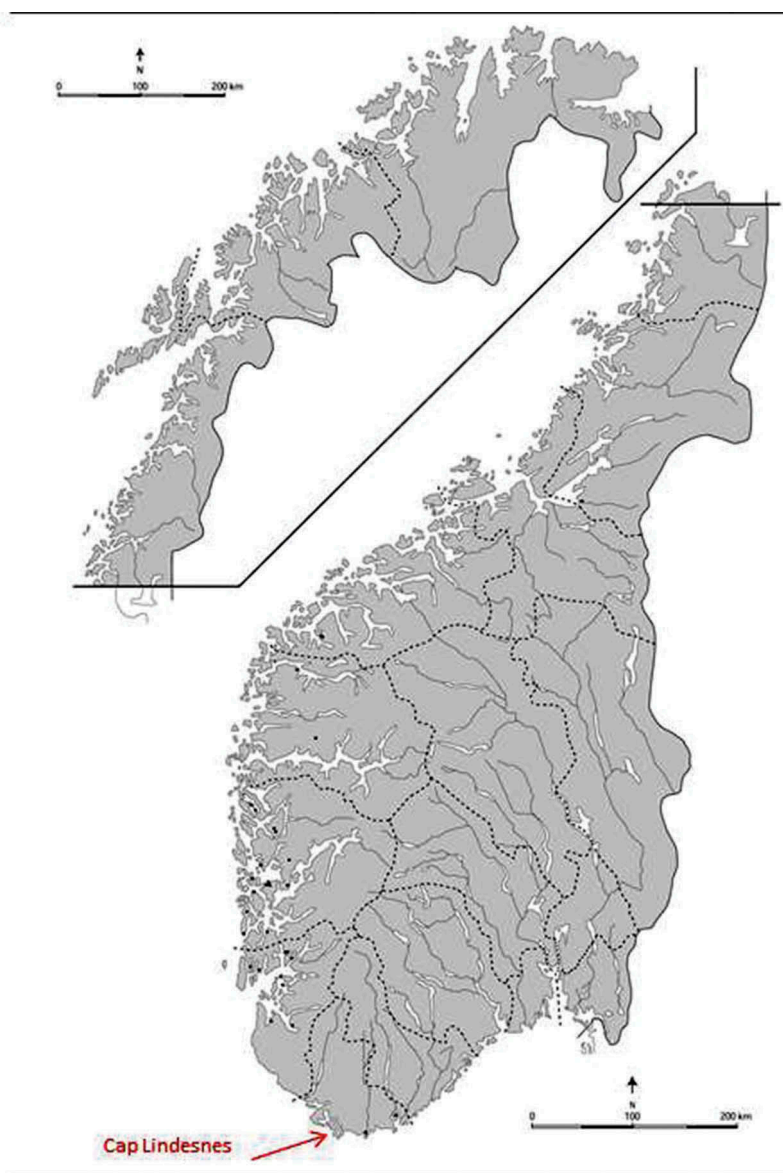


Figure 6. Finds of oak ship components in Norway. Map: Authors.



Karmøy (from the east to the west of Norway) is no longer tenable since Storhaug and Grønhaug are now the oldest known ship graves in Scandinavia. The Oseberg burial differs from the other ship burials in the sense that the ship was built in a completely different region from where the burial took place. Since the Viking Age ship graves represent burials at a very high social level, it is likely that the Oseberg burial was a direct result of inter-dynastic relations between Western Norway and the Oslofjord area in the early Viking Age. But the new, early dates for the ship burials in Western Norway also make it relevant to delve into the background for this particular practice. Where did the idea of burying a deceased in his or her ship originate and what was its significance?

On a general level, the boat graves of the Iron Age provide us with a background for the practice. In Scandinavian archaeology, however, it is usual to make a distinction between boat graves and ship graves. Following a time-honoured tradition, extending back to Norse times, vessels with up to six pairs of oars, the so-called *tolværing*, are considered boats, while 'a ship is a large seagoing vessel, superior in size, complexity and status to those contemporary vessels which were referred to as boats' (Hutchinson 1994, p. 189. See also, Marsden 1996, p. 224).

Boat graves were a common feature of the areas bordering the North Sea and Baltic at least from the Late Roman period to Viking Age. The greatest numbers of boat graves have been discovered in Norway and Sweden, where the majority date from the Viking Age (Müller-Wille 1974, 1995). Apart from the basic use of a boat for burial, these graves are very diverse. Some are richly furnished, others are not; some are cremations, others inhumations; some are female, others male etc. (Müller-Wille 1974). The earliest known Iron Age boat graves are those at Slusegård on Bornholm (Crumlin-Pedersen 1995), with the Valderøy boat in Western Norway only slightly later (Myhre 1980). The Slusegård vessels were expanded log boats, of a type also seen in later boat graves in England (Snape), Sweden and Norway (Filmer-Sankey 1992, Filmer-Sankey and Pestell 1995, Gjerpe 2005, Larsson 2007). However, apart from the Slusegård and Valderøy graves, the oldest boat graves seem to be from the fifth and sixth centuries. They are few in number, but this Migration period boat graves have a relatively

pronounced *western* distribution in Scandinavia. In addition, Carver (1990, 1995) mentions a number of possible early finds in England, all of them confined to the east coast. As pointed out by Næss (1969), the idea of a Swedish point of distribution for the boat-burial tradition does not fit with the archaeological evidence, since the earliest boat graves in Vendel, and other sites in Eastern Sweden, are later than the West Norwegian examples, and perhaps also than those in England (see also Ljungkvist 2005 for a more recent discussion of the chronology of the rich Eastern Swedish finds).

Given this distribution pattern for the early boat graves, it must be concluded that the use of boats in burials was a common practice across the North Sea and the Western Baltic during the Late Migration period (Figure 7). As Carver writes, from an English point of view, 'boat burial is a signal of ideology' that is coming from, or shared with, contemporary peoples to the north-east across the North Sea' (1990, p. 119). In the Late Migration period, England and Scandinavia share several common artefact types, for instance bracteates, relief- and equal-armed brooches, as well as stylistic details such as those seen on some cruciform brooches and ceramic vessels and the use of tablet-woven braids and ornaments in Style I and Style II. However, since no early boat graves have been recorded in Denmark and they have a relatively pronounced western distribution, it seems likely that the introduction of this practice followed a more northerly route. All things considered, we suggest that boat burial was introduced to Eastern England as part of the particular 'wave' of cultural influences which transferred wrist clasps and a new *tracht* from Western Norway to England in the late fifth century, and which might have involved settlers moving from Southwest Norway to East Anglia and Humberside (Hines 1984, 1992, 1993).

However, both Karmøy graves differ from all of these early boat graves, first and foremost because the Karmøy graves involved the use of proper, ocean-going ships. But also because of other characteristics, that is, the use of a timbered burial chamber placed inside the ship and burial beneath a large earthen barrow. Ship graves like those at Storhaug and Grønhaug were a rare and exclusive form of burial in the late Iron Age, but there are close parallels elsewhere in Scandinavia: the graves at Oseberg



Figure 7. Early boat graves in North Europe. Map: Authors.

(AD 834), Gokstad (AD 900–5) and Tune (AD 910–20) in the Oslofjord area, as well as Ladby on Funen (c. AD 900) (Sørensen 2001). There is also the ‘Bootkammergrabe’ (boat-chamber grave) at Haithabu (c. AD 850) (Wamers 1994), in addition to the three cremations at Myklebost in Western Norway, Borre in the Oslofjord area (c. AD 900) (Myhre 1992) and Ile de Groix in Brittany (c. AD 950) (Müller-Wille 1978), which all show affinities to the Karmøy graves. Similarly, the Swedish boat graves do not match up; while these were also inhumations, they do not have chambers, and they either lie under a flat surface or are only covered by a low mound. The recent finds from Salme on Saaremaa in Estonia are still awaiting publication; however, these burials from around AD 750, while extraordinary in many respects, do seem to line up more with the boat graves of Eastern Sweden (Allmäe *et al.* 2011, Peets 2013). Ship burial with a chamber and beneath a large barrow is clearly a western phenomenon; one which was, first and foremost, associated with the

North Sea. This conclusion is supported by the fact that the two oldest proper ship graves in the archaeological record both lie in England – Snape and Sutton Hoo.

### An Anglo-Saxon background?

Snape, as far as its record extends, and Sutton Hoo (mound 1) are definitely comparable with the later Scandinavian ship graves. In the case of Sutton Hoo, we recognise not only the ship (a rowing ship, like in the Karmøy graves), but also the burial chamber onboard and the large barrow built over it. The similarities seem obvious but attention is drawn instead to the more or less contemporary boat graves at Vendel and Valsgärde in Sweden, something which extends back to the very beginning of Sutton Hoo research. In Scandinavia, a Swedish connection was suggested by Shetelig as early as 1940, based on similarities between some of the objects in Sutton Hoo and finds from Vendel and Old Uppsala.

Nerman took the argument one step further when he argued that Sutton Hoo 1 was in fact the burial mound of a Swedish king (Shetelig 1940, Nerman 1948).

It is not our intention here to deny the close links between some of the artefacts from Sutton Hoo and finds from Eastern Sweden, far from it, even if some of the similarity may be due to these artefacts being produced in the same workshops in the Frankish empire, and not in either Sweden or Anglo-Saxon England (cf. Arrhenius 1985). Many of the similarities are genuine (Lamm and Nordström 1983), but these similarities do not extend to the burial practice itself, even though this is often assumed. These differences aside, the Vendel period boat graves in Eastern Sweden are rarely interpreted as belonging to the uppermost social strata ('kings'), but rather to a militarised aristocracy. Discussing the Vendel period (c. AD 550–750) high-status burials in Eastern Sweden, Ljungkvist (2005, p. 256) writes that 'the burials with the most status-laden artefacts ... are in fact not the boat graves. The most exclusive finds in the Early Vendel period are from the Uppsala högar', that is, from cremations graves beneath large barrows. Sutton Hoo, on the other hand, was almost certainly associated with the royal dynasty of East Anglia (Carver 1998). This attribution to (petty) kings is also true for the later ship graves, including the ones on Karmøy (Bonde and Stylegar 2009).

Two questions then spring to mind: What did ship burial 'represent' in an early seventh century Anglo-Saxon context and what, if anything, links this practice with the later ship graves in (western) Scandinavia? Carver has argued that the Kingdom of East Anglia was an innovation of the late sixth century and that it was formed within an ideology that was not yet Christian, but pagan with strong Scandinavian affinities (1990, p. 119). As the situation now stands, it seems reasonable to suggest that elements of the boat-burial practice, as it existed on both sides of the North Sea, became transformed during this process, leading to the advent of ship burial as a particularly elaborate and exclusive practice fit for 'kings'. Furthermore, we suggest that, once in existence, ship burial was able to 'travel' to Scandinavia via the same kind of networks that, in the previous period, had distributed boat burial as a funerary practice.

From about AD 500, a number of chiefdoms existed along the coast of Norway, and through mutual rivalry and competition these polities gradually developed into more permanent, supraregional lordships (Myhre 1992, Sawyer 1993). In the eighth century, three central areas stand out – one of them being Karmøy, which most probably constituted the centre of an emerging kingdom encompassing most of the west coast (Myhre 1993). In this process, families claiming royal status could utilise an already existing 'template' derived from the Anglo-Saxon kingdoms, and this eventually also led to Christianisation, via English missionaries. In the eighth century, if not before, ship burial was part of the same 'package'.

As for the second question, even if both the relative and absolute chronologies of the ship graves are now revised, the gap in time between the latest Anglo-Saxon grave (Sutton Hoo) and the oldest Scandinavian example (Grønhaug) is still considerable: about 150 years. This is more than twice the interval between the oldest ship grave in Eastern Norway (Oseberg) and the second oldest (Gokstad). But the exclusivity of ship burial in the late Iron Age means that just one further discovery of this kind could bridge this gap considerably. Of greater importance is the question of whether there actually *were* cultural contacts with the higher echelons of society across the North Sea during the seventh and eighth centuries? As Myhre points out, 'the Scandinavian upper social strata ... were not isolated from the rest of Northern Europe during the Merovingian period, but shared cultural ideas and values with other Germanic kingdoms' (1998, p. 26). With regard to Anglo-Saxon – Scandinavian relations in general after the Sutton Hoo horizon and before the first attested Viking raids just before AD 800, the evidence is scarce and mostly indirect. Perhaps the most important indication of continued contacts is the English influence seen on Scandinavian Style II (Ørsnes 1966). On the other hand, there is little direct evidence; for example, there are no records of early English *sceattas* from Scandinavian contexts. Even if some insular ecclesiastical objects had reached Norway by the eighth century (Myhre 1998, p. 27), the bulk of insular imports to Scandinavia began in the Viking Age with, interestingly, Western Norway as the initial main recipient (Wamers 1985, 1998, Bruce-Mitford



2005). The Oseberg ship burial for instance contains its fair share of imports from England – Ireland, including the famous ‘Buddha’ bucket with its anthropomorphic escutcheons in squatting posture (Figure 8), and two decorative mounts, probably from a belt or a horse bridle (Figure 9), which are so similar to a mount found in Markyate, Hertfordshire, that they may actually originate from the same workshop (Grieg 1928, p. 72ff and 239; Bruce-Mitford 1964).



**Figure 8.** The ‘Buddha bucket’ from the Oseberg grave. Photo: Museum of Cultural History, Oslo/Eirik Irgens Johnsen.



**Figure 9.** Mounts from Oseberg. Photo: Museum of Cultural History, Oslo.

But there are also some important indications of continued elite contacts between Eastern England and Western Norway in particular during the previous period (Bakka 1971). Beginning with the Grønhaug ship grave, there is a distinct possibility that a sherd from a glass vessel found in the ship comes from an Anglo-Saxon pouch bottle, as suggested by Schetelig (1912, p. 223; cf., 2001). With this one possible exception, all the known specimens of this type are from Eastern England (Evison 2008, p. 7). We are on safer ground, however, with two definite and two less certain dark blue squat jars from burial contexts in Western Norway (Holand 2001, cf. Näsman 1986). These distinctive blue globular beakers, with thick zigzag trails, are exclusive to England, with the exception of those that found their way to Norway (Evison 2008, p. 7). This type is conventionally dated to the late sixth and the seventh century (Figure 10).

The occurrence of these Anglo-Saxon glass vessels in Western Norway suggests that contacts between Eastern England and Western Norway still existed on an elite level when the first ship burials took place in Western Norway in the late eighth century, and that the ship burial ‘idea’ could have arrived on Norway’s west coast via these same elite networks.

Sutton Hoo’s early seventh century ship burials, in large, ocean-going vessels, are often compared with the boat graves of Vendel, Valsgårde and other sites in the Lake Mälaren region of Sweden, while Oseberg and the other ship burials in the Oslofjord area have



**Figure 10.** Globular beaker from Løland, Lindesnes, Vest-Agder. Photo: Museum of Cultural History, Oslo/Ove Holst.



traditionally been interpreted as the precursors of, and models for, the Karmøy ship graves. In light of more recent research it is more likely that the use of ships and boats in burials was common practice around the North Sea and in the Western Baltic during the Late Migration period and was introduced to Eastern England with the same 'wave' of cultural influences that took new forms of brooches and a new dress code from Western Norway to Anglia in the late fifth century AD, and, furthermore, that the Anglian ship graves of the early seventh century represent an elaboration of this common practice, related to political centralisation and Christianisation in the Anglo-Saxon kingdoms. In light of new dendrochronological dates from Avaldsnes in Western Norway, it seems probable that this high-status, indeed royal, form of burial, that is, actual ship graves as opposed to the much more widespread practice of burial in relative small boats, was introduced to Scandinavia from Eastern England via Western Norway in the eighth century, culminating in the well-known Viking Age ship graves at Oseberg, Gokstad, Tune and Ladby.

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## References

- Allmäe, R., Maldre, L., and Tomek, T., 2011. The Salme I ship burial: an osteological view of a unique burial in Northern Europe. *Interdisciplinaria Archaeologica*, 2, 109–124.
- Andersen, H.H., 1991. Dendrokronologisk datering af Mammengraven. In: M. Iversen, ed. *Mammen. Grav, kunst og samfund i vikingetid*. Højbjerg: Jysk arkæologisk selskab, 43–44.
- Andersen, H.H., 1995. *Das Danewerk im Früh- und Hochmittelalter*. Flensburg: Flensburg Avis.
- Arrhenius, B., 1985. *Merovingian garnet jewellery – emergence and social implications*. Stockholm: Almqvist & Wiksell.
- Axboe, M., 1995. Danish kings and dendrochronology: archaeological insights into the early history of the Danish state. In: G. Ausenda, ed. *After empire. Towards an ethnology of Europe's barbarians*. Woodbridge: Boydell Press, 217–251.
- Baillie, M.G.L., 1982. *Tree-ring dating and archaeology*. London: Croom Helm.
- Baillie, M.G.L. and Pilcher, J.R., 1973. A simple crossdating program for tree-ring research. *Tree-Ring Bulletin*, 33, 7–14.
- Bakka, E., 1971. Scandinavian trade relations with the continent and the British Isles in pre-viking times. *Early Medieval Studies*, 3, 37–51.
- Beowulf*, 1892. *An Anglo-Saxon epic poem. Translated from the Heyne-Socin text by Leslie Hall*. Boston: D. C. Heath & co.
- Bjørkvik, H., 1999. Avaldsnes i førhistorisk og tidleg historisk tid. In: S.I. Langhelle and B. Lindanger, eds. *Kongskyrkje ved Nordvegen. Olavskyrkja på Avaldsnes 750 år*. Akssdal: Lokalhistorisk stiftelse.
- Bonde, N., 1997a. Dendrochronological dating of the viking age ship burials at Oseberg, Gokstad and Tune, Norway. In: A. Sinclair, E. Slater, and J. Gowlett, eds. *Archaeological Sciences 1995*. Oxford: Oxbow Books, 195–200.
- Bonde, N., 1997b. Dendroprovenancing: count the rings, map the journey. A new branch of tree-ring studies. In: G. De Boe and F. Verhaeghe, eds. *Travel technology & organisation in medieval Europe. Papers of the 'Medieval Europe Brugge 1997' conference*. Zellik: Instituut voor het archeologisch patrimonium, Vol. 8, 53–55.
- Bonde, N., 2005. Træ som arkæologisk kilde – nye muligheder. In: C. Bunte, B. Berglund, and L. Larsson, eds. *Arkeologi och naturvetenskap*. Nyhamnsläge: Gyllenstiernska Krapperupstiftelsen, 344–352.
- Bonde, N., 2007. Dendrochronological dates from kaupang. In: D. Skre, ed. *Kaupang in skiringssal*. Højbjerg: Jysk arkæologisk selskab, 273–282.
- Bonde, N. and Christensen, A.E., 1993. Dendrochronological dating of the viking age ship burials at Oseberg, Gokstad and Tune, Norway. *Antiquity*, 67, 575–583. doi:10.1017/S0003598X00045774
- Bonde, N. and Christensen, K., 1984. Trelleborgs alder. Dendrokronologisk datering. *Aarbøger for Nordisk Oldkyndighed Og Historie*, 1982, 111–152.
- Bonde, N. and Stylegar, F.-A., 2009. Fra avaldsnes til oseberg. Dendrokronologiske undersøkelser av skipsgravene fra Storhaug og Grønhaug på Karmøy. *Viking*, 72, 149–168.
- Bonde, N., Tyers, I., and Wazny, T., 1997. Where does the timber come from? Dendrochronological evidence of the timber trade in Northern Europe. In: A. Sinclair, E. Slater, and J. Gowlett, eds. *Archaeological sciences 1995*. Oxford: Oxbow Books, 201–204.
- Bråthen, A., 1982. *Dendrokronologisk serie från västra Sverige 831-1975*. Rapport RAÅ 1982:1. Stockholm: Riksantikvarieämbetet och Statens Historiska Museer.

- Brøgger, A.W. and Shetelig, H., 1951. *The viking ships. Their ancestry and evolution*. Oslo: Dreyer.
- Bruce-Mitford, R.L.S., 1964. A Hiberno-Saxon bronze mounting from Markyate, Hertfordshire. *Antiquity*, 38, 219–220. doi:10.1017/S0003598X00105095
- Bruce-Mitford, R.L.S., 2005. *A Corpus of Late Celtic Hanging-Bowls, with an account of the bowls found in scandinavia by Sheila Raven*. Oxford: Oxford University Press.
- Carver, M.O.H., 1990. Pre-viking traffic in the North Sea. In: S. McGrail, ed. *Maritime Celts, Frisians and Saxons*. London: Council for British Archaeology, 117–125.
- Carver, M.O.H., 1995. Boat-burial in Britain: ancient custom or political signal? In: O. Crumlin-Pedersen and B.M. Thye, eds. *The ship as symbol in prehistoric and medieval scandinavia*. Copenhagen: National Museum of Denmark, Department of Archaeology and Early History, 111–124.
- Carver, M.O.H., 1998. *Sutton hoo: burial ground of kings?* London: British Museum Press.
- Christensen, A.E., 1995. Boat fragments from mangersnes. In: O. Olsen, J.S. Madsen, and F. Rieck, eds. *Shipshape. Essays for Ole Crumlin-Pedersen on the occasion of his 60th anniversary February 24th 1995*. Roskilde: Viking Ship Museum, 73–80.
- Christensen, A.E. and Leiro, G., 1976. Klåstadskipet. *Vestfoldminne*, 1976, 2–17.
- Christensen, K., 1993. Can oak chronologies from Northern Jutland and Western Sweden be applied to dendrochronological dating of Norwegian oak timber? In: O. Storsletten and T. Thun, eds. *Dendrochronology and the investigation of buildings*. Oslo: Riksantikvaren, 52–58.
- Christensen, K., 2003. Ravning-broens alder. En af Danmarks sikreste dendrokronologiske dateringer?. *Kuml*, 2003, 213–226.
- Christensen, K., 2004. Den lange kurve. *Danske Museer*, 2004 (5), 31–33.
- Christensen, K., 2007. Forhistorisk dendrokronologi i Danmark. *Kuml* 2007, 217–236.
- Christensen, K. and Havemann, K., 1994. Modern oak chronologies from Norway. *Dendrochronologia*, 10, 137–146.
- Christensen, K. and Havemann, K., 1998. Dendrochronology of oak (*Quercus* sp.) in Norway. In: K. Griffin & Lotte Selsing (eds.) *Dendrokronologi i Norge*. Stavanger: Arkeologisk museum i Stavanger, 59–80.
- Christensen, K. and Krogh, K., 1987. Jelling-højene dateret. *Nationalmuseets Arbejdsmark*, 1987, 223–231.
- Crumlin-Pedersen, O., 1995. Boat-burials at Slusegaard and the Interpretation of the Boatgrave Custom. In: O. Crumlin-Pedersen and B.M. Thye, eds. *The ship as symbol in prehistoric and medieval scandinavia*. Copenhagen: National Museum of Denmark, Department of Archaeology and Early History, 87–99.
- Dengsø Jessen, M., et al., 2014. A palisade fit for a king: ideal architecture in King Harald Bluetooth's jelling. *Norwegian Archaeological Review*, 47, 42–64. doi:10.1080/00293652.2014.921239
- Eckstein, D. and Schietzel, K., 1977. Zur dendrochronologischen Gliederung und Datierung der Baubefunde von Haithabu. In: *Berichte über die Ausgrabungen in Haithabu Bericht 11 Untersuchungen zur Anthropologie, Botanik und Dendrochronologie*. Hrsg. von Kurt Schietzel. Neumünster: Karl Wachholtz Verlag, 141–164.
- EUFORGEN. 2009. *European forest genetic resources programme*. Distribution maps. Available from: <http://www.euforgen.org/distribution-maps/>.
- Evison, V., 2008. *Catalogue of Anglo-Saxon Glass in the British Museum*. London: British Museum.
- Fægri, K., 1954. On age and origin of the beech forest (*Fagus sylvatica* L) at Lyngrefjorden, near Bergen (Norway). *Danm Geol Unders II Rk*, 80, 230–249.
- Filmer-Sankey, W., 1992. Snape Anglo-Saxon cemetery – the current state of knowledge. In: M. Carver, ed. *The age of Sutton Hoo*. Woodbridge: Boydell Press, 39–51.
- Filmer-Sankey, W. and Pestell, T., 1995. The Snape logboats. Excavation, construction and performance. In: O. Olsen, J.S. Madsen, and F. Rieck, eds. *Shipshape. Essays for ole crumlin-pedersen on the occasion of his 60th anniversary February 24th 1995*. Roskilde: Viking Ship Museum, 81–88.
- Gjerpe, L.E., 2005 (ed.) *Gravfeltet på Gulli. E18-prosjektet Vestfold Bind 1*. Varia 60, Oslo: Kulturhistorisk museum.
- Grieg, S., 1928. Kongsgaarden. In: A.W. Brøgger and H. Shetelig, eds. *Osebergfundet*. Oslo: Universitetets oldsaksamling, Vol. II, 250–263.
- Hines, J., 1984. *The Scandinavian character of Anglian England in the pre-Viking period*. Oxford: British Archaeological Reports.
- Hines, J., 1992. The scandinavian character of Anglian England. An update. In: M.H.O. Carver, ed. *The Age of Sutton Hoo. The seventh century in North-West Europe*. Woodbridge: Boydell Press, 315–329.
- Hines, J., 1993. *Clasps-Hektespenner-Agraffen. Anglo-scandinavian clasps of the third to sixth centuries AD. Typology, diffusion and function*. Stockholm: Almqvist & Wiksell.
- Holand, I., 2001. *Sustaining life. Vessel import to Norway in the first millenium AD*. Stavanger: Arkeologisk museum i Stavanger.
- Hultén, E., 1971. *Atlas över växternas utbredning i Norden*. Stockholm: Generalstabens Litografiska Anstalts förlag.
- Hutchinson, G., 1994. *Medieval ships and shipping*. London: Leicester University Press.
- Kaennel, M. and Schweingruber, F.H. (Compilers), 1995. *Multilingual glossary of dendrochronology*. Terms and Definitions in English, German, French, Spanish, Italian, Portuguese and Russian. c, Vienna: Haupt.
- Lamm, J.P. and Nordström, H.-Å., 1983 (eds.). Vendel period studies. In: *Transactions of the boat-grave symposium in Stockholm, 2–3 February 1981*. Stockholm: Museum of National Antiquities.
- Larsson, G., 2007. *Ship and society. Maritime ideology in late iron age Sweden*. Uppsala: Department of Archaeology and Ancient History.
- Ljungkvist, J., 2005. Uppsala högars datering och några konsekvenser av en omdatering till tidiga vendeltiden. *Fornvännen*, 100, 245–259.
- Lorange, A., 1887. Storhaugen paa Karmøen. Nyt Skibsfund fra Vikingetiden. *Bergen Museums Aarbog*, 4, 1–16.

- Marsden, P., 1996. *Ships of the port of London – twelfth to seventeenth centuries AD*. English Heritage: Archaeological Report 5.
- Müller-Wille, M., 1974. Boat-graves in Northern Europe. *International Journal of Nautical Archaeology*, 3 (2), 187–204. doi:10.1111/ijna.1974.3.issue-2
- Müller-Wille, M., 1978. Das Schiffsgrab von der Ile de Groix (Bretagne) – ein Exkurs zum Bootkammergrab von Haithabu. *Berichte Haithabu*, 12, 48–84.
- Müller-Wille, M., 1995. Boat-graves, old and new views. In: O. Crumlin-Pedersen and B.M. Thye, eds. *The ship as symbol in prehistoric and medieval scandinavia*. Copenhagen: National Museum of Denmark, Department of Archaeology and Early History, 101–110.
- Myhre, B., 1980. Ny datering av våre eldste båter. *Arkeo*, 1980, 27–30.
- Myhre, B., 1992. The royal cemetery at Borre, Vestfold: A Norwegian centre in a European periphery. In: M.H.O. Carver, ed. *The age of sutton hoo. The seventh century in North-West Europe*. Woodbridge: Boydell Press, 301–314.
- Myhre, B., 1993. Rogaland forut for Hafrsfjordslaget. In: M.S. Veia, ed. *Rikssamlingen og Harald Hårfagre*. Kopervik: Karmøy kommune, 41–64.
- Myhre, B., 1998. The archaeology of the early viking age in Norway. In: H.B. Clarke, M. Ni Mhaonaigh, and R.Ó. Floinn, eds. *Ireland and scandinavia in the early viking age*. Dublin: Four Courts Press, 3–36.
- Myking, T., Yakovlev, I.A., and Ermland, G.A., 2011. Nuclear genetic markers indicate Danish origin of the Norwegian beech (*Fagus sylvatica* L.) populations established in 500–1,000 AD. *Tree Genetics & Genomes*, 7, 587–596. doi:10.1007/s11295-010-0358-y
- Næss, J.-R., 1969. Grav i båt eller båt i grav. *Stavanger Museum Årbok*, 79, 57–76.
- Näsman, U., 1986. Vendel Period glass from Eketorp-II, Öland, Sweden. *Acta Archaeologica*, 55 (1984), 56–116.
- Nerman, B., 1948. Sutton Hoo – en svensk kunga- eller hövdinggrav? *Fornvännen*, 1948, 65–93.
- Nordenborg Myhre, L., 2004. *Trialectic archaeology. Monuments and space in Southwest Norway 1700–500 BC*. Stavanger: Arkeologisk museum i Stavanger.
- Nørgård Jørgensen, A., 1995. Nye undersøgelser i Kanhavekanalen. *Marinarkæologisk Nyhedsbrev*, 5, 9–15.
- Opedal, A., 1998. *De glemte skipsgravene. Makt og myter på Avaldsnes*. Stavanger: Arkeologisk museum i Stavanger.
- Opedal, A., 2005. *Kongens død i et førstetlig rike. Skipsgravritualer i Avaldsnes-området og aspekter ved konstituering av kongemakt og kongerike 700–950 e.Kr.* Unpublished dissertation. University of Oslo.
- Ørsnes, M., 1966. *Form og stil i Sydsandinaviens yngre germanske jernalder*. Copenhagen: Gyldendal.
- Peets, J., 2013. Salme ship burials. *World Archaeology*, 58, 18–24.
- Reiersen, H., 2009. *The central place of the avaldsnes area, SW Norway. An analysis of elites and central functions along karmsund 200 BC–AD 1000*. Unpublished dissertation. University of Oslo.
- Roesdahl, E., 1994. Dendrochronology and viking studies, with a note on the beginning of the viking age. In: B. Ambrosiani and H. Clarke, eds. *Developments around the baltic and the north sea*. Stockholm: Birka Project, 106–116.
- Sawyer, P., 1993. Rikssamlingen i England og Sverige sammenlignet med den norske rikssamling. In: M.S. Veia, ed. *Rikssamlingen og Harald Hårfagre*. Kopervik: Karmøy kommune, 131–146.
- Schetelig, H., 1902. En plyndret baadgrav. *Bergen Museum Aarbog*, 1902, 1–14.
- Schetelig, H., 1906a. Reports of district secretaries: Norway. *Saga-Book of the Viking Club*, 4, 54–66.
- Schetelig, H., 1906b. Ship Burials. *Saga-Book of the Viking Club*, 4, 326–363.
- Schetelig, H., 1912. *Vestlandske graver fra jernalderen*. Bergen: Grieg.
- Schetelig, H., 1917a. Graven. In: A. W. Brøgger, H. Falk & H. Schetelig eds.: *Osebergfundet*. Kristiania: Universitetets oldsaksamling, Vol. I, 209–278.
- Schetelig, H., 1917b. Skibet. In: A. W. Brøgger, H. Falk & H. Schetelig eds.: *Osebergfundet*. Kristiania: Universitetets oldsaksamling, Vol. I, 283–363.
- Schetelig, H., 1940. Skibsgraven ved Sutton Hoo i Suffolk. *Viking*, 4, 167–172.
- Sørensen, A.C., 2001. *Ladby. A danish ship-grave from the viking age* (Ships and Boats of the North 3.). Roskilde: Viking Ship Museum.
- Stylegar, F.-A., et al., 2011. To ansiktsmasker og en ring fra Avaldsnes i Rogaland. Et svar og flere spørsmål. *Fornvännen*, 106, 8–25.
- Sylvester, M., 2009. Finnemoen i Nærøy – en båtkjøll og et båtverft fra merovingertid? *Viking*, 72, 137–148.
- Vadstrup, S., 1994. Vikingernes skibsbygningsværktøj. *Museet for Søfart. Årbog 1994*. 100–123.
- Wamers, E., 1985. *Insularer Metallschmuck in wikingerzeitlichen Gräbern Nordeuropas*. Neumünster: Karl Wachholtz Verlag.
- Wamers, E., 1994. König im Grenzland. Neue Analyse des Bootkammergrabes von Haiðaby. *Acta Archaeologica*, 65, 1–65.
- Wamers, E., 1998. Insular finds in viking age scandinavia and the state formation of Norway. In: H.B. Clarke, M. Ni Mhaonaigh, and R.Ó. Floinn, eds. *Ireland and scandinavia in the early viking age*. Dublin: Four Courts Press, 37–72.