

Where Does The Timber Come From? Dendrochronological Evidence of the Timber Trade in Northern Europe

Niels Bonde,¹ Ian Tyers² and Tomasz Wąsny³

¹ Natural Sciences Research Unit, National Museum of Denmark; ² Archaeological Science Research School, University of Sheffield; ³ Faculty of Conservation, Academy of Fine Arts, Warsaw

Introduction

Dendrochronology can provide more than datings. A lot of additional information can be obtained from the samples: the most obvious concerns the quality of the timber and information about conversion of timber etc. In favourable cases dendrochronology also provides information about the origin of the wood – where the trees grew, i.e. the provenance of the wood.

The question of provenance of the wood – or timber, which is the term we ought to use – is of extreme importance in dendrochronological research on old shipwrecks and on wooden artifacts. Often the place where a large sea going ship was built will not be the same as where the wreck was found and excavated hundred of years later. It is not always that we have such luck as with the Swedish man-of-war (the VASA) that sunk on its maiden trip just outside the shipyard in Stockholm where it was launched in 1628 AD.

In the same way international trade can bring a work of art hundreds of kilometres from the workshop where it originally was produced – not to mention the problems of

determining the place of origin of the *material* used in the making of the object!

An engraving from the beginning of the 17th century (plate 1), illustrating the town of Szczecin/Stettin, clearly demonstrates some of the problems that the dendrochronologist has to take into account when he or she is doing research into material coming from ships or related to trade. On the right of the picture, transportation of wood on the river Oder is taking place. The wood was transported from inland Europe to the harbour of the city by barges or by floating downstream. In the town it was turned into timber and placed in a timber yard for re-sale. The 'Neu Zimmer Hoff' – the New Timberyard was situated close to the river. The question is from which region/area did the timber actually originate and where did it go?

On the left side of the engraving, the large sea going ships are seen sailing in to the harbour to take on their cargo. Some took timber to the Netherlands, to England, to Scandinavia, etc. even as far as Portugal. Where were these ships built? In the countries just mentioned or in the shipyard

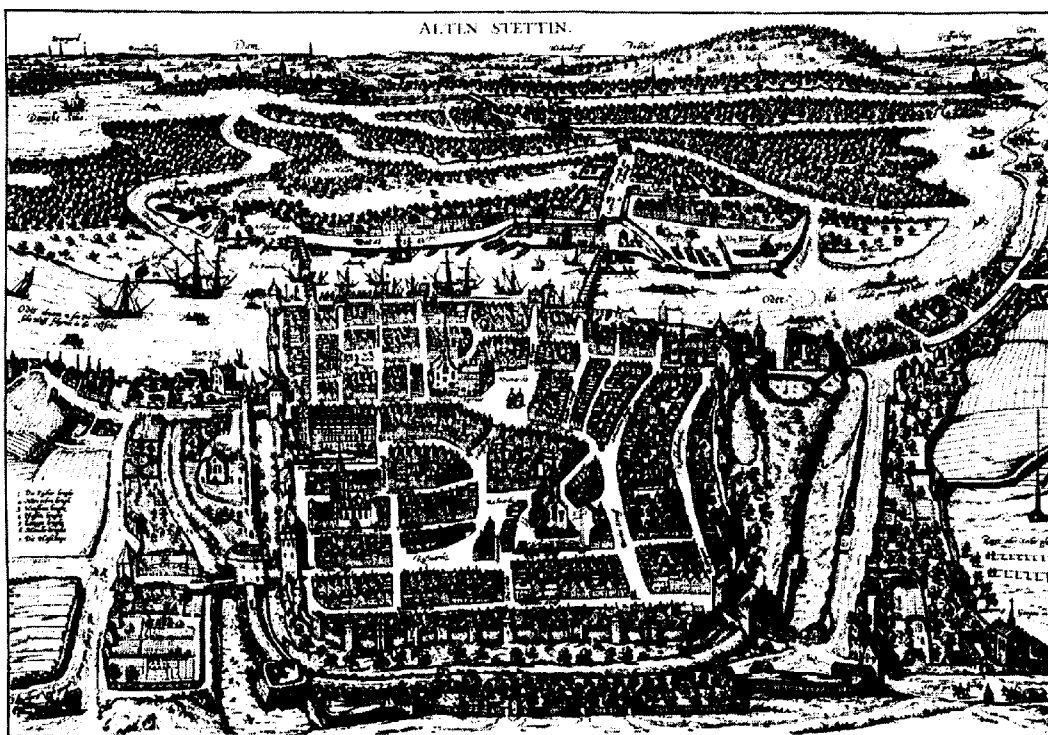


Plate 1. Engraving showing the town of Szczecin/Stettin. Braunius and Hogenberg 1618/23.
(Photo. The Royal Library, Copenhagen).

shown to the left in the picture with the timberyard beside it – the 'Schifbauer Lastade' and the 'Delen Hoff'. Where did these ships end up? On the bottom of the sea somewhere, or perhaps some were broken up and the timber reused in other constructions.

Similar questions can be asked if you are examining wooden artifacts. The wood could have been turned in to planks or 'wainscots' and sold to a local workshop, which used the material to cover the walls in a house with panelling, or sold to a workshop where altars and crucifixes (polychrome sculpture) were produced. Most likely the bulk of the timber was exported as semi-products, wainscots, boards, barrel-staves etc. for resale or use in workshops in the big commercial centres in northern Europe.

To deal with the problem of the origin of the timber the dendrochronologist has to establish a huge network of chronologies covering all the possible regions of origin of the material which he or she receives.

The foundation stone of dendrochronology is that trees living under the same conditions will grow in the same way, and the conditions in the centre of eastern Europe are certainly quite different from those in Scandinavia or England. Based on these facts, the tree-ring measurements make it possible to indicate the geographical region within which the trees that produced the timber used in various constructions originated.

Dendrochronologists in Copenhagen (Denmark), Lund (Sweden), Hamburg (Germany), Warsaw (Poland), and Sheffield (United Kingdom) co-operate very closely and have access to all the chronologies produced in their laboratories. Furthermore, as all the master-chronologies for

oak (*Quercus sp.*) in our region have, through the 1980s, been expanded to cover the last 15 centuries, the possibility of doing successful research on items connected to trade and communication in northern Europe has increased considerably.

The original premise for dendrochronological dating of medieval oak artefacts was that the material was derived from trees of more or less 'local' origin (Eckstein and Bauch 1974; Fletcher 1977). Subsequently it was realized that sequences for medieval objects from across Europe were derived from one apparently similar source which was not local to the findsites of most of the material (Baillie 1984). As research has continued and the chronology network has widened it has become apparent that there is a new branch of tree-ring studies developing which may be dubbed *dendroprovenancing*!

This new aspect may be illustrated by examining groups of objects such as barrels, ships, paintings, furniture, altars, chests, wainscots and room panelling recovered from archaeological sites, shipwrecks, houses and art-historical collections from all over Europe. Take for example, a painting from Gdansk (Poland), a shipwreck from the sea around Denmark and a door excavated in London. The tree-ring sequences from these objects cross-date (fig. 1). By contrast the sequences do not cross-date with the local chronologies from Denmark and England (fig. 2). This phenomenon is characteristic of movable object types and is never seen, at least in western Europe, in baulks or large cross-section beams. It has until now been recognised in objects dating from the late 14th century to the mid 17th century and the timbers are most frequently found in plank form derived from exceptionally evengrown 200–400 year old oak trees.

The first clues to this riddle were found in the extensive customs records in Poland, Denmark and on the western European seaboard (Bang 1922). These demonstrate that vast quantities of oak planking were exported through a number of ports in the eastern Baltic primarily through the agency of the German Hanse and The Teutonic Order throughout the European Middle Ages and up to the middle of the seventeenth century.

Although the material was exported from the Baltic ports, much of it probably originated more than 500 km inland and was floated down the river systems to the ports where the ships loaded their cargo.

The key scientific evidence, which confirms the documentary evidence, was obtained by the construction of an oak tree-ring chronology from large beams from an area of

	Sample from painting (PL) Mid 15th cent.	Sample from shipwreck (DK) End 14th cent.
Sample from shipwreck (DK) End 14th cent.	5,92	
Sample from door (GB) End 14th cent.	2,32	6,71

Figure 1. Values for cross-dating (t-values) of objects from northern Europe. t-values are a measure of similarity between two tree-ring series which show how well the series cross-date. Values equal to or greater than 3.5 are regarded as significant indicators of a likely match. For t-values, see Baillie and Pilcher 1973.

	NL	GB	S	DK	D	PL	panels/GB
Sample from painting (PL) Mid 15th cent.	1,70		1,17	0,54	1,49	5,96	7,05
Sample from shipwreck (DK) End 14th cent.	1,36	1,64	1,77	2,75	1,94	5,44	5,85
Sample from door (GB) End 14th cent.	1,11	1,89	3,35	3,37	4,17	4,87	5,59

Figure 2. Values for cross-dating (t-values) of objects with oak master-chronologies from northern Europe. Note that the distance from England to Denmark is c. 800 km (500 miles) and Denmark to Poland is c. 600 km (350 miles) whilst England to Poland is c. 1400 km (900 miles).

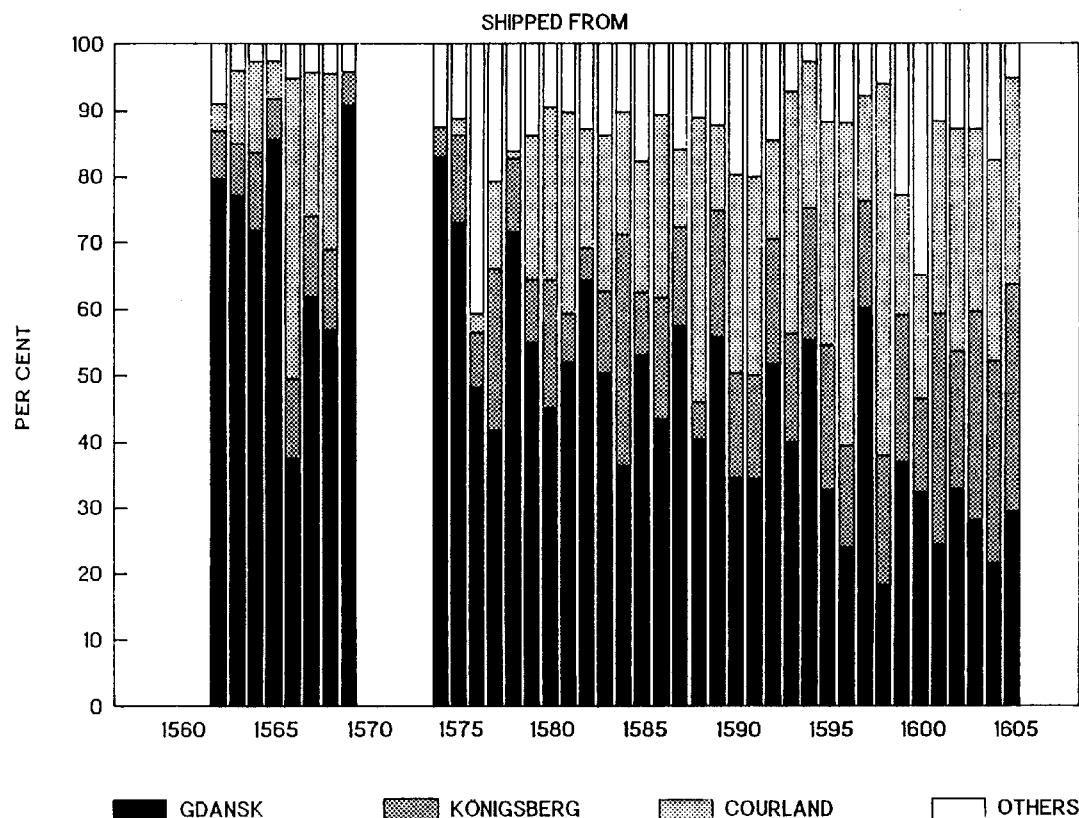


Figure 3. Diagram compiled from the tables in the *Books of the Sound Dues*. The graph shows the relative quantity of wainscots shipped from various places in the Baltic area from 1562 to 1605 (figures for 1570 to 1573 are missing). In 1562 Gdansk, Königsberg and Courland were responsible for about 90% of the total export of wainscots with Gdansk as by far the most important with up to 80%. Over the years the importance of Gdansk declined up to 1605 where the three places still represented about 90% of the total export but now with one third each. This means that if dendrochronological research is to be carried out on material deriving from the Baltic region around 1560 the most obvious place to start will be to look for chronologies covering the area(s) that delivered timber for export through the harbour in Gdansk. With material from about 1600 the picture is more complicated, chronologies from many various geographical regions will have to be taken into account.

Polish eastern Pomerania some distance away from the Vistula River, thus avoiding the possibility of contamination by timbers that were part of the trade (Ważny 1990). This sequence can be used not only to date the types of objects mentioned above, but also to indicate that the timbers were derived from somewhere in or around this area (Klein 1986; Bonde 1992).

Recent re-analysis of some elements of this group has indicated the presence of multiple sources within the group, and thus the working model for the analysis of this type of material has changed into a third form. The initial assumption of exclusively local material was reinterpreted as an hypothesised single foreign source (Baillie *et al.* 1985; Eckstein *et al.* 1986). This hypothesis has now been further refined in the light of documentary evidence (fig. 3), internal tree-ring cross-matching and signature sequences, into one of multiple export areas within a larger geographical zone (Ważny and Eckstein 1987; Ważny 1992). Further refinement will require an extensive programme of creating local oak chronologies from a wide range of ecological zones throughout Europe. This will maximise our ability to differentiate sources with a high degree of resolution, and

aid future dendroclimatological work which will also require the same chronology network. The work will have to begin by dismantling the large master chronologies built for dating purposes (Hillam and Tyers 1995). These should then be rebuilt using modern zoning/clustering criteria. This requirement for a higher resolution chronology network shows that European oak dating studies are reaching a new level of maturity. This pattern will be repeated as work on other species moves from dating to other areas of research.

The ability of dendrochronological methods to identify groups of material from large scale transportation is of historical and cultural interest, but also offers a useful lesson for other workers in other parts of the world. The European experience shows that an appreciation of the history of woodland exploitation and trade in any research area is required before localised tree-ring sequences from non-living material can be successfully and reliably constructed. The successful dating of large groups of later-medieval, post-medieval and recent timber structures world-wide will require not only a greater understanding of local and larger trade patterns, but also the creation of more finely resolved chronology networks.

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