

Dendrochronological research of the panel painting ‘Drinking company outside a tavern’ by Cornelis Saftleven (inv. nr. NM0693, Nationalmuseum, Stockholm, Sweden)

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Summary

The panel that serves as support for the painting ‘Drinking company outside a tavern’, by Cornelis Saftleven (1607 – 1681) consists of three boards of oak (*Quercus* sp.) disposed horizontally. 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 the potential production time of the painting. For this, two objectives were set: i) to establish the date and provenance of the wood, and ii) to determine 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 the top and bottom ones in 1622 and the middle one in 1623 (dates of the outermost, most recent rings) with a Baltic chronology representing the southeast of Lithuania or its hinterland. The absence of sapwood rings hampers estimating the felling date for the parental tree. Therefore, it can only be estimated that the tree was cut *after* 1629 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 place it in the first half of the 1630s. However, the dendrochronological research has revealed an outstanding match between the tree-ring series of the bottom board of this painting with the series of two other boards from two different paintings that also have the 4MM mark. One is a panel painting entitled ‘Christ preaching from a boat’, at the National Galleries of Scotland (inv. nr. NG 1508), by Herman Saftleven. Another one is a ‘Portrait of a young girl’ at the Floris van Wanroij Fine Art gallery in the Netherlands, by Pieter Hermansz. Verelst. Both paintings are signed and dated in 1642. Given their contemporaneity, and that they share wood of the same tree with the panel reported here, it is plausible that the painting ‘Drinking company outside a tavern’ was produced in 1642, or shortly before or after.

Introduction

The panel painting ‘Drinking company outside a tavern’ (oil on panel, 66.7 cm high x 89.7 cm wide; Fig. 1) at the Nationalmuseum in Stockholm, Sweden (inv. nr. NM0693), was made by the Dutch painter Cornelis Saftleven (Gorinchem 1607 – Rotterdam 1681). This panel painting has a mark on the back (Fig. 2), which has been interpreted as ‘4MM’ (placed vertically with the number 4 on top; Fig. 3). 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). The goal of the dendrochronological research was to shed light on the potential production time and place of the painting by dendrochronology, as part of a larger study that aims to identify the location of the workshop (and hopefully the identity) of this panel maker.

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



Figure 1. Painting 'Drinking company outside a tavern' (oil on panel, 66.7 cm high x 89.7 cm wide) at the Nationalmuseum in Stockholm, Sweden (inv. nr. NM0693) (photo: Nationalmuseum).

Material and Methods

The panel consists of three boards of oak (*Quercus* sp.) disposed horizontally, and which have been processed semi-tangentially from the parental tree (Figs. 2 and 3). Pith and sapwood are absent in the wood. The back of the boards has evident, regular saw marks at intervals of 2.1 mm (Fig. 4). With an average thickness of 9.4 mm, Board 3 (bottom one) is slightly thinner than the other two (10.2 mm average).

The research was carried out along the transverse section on the left-hand side of the boards (referenced while looking at the back of the panel), and in a portion of the right-hand side of the Board 3 (Fig. 2). To visualise the tree rings, a slight preparation of the wood was carried out by cleaning slightly the transverse surface with a sharp plane (Fig. 3).² 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 2. Back of the panel (left) and detail of the 4MM mark (right). The panel is made of three boards disposed horizontally. The arrows indicate the growth direction and the portion of the boards researched by dendrochronology. The position of the mark in the panel is indicated on the left photo with a circle. A detail of the mark (rotated 90 degrees clockwise) is presented on the photo on the right (photos: C. Heisser, Nationalmuseum).

² This preparation was carried out by Lena Dahlen, materials conservator of the Nationalmuseum; the photographs were taken by photographer Cecilia Heisser.

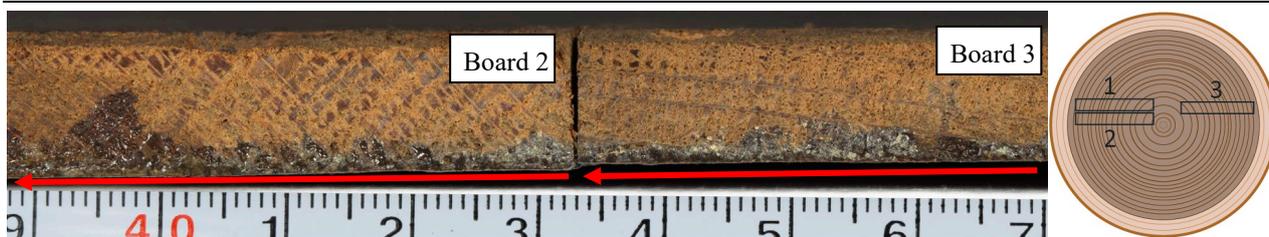


Figure 3. Detail of a portion of the transverse section on the left side of Boards 2 and 3. The transverse surface was slightly cleaned with a plane to enable the accurate measurement of the tree-ring widths. The arrows indicate the growth direction. The diagram illustrates the part in the stem where the boards derive from (photo: C. Heisser, Nationalmuseum; diagram: M. Domínguez-Delmás).

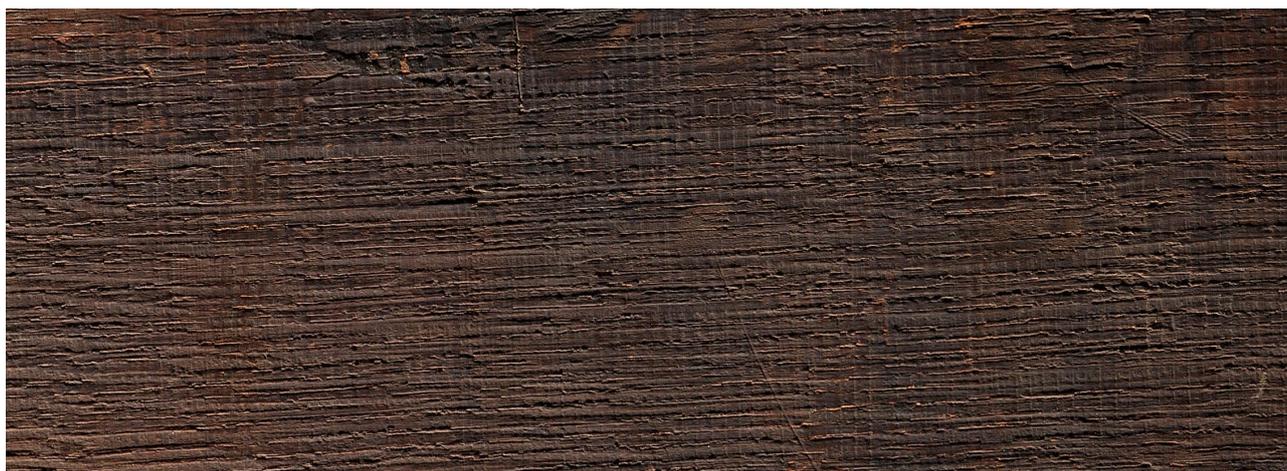


Figure 4. Detail of a portion of the back of Board 3. The regular saw marks appear as vertical lines evenly spaced (photo: cropped from photo by C. Heisser, Nationalmuseum). The same marks are evident in the other two boards.

Results dendrochronological research

The comparison of the tree-ring series obtained from each board with each other shows a good correlation, albeit a bit weak, indicating that the boards originate from different trees that grew under similar conditions (possibly in the same geographical area) (Table 1; Fig. 5).

Table 1. Relevant statistical results between the tree-ring series. OI: overlap; 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 $p < 0.01$ and $p < 0.001$ respectively.

Tree-ring series DR Dendro-code		OI	CC	TBP	%PV
40440011	40440021	120	0.42	4.74	69.2###
	40440030	120	0.37	5.42	61.7##

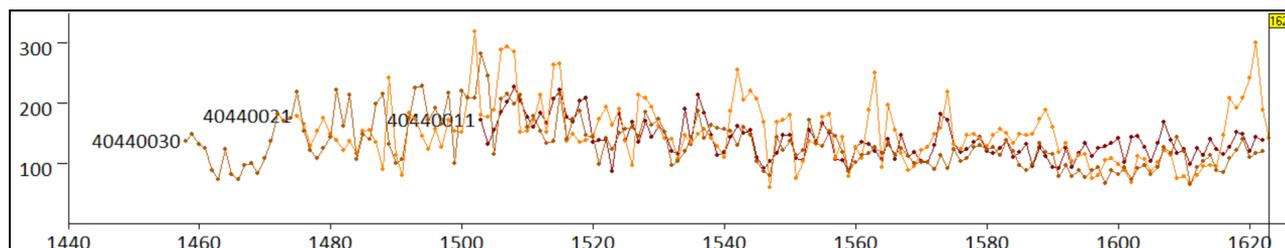


Figure 5. Visual match between the tree-ring series obtained from the three boards: Board 1 (40440011, in dark brown), Board 2 (40440021, in orange) and Board 3 (40440030, in light brown). The wood of these boards originates from different trees. Y-axis: ring width (1/100 mm); X-axis: calendar years.

Crossdating with reference chronologies from central, northern and eastern Europe resulted in the dating of all the boards with the 2021BLT3 chronology (Daly and Tyers, 2022). The last (outermost) tree rings in the Boards 1 and 3 date to 1622 C.E., while the outermost rings in the Board 2 dates to the year 1623 C.E. (Table 2, Figs. 6, 7, 8). The wood is likely to originate from the southeast of Lithuania or its hinterland.

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: number 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
Board 1 (top)	40440011	120	-	0	>8	1503	1622	After 1630	0.58	7.66	75.0###	120	2021BLT3
Board 2 (middle)	40440021	149	-	0	>8	1475	1623	After 1631	0.53	7.95	72.5###	149	2021BLT3
Board 3 (bottom)	40440030	165	-	0	>8	1458	1622	After 1630	0.45	6.45	63.9###	165	2021BLT3

*Estimation based on Wazny (1990) for the 90% confidence interval (see Haneca et al. (2009)).

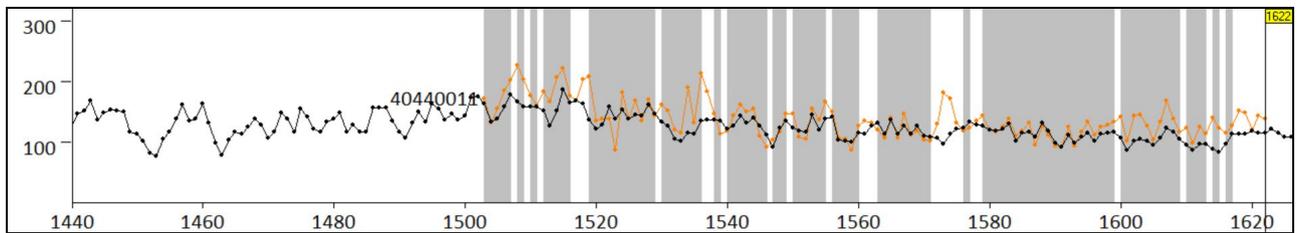


Figure 6. Visual match between the tree-ring series of the Board 1 (40440011; orange) and the reference chronology 2021BLT3 (black). Y-axis: ring-width (1/100 mm); X-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series and the reference chronology.

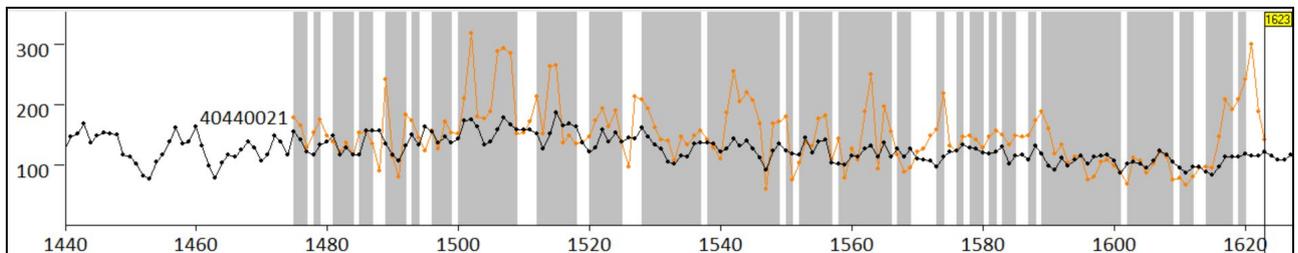


Figure 7. Visual match between the tree-ring series of the Board 2 (40440021; orange) and the reference chronology 2021BLT3 (black). Y-axis: ring-width (1/100 mm); X-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series and the reference chronology.

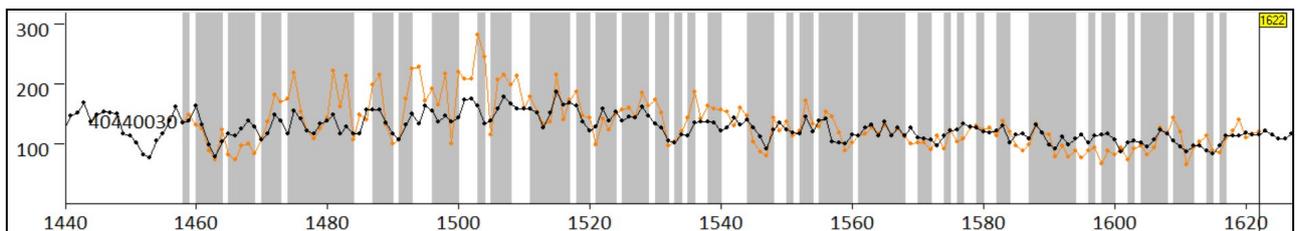


Figure 8. Visual match between the tree-ring series of the Board 3 (40440030; orange) and the reference chronology 2021BLT3 (black). Y-axis: ring-width (1/100 mm); X-axis: calendar years. The shaded area shows the percentage of parallel variation (%PV) between the tree-ring series and the reference chronology.

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 (Sohar et al., 2012), it can be estimated within a 95% confidence interval that the trees from which the Boards 1 and 3 were obtained were cut after 1628, whereas the tree used to make Board 2 was cut after 1629 (Table 1). In addition to the years added to account for the absent sapwood and the unknown number of heartwood rings to the sapwood border, some years must also be added to account 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 in the first half of the 1630s.

However, the comparison of the tree-ring series from these three boards with those from boards of other panel paintings bearing the 4MM mark, has revealed an outstanding match of Board 3 with two boards of two other paintings (Table 3, Fig. 9): one is a panel painting entitled ‘Christ preaching from a boat’, at the National Galleries of Scotland (inv. nr. NG 1508), by Herman Saftleven (dendro-code 40450031, see dendro-report DR_R2022005; Domínguez-Delmás, 2022a); the other one is a ‘Portrait of a young girl’ at the Floris van Wanroij Fine Art gallery in the Netherlands, by Pieter Hermansz. Verelst (dendro-code 40520031, see dendro-report DR_R2022007; Domínguez-Delmás, 2022b). Both paintings are signed and dated in 1642.

Table 3. Statistical results between the tree-ring series of boards derived from the same tree in three different paintings. OI: overlap; 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 $p < 0.001$.

DR Dendrocode	OI	CC	TBP	%PV	
40440030	40450031	161	0.72	13.6	74.8###
	40520031	48	0.74	7.84	86.5###
40450031	40520031	47	0.80	11.0	78.7###

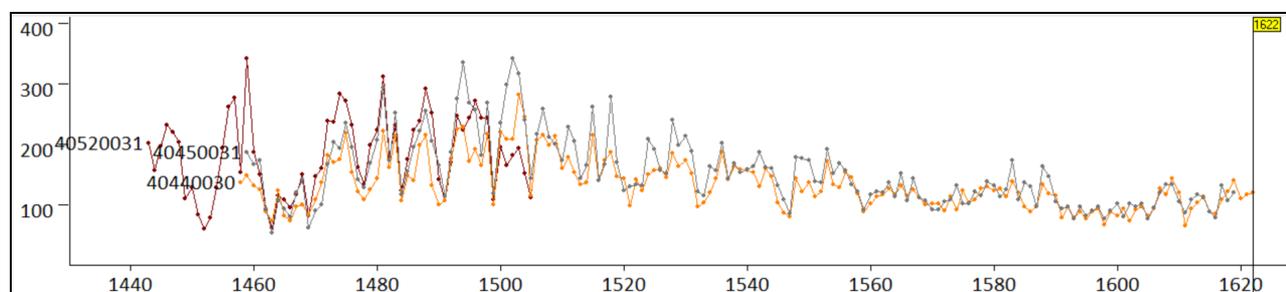


Figure 9. Visual match between the tree-ring series obtained from the Board 3 of this panel painting (40440030, in orange) with the Board 3 of the panel painting ‘Christ preaching from a boat’ from the National Galleries of Scotland (40450031, in grey), and the Board 3 of the painting ‘Portrait of a young girl’ at the Floris van Wanroij art gallery in the Netherlands (40520031, in dark brown). The wood of these boards originates from the same tree. Y-axis: ring width (1/100 mm); X-axis: calendar years.

Conclusions

The dendrochronological research has provided a date for the boards making up the panel (1623 and 1622 C.E.) and an estimated date for the felling of the trees after 1628 and 1629 C.E.. However, even more interestingly, the research has revealed that the Board 3 of this panel is made of wood from the same tree that was used to make two other panel paintings that also have the 4MM mark. Those paintings are signed by their respective artists, and dated in 1642. Given their contemporaneity, and that they share wood of the same tree with the panel reported here, it is plausible that the painting ‘Drinking company outside a tavern’ was made in 1642, or shortly before or after.

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DR_R2022006, 'Drinking company outside a tavern', Cornelis Saftleven (inv. nr. NM0693, Nationalmuseum, Stockholm, Sweden)

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.