

Dendrochronological research of the panel painting 'Enjoying the ice' attributed to Barend Avercamp, Rijksmuseum collections (Amsterdam, the Netherlands)

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SUMMARY

The support of the panel painting 'Enjoying the ice' at the Rijksmuseum collections is attributed to Barend Avercamp and consists of three boards of oak (*Quercus* sp.) disposed vertically. The middle board has a panel maker's mark stamped on the back, which has been interpreted as '4MM' (vertical mark, with the 4 on top). The aim of the dendrochronological research was to gain knowledge about this panel maker's practices by establishing the date and provenance of the wood, and determining whether this and/or other panels bearing the same mark share wood obtained from the same tree. The research was carried out on the transverse edges of the boards and resulted in the dating of all of them with Baltic chronologies in 1577 (Board 1), 1623 (Board 2, middle one) and 1618 (Board 3) (dates of the outermost, most recent rings). The absence of sapwood rings hampers estimating the felling date of the trees. Therefore, it can only be estimated that the trees were cut *after* 1583, 1629 and 1624 C.E.. Considering the seasoning time, at least two to five years should be added to estimate the earliest possible production time of the painting, which would fall in the 1630s. However, a date in the 1640s cannot be excluded, as the panel maker may have removed a large portion of sapwood from the boards. A date in the 1650s seems unlikely, as the most recent painting bearing the 4MM mark is signed by the artist in 1648. Further research on other paintings bearing this mark will reveal the span of time in which this panel maker was active and help narrow down the production time of the undated paintings.

INTRODUCTION

The painting 'Enjoying the ice' at the Rijksmuseum (38.5 cm x 51 cm; <http://hdl.handle.net/10934/RM0001.COLLECT.5851>; Fig. 1) is attributed to Barend Avercamp (Kampen 1612 – Kampen 1679) and has an uncertain chronology between 1630 and 1679. The panel has a mark on the back (Fig. 2), which has been interpreted as 4MM (placed vertically with the number 4 on top). This mark has been identified as that of a panel maker active in the Northern Netherlands in the first quarter of the 17th century (Wadum, 2014). As part of a larger study that aims to shed light on the location of the workshop (and possibly on the identity) of this panel maker, the goal of the dendrochronological research was to determine the date and provenance of the wood, and whether this and/or other panels bearing the same mark share wood obtained from the same tree.



Figure 1. Painting 'Enjoying the ice', attributed to Barend Avercamp (oil on panel, h 38.5cm x w 51 cm). Source: Rijksmuseum collections <http://hdl.handle.net/10934/RM0001.COLLECT.5851>.

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 Rijksmuseum. The panel consists of three boards made of oak (*Quercus* sp.) disposed vertically (Fig. 2, left photo). It is bevelled on all sides, and it has evenly spaced saw marks caused by mechanical sawing. The 4MM mark is located on the lower part of the central board and placed downwards (Fig. 2, right-hand side photo). All the boards have been processed radially from the stem (Fig. 3). Pith and sapwood are absent in all of them.

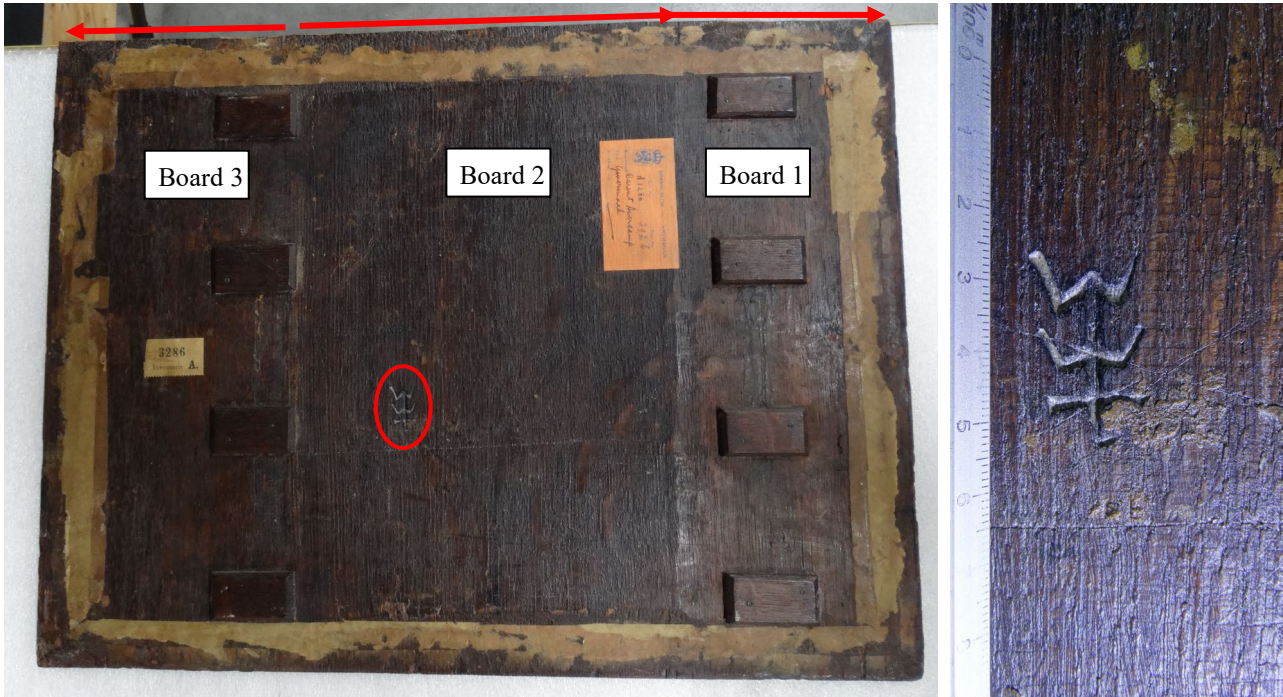


Figure 2. Left: back of the painting where three boards can be observed. The circle encloses the 4MM mark, and the arrows indicate the direction of tree growth in the parts where the boards have been researched; right: detail of the 4MM mark positioned downward, as it appears on the panel (photos: M. Domínguez-Delmás).

The research was carried out on the top end of the boards. Portions of the transverse ends had been cleaned with knives by P. Klein prior to this research (Fig. 3). To visualise the tree rings on the unprepared parts of the edges and obtain the longest possible tree-ring series for each board, a slight preparation of the wood was carried out by cleaning a shallow and narrow line along the transverse surface with sharp blade knives. 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).

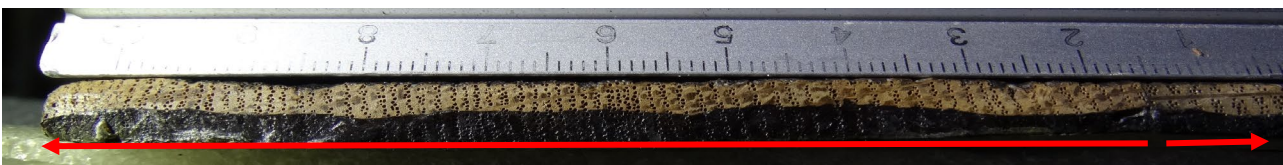


Figure 3. Detail of the joint between Boards 1 and 2. The boards have been processed radially from the stem of the tree. The preparation of the wood had been carried out by P. Klein prior to this research. The arrows indicate the growth direction (photo: M. Domínguez-Delmás).

RESULTS DENDROCHRONOLOGICAL RESEARCH

A measurement series containing 73 tree rings was obtained from the right board (Board 1), whereas the middle and left ones (referenced as when looking at the back of the painting) have 156 (Board 2) and 125 (Board 3) respectively. Internal crossdating (i.e. comparison of the measurement series from the boards between them) did not result in outstanding matches, which implies that the wood originates from different trees that may have grown in different areas.

Crossdating with reference chronologies from central and northern Europe resulted in the dating of the boards in 1577 (Board 1), 1623 (Board 2) and 1618 C.E. (Board 3) (Table 1, Figs. 4 to 6). Those years represent the dates of the last, most recent ring in the boards, and were provided by a chronology representing the southeast of current Lithuania or its hinterland (Daly and Tyers, 2022).

Table 2. 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 $p < 0.001$ respectively.

Element	DR Dendrocode	N	Pith	SW	WK*	Begin year	Last year	Estimated felling date	CC	TBP	%PV	Reference chronology
Board 1	40300011	73	-	0	>6	1505	1577	After 1583	0.42	4.25	71.2###	2021BLT3
Board 2	40300021	156	-	0	>6	1468	1623	After 1629	0.57	8.94	75.0###	2021BLT3
Board 3	40300031	125	-	0	>6	1494	1618	After 1624	0.60	8.86	74.8###	2021BLT3

*Estimation based on Sohar et al. (2012).

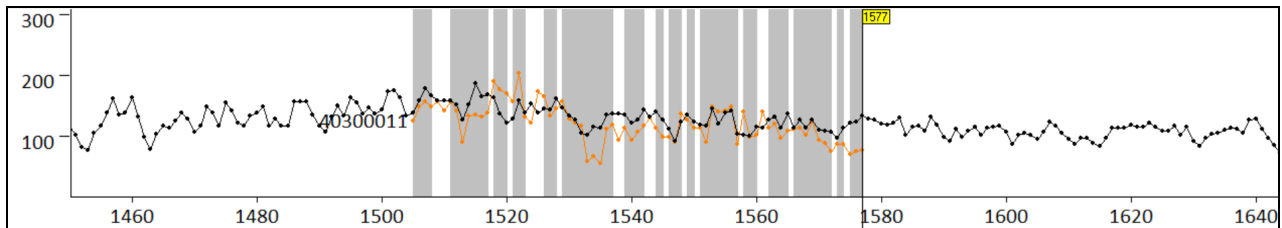


Figure 4. Visual match between the tree-ring series obtained from Board 1 (40300011) and the reference chronology 2021BLT3 (black). Y-axis: ring-width (1/100 mm); x-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series.

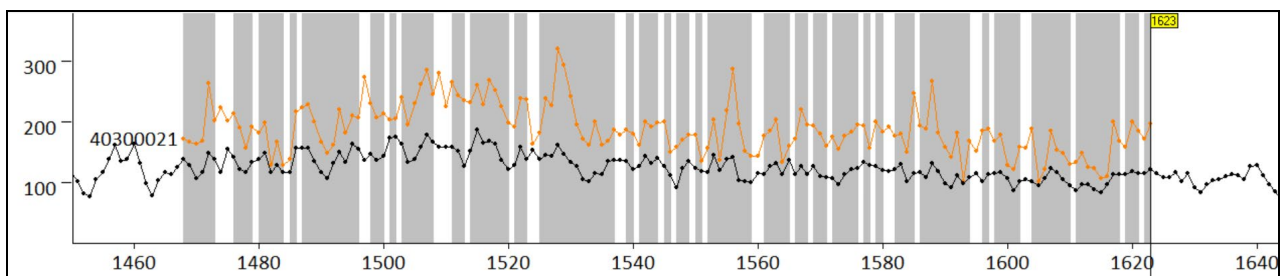


Figure 5. Visual match between the tree-ring series obtained from Board 2 (40300021) and the reference chronology 2021BLT3 (black). Y-axis: ring-width (1/100 mm); x-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series.

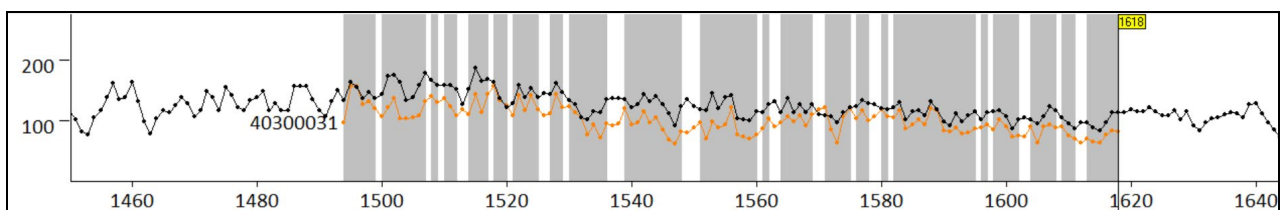


Figure 6. Visual match between the tree-ring series obtained from Board 3 (40300031) and the reference chronology 2021BLT3 (black). Y-axis: ring-width (1/100 mm); x-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series.

The absence of sapwood rings in the wood hampers the estimation of the felling date of the trees within a range of years. Therefore, only a *terminus post quem* date can be provided. Considering the sapwood statistics of trees growing in the eastern Baltic provided by Sohar et al. (2012), it can be estimated within a 95% confidence interval that the trees from which the Boards 1, 2 and 3 were obtained were cut *after* 1583, 1629 and 1624 respectively (Table 1). The Board 1 was obtained from an inner part of the stem, hence the early date of the outermost ring.

In addition to the years covered by the absent sapwood and the unknown number of heartwood rings to the sapwood border, some years must be accounted for the transport and seasoning of the wood. From observations of panel paintings signed by the artists and retaining partial sapwood it has been proposed that the seasoning time was about 2 to 5 years in the 17th and 18th centuries (Klein et al., 1987; Wadum, 1998). Those numbers would place the earliest production time of the panel in the 1630s.

The comparison of the tree-ring series from these three boards with those from boards of other panel paintings bearing the 4MM mark has not revealed outstanding matches.

CONCLUSIONS

The dendrochronological research has provided a date for the boards making up the panel (1577, 1623 and 1618 C.E.) and an estimated date for the felling of the trees after 1583, 1629 and 1624 respectively. Considering a seasoning time of two to five years (Klein et al., 1987; Wadum, 1998), the earliest production time for the panel would be the 1630s. However, a production time in the 1640s cannot be discarded, as the amount of sapwood rings removed by the panel maker could be higher. To my knowledge, the most recent panel bearing the 4MM mark dates to 1648 ('Portrait of an old woman', 64.5 cm high x 54.5 cm wide, painted by Bartholomeus van der Helst; currently at the private collection of Lady Colum Crichton Stuart, widow of the 6th Marquis of Lansdowne, London, 1954; Wadum et al., forthcoming). Therefore a date in the 1650s seems unlikely.

The panel maker's mark present on the middle board has been found in other paintings by artists from the Northern Netherlands. A forthcoming publication by J. Wadum, A. Jager, M. Domínguez-Delmás (Wadum et al., forthcoming) will shed light into the location and practice of this panel marker's workshop practices.

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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.