

Dendrochronological research of panel painting 'Huis te Riviere', anonymous Stedelijk Museum Schiedam (Schiedam, The Netherlands)

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Summary

The anonymous panel painting 'Huis te Riviere' consist of two boards of oak (*Quercus* sp.) disposed horizontally and joined along the side corresponding to the most recent rings. The aim of the dendrochronological research was to establish whether the painting had been made before the destruction of the depicted castle around 1574 C.E. or afterwards. The research was carried out on the transverse edge of the boards and resulted in the dating of both with Baltic chronologies. The outermost ring measured on the upper board dates to 1625, and the tree is estimated to have been cut after 1633. The outermost ring on the bottom board dates to 1631. The presence of two sapwood rings in this board allows estimating the felling date of the tree between 1638 and 1653. The painting was therefore made in the second quarter of the 17th century or in the 1650s, decades after the destruction of the castle. A panel maker's mark on the back of the upper board has been identified as that of a craftsman active in the Northern Netherlands, possibly the Rotterdam/Dordrecht area.

Introduction

The painting 'Huis te Riviere' (oil on panel, 59 x 81.5 cm; Fig. 1) from the Stedelijk Museum Schiedam collection (inv. H-00000086.1-12.01; <https://www.stedelijkmuseumschiedam.nl/werk/huis-te-riviere/>) depicts a view of the former city castle, which was built around the 13th century and was destroyed by fire at the beginning of the Eighty-Years' War, c. 1574 C.E. (R. de Bruijne, pers. comm.). The town hall acquired the painting in 1688. The aim of the dendrochronological research was to find out whether the painting was made before or after the destruction of the castle.



Figure 1. Painting 'Huis te Riviere' from the Stedelijk Museum Schiedam collection (source: (inv. H-00000086.1-12.01; <https://www.stedelijkmuseumschiedam.nl/werk/huis-te-riviere/>).

¹ Research carried out within the Wood for Goods project (<https://www.nwo.nl/projecten/016veni195502-0>)

Material and Methods

The inspection of the painting was done at the depot of the Stedelijk Museum Schiedam. During the inspection it was noted that the panel consists of two boards made of oak (*Quercus* sp). disposed horizontally and joined along the side corresponding to the outer part of the tree (Figs. 2 and 3). The upper board has been processed radially from the parental tree (Fig. 3). Conversely, the lower board was probably processed by rift sawing/splitting (Fig. 3). The pith is absent in both boards, but two sapwood rings are present on the bottom one (Fig. 3). The back of the boards is very smooth, without evident saw marks. The research was carried out on the left side of the boards (looking at the panel from the back). On the upper board, a panel maker's mark can be seen (Figs. 2 and 4).



Figure 2. Back of the painting where both boards can be observed (the dash line runs along the edge between them). The arrows indicate the growth direction. The circle encloses the panel maker's mark (photo: M. Domínguez Delmás).

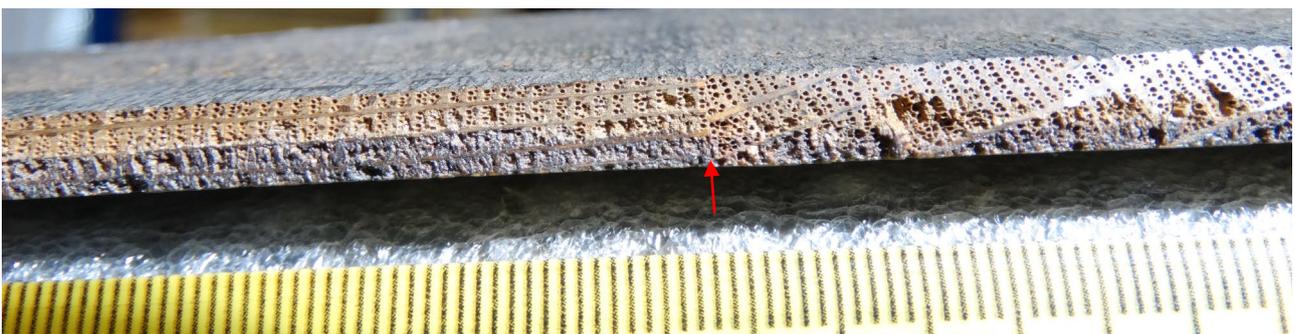


Figure 3. Central part of the panel where both boards join (pointed at by arrow). Two sapwood rings are present on the right (bottom) board. The right (upper) board is perfectly radial, whereas the other one has been processed by rift sawing/splitting. (photo: M. Domínguez Delmás).

To visualise the tree rings, a slight preparation of the wood was carried out by cleaning a shallow and narrow line along the transverse surface with sharp blade knives (Fig. 3). Tree rings were photographed with a macro lens, and ring widths were measured on screen with CooRecorder (Cybis). The photographs included a ruler to allow the calibration of the measurements. Therefore, the obtained ring widths represent absolute values. Crossdating was done in PAST4 v. 4.3.102 (SCIEM).



Figure 4. Panel maker's mark on the back of the upper board (photos: M. Domínguez Delmás).

Results

Dendrochronological research

A measurement series containing 236 tree rings was obtained from the upper board, whereas the lower board provided a shorter series with 173 rings (including two sapwood rings) (Table 1). Internal crossdating (i.e. comparison of the measurement series from the planks between them) revealed a lack of outstanding correlations ($r=0.25$; TBP=3.16; see Glossary and abbreviations on Appendix A), which indicates that these boards derive from trees growing either in different areas, or under different conditions in the same area.

Crossdating with reference chronologies from central and northern Europe resulted in an outstanding match of the tree-ring series from the upper board with the BALT3 chronology (Tyers&Daly, unpublished) in 1625 C.E. (date of the last, most recent ring; Table 1, Fig. 5). The outermost ring of the bottom board dated to 1631 C.E. with the same chronology (Table 1, Fig. 6).

The presence of two sapwood rings in the bottom board allows estimating the felling date of the tree within a range of years. Considering the sapwood statistics of trees growing in the Baltic (more specifically Poland), we can estimate within a 90% confidence interval that the tree was cut between 1638 and 1653 (Table 1). The tree used to made the upper board was cut *after* 1633, but the lack of sapwood hampers the possibility to specify how many years after that date.

Table 1. Results dendrochronological research. N: number of measured rings. Pith: estimated nr of rings missing to pith; SW: number of sapwood rings; WK: bark edge: -, absent/number in brackets indicates estimated number of missing rings to bark edge. CC: correlation coefficient; TBP: Student's *t*-value according to Baillie and Pilcher (1973); %PV: percentage parallel variation (Eckstein and Bauch, 1969); ###, significance level of %PV at $p<0.001$; OI: overlap.

Element	DR Dendrocode	N	Pith	SW	WK*	Begin year	Last year	Estimated felling date	CC	TBP	%PV	OI	Reference chronology
Upper board	40420011	236	-	0	>8	1390	1625	After 1633	0.53	9.9	70.6###	236	BALT3
Bottom board	40420021	173	-	2	7-22	1459	1631	1638-1653	0.40	6.1	71.1###	173	BALT3

*Estimation based on Wazny (1990).

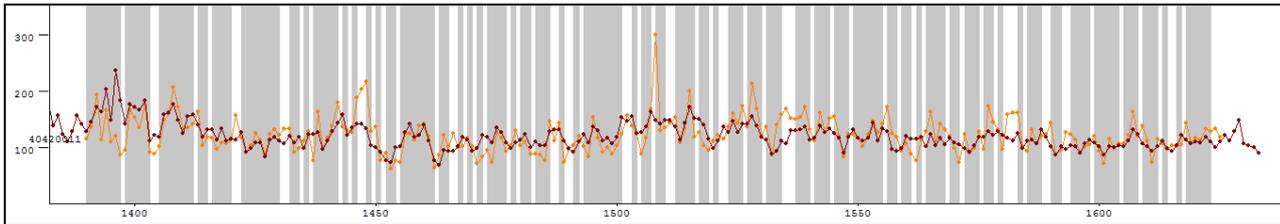


Figure 5. Visual match between the tree-ring series obtained from the upper board (40420011) and the reference chronology BALT3 (dark brown). Y-axis: ring-width (1/100 mm); x-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series.

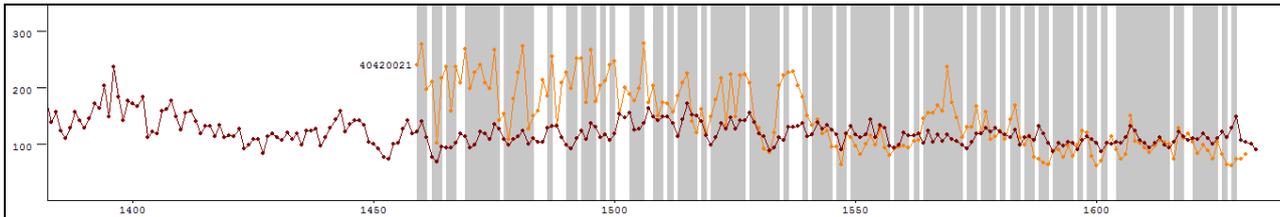


Figure 6. Visual match between the tree-ring series obtained from the bottom board (40420021) and the reference chronology BALT3 (dark brown). Y-axis: ring-width (1/100 mm); x-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series.

The panel maker's mark

The panel maker's mark on the upper board has been linked to a panel maker of the Northern Netherlands, possibly active in the Rotterdam/Dordrecht area (Wadum, 2014). Research into other panels bearing this mark will shed light into the chronology of their activities.

Conclusions

The estimated felling dates of the trees used to make the boards of this panel suggest a likely production time of the painting in the second quarter of the 17th century, or in the 1650s. Therefore, the painting was made several decades after the depicted castle was destroyed.

The panel maker's mark present on the upper board has been found in other paintings by artists from the Northern Netherlands, and it has been suggested that this craftsman may have been operating in the Rotterdam/Dordrecht area. Establishing the timeframe in which this panel maker was active could help narrowing down the production time of the painting. This research will continue within the Wood for Goods project.

References

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Appendix A. Glossary and abbreviations

N	Total number of measured rings in the sample;
Pith	Centre of the tree; +1/-, pith present/absent;
SW	Number of sapwood rings present on the board.
Bark edge (WK)	Boundary between the last ring and the bark; WK: bark edge present; when absent, an estimation of the number of rings to the bark edge might be given depending on the wood species;
Begin year	Date of the first ring (closest to the pith of the tree) measured in the sample;
Last year	Date of the last ring (most recent ring, closest to the bark of the tree) measured in the sample;
Estimated felling date	Date of the last ring plus the estimated mean number of rings to the bark edge when the WK is not present;
TBP	Value of the Student <i>t</i> -test according to Baillie and Pilcher (1973); this value is used to identify the match between two tree-ring series for which the correlation reaches its highest value. Student's <i>t</i> values over 5 for an overlap of 100 rings are likely to indicate a match;
%PV	Percentage of parallel variation; this value indicates, for the overlapping period between two tree-ring series, the percentage of years in which the ring-widths increase or decrease similarly. Values higher than 65%, for an overlap of 100 rings are highly significant and indicate a match;
Overlap (OI)	Number of overlapping rings between two curves in their matching position;
Reference chronology	Chronology used to date the sample.