

Historical timber trade and its implications on dendrochronological dating

Tomasz Ważny

Academy of Fine Arts, Faculty of Conservation, ul. Wybrzeże Kosciuszowskie 37, 00-379 Warsaw, Poland

In medieval Europe the development of agriculture and the increasing demand for wood as a construction material caused considerable regional deforestation. Countries which had depleted in wood resources were forced to find new sources of timber and accordingly wood became one of the main items of exchange for other goods. This trade expanded in the 15th and 16th centuries. The majority of wood on the European timber market had its origin in the South Baltic region, and Gdańsk/Danzig was a centre for the timber trade.

The city of Gdańsk had close trading contacts with Lübeck as early as the first half of the 13th century, and later took up an important position in the Hanseatic League. The export of wood via Gdańsk was greatest between 1350 and 1600. The quantities of wood exported during this time are difficult to estimate because of the lack of documents; in addition the units of measurement varied greatly from region to region. Of particular value at this time was the "wainscot", a special quality of timber.

The best sources of information about the Baltic timber trade are the so-called Sound Dues records; the Sound is the strait which now divides Denmark from Sweden which ships had to pass through on their way from the Baltic to the North Sea. From these custom records we learn that in 1565 85% of the ships carrying wainscots, for export from the Baltic to the west, set out from Gdańsk. In the first half of the 17th century the Gdańsk timber trade went into recession as a result of the exhaustion of the Polish forests, the political situation and a series of devastating wars. Further details of this are given by Ważny and Eckstein (1987).

From the dendrochronological point of view, answers to the following questions are important:

- what was the quantity and quality of wood exported,
- what was the origin of the timber, and
- what was its destination?

Answers can be found in custom records, archived letters and trade books. The greatest demand was for oak timber, which was needed in large quantities for ship building, harbour constructions and other purposes. In the 17th century about 4000 well-grown oak trees were needed to build a medium-size merchant ship (Olechnowicz 1960). The life-time of such a ship was very short, due either to the activities of war or more natural destructive factors, such as fungi, insects, shipworms and other marine

destroyers of wood. A ship made of European wood was able to withstand only about four trips to Africa.

In addition to oak wood, ash and spruce were also exported from the South Baltic area, and by the 18th century oak had been replaced by large quantities of pine. The Vistula river and its tributaries provided the necessary facilities for transportation. The floating of timber down the Vistula river began on a large scale in the 1370's.

Originally it was Prussia which was the source of wood, in particularly the area around Gdańsk. As demand grew, the centre shifted to the south and south-east of the Kingdom of Poland and to Lithuania. According to data from the 15th and the first half of the 16th century, Mazovia had a large share in the delivery of wood (Fig. 1);

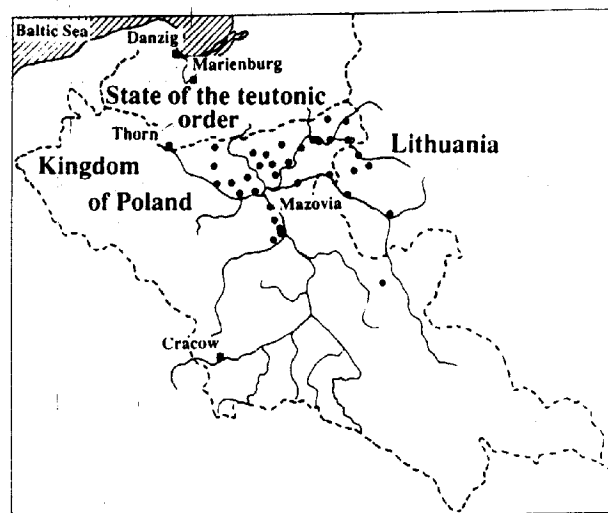


Fig. 1. Vistula river-basin with the main sources of wood (dots). Political borders refer to the first half of the 15th century.

Little Poland and Podlasie were almost as important. Gdańsk was also the main market place for Lithuanian goods after the canal between Pregel and the Kuron Bay was built at the turn of the 14th century.

In the first period of timber trade in Central Europe, the main importers of wooden products were the Wende cities such as Hamburg, Lübeck, Kiel, Wismar, Rostock and Stralsund, although England and Holland were also dependent on wood from Gdańsk. At the end of the 15th century a new customer appeared - the Iberian Peninsula. The extension of the empires of Spain and Portugal over almost the whole world required the maintenance of huge fleets.

The building of fleets by the European sea powers, England, Portugal, Holland and Spain, resulted in a great demand for Baltic wood over a long period of time. In more recent times, from 1740-1805, most ships with wood as their main cargo were leaving Gdańsk for England, Holland, France, Denmark and Spain.

As a result of this huge timber trade, quantities of wood from the South Baltic area have to be expected in various objects in western and south-western Europe (Fig. 2). This fact gradually became evident as dendrochronological dating work progressed in northern Europe.

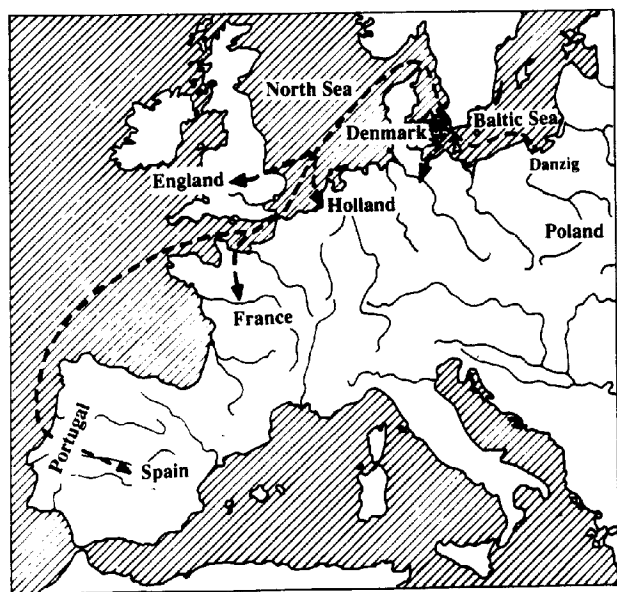


Fig. 2 Probable occurrence of timber from the South Baltic area in West Europe.

The first indications appeared with the dating of works of art. At the beginning of the 1980's a scientific controversy started with regard to the dendrochronological dating of paintings by Rembrandt, Rubens, and other contemporary artists on oak panels (Baillie 1984). At that time the so-called art-historical tree-ring chronologies could be divided in two groups. The first one represented, without any doubt, wood from western Europe - probably Germany and Holland. The second one contained wood of, at that time, unknown origin. This kind of wood was, however, not found later than 1650.

This wood was at that time not datable by the existing reference chronologies. The tentative position of these tree-ring series differed between various dendrochronological laboratories by up to eight years, and these differences were the source of the afore-mentioned controversy. The assumption by Baillie (1984) that the wood was imported is now dendrochronologically proven by means of a recently established long-term chronology from northern Poland (Eckstein et al. 1986). In the meantime, it has become possible to identify wood from Poland in several architectural structures and works of art in England, Belgium, Holland, Denmark and Germany.

How can we pin-point the origin of the wood and how can this be achieved more precisely?

The European chronology network is becoming denser, to a point where it covers most of Europe. By matching tree-ring patterns against different reference chronologies, not only can the date be provided but also the origin of the wood can be determined with more precision. Local reference chronologies are particularly helpful and even mean curves for single objects can be of use. Such spatially small-scale chronologies are more useful for the purpose of assessing the origin of timbers than trans-regional standard chronologies where tree-ring series from a large area are included.

The precision of establishing the origin of timber is connected with the density of the chronology network and its spatial range. The elaboration of modern chronologies in Poland brings us closer to the historical origin of the wood, allowing the differentiation between trees from the northern Polish coast and the forest of East Poland (Ważny 1990). By using mean tree-ring series, it is also possible to recognize the trade with wood on a smaller scale and over smaller distances, compared to the previous examples. Construction elements from different historical buildings can be linked to one particular forest area.

Conclusions

- 1) Dendrochronology has been proven to be useful for verifying, specifying and supplementing documents concerning the historical timber trade. As a supplement to historical records, dendrochronological dating illustrates the physical extend of this trade.
- 2) The recognition of areas of origin and the main timber routes makes it easier to select reference chronologies for dendrochronological dating. This is particularly useful for dating wood from mobile objects (works of art, ships) as well as wood from harbour cities. Determination of the origin of the timber is necessary if tree-ring sequences from historical wood are to be used in dendroclimatology or to obtain ecological information about the past.
- 3) In order to increase the precision with which the origin of the wood can be determined, it is necessary to develop further the dendrochronological network.

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