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# Unraveling a 17th-Century North Netherlandish Panel Maker

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## Abstract

The marking and branding of oak panel painting supports is a well-known practice in art-production centers of the Southern Netherlands, such as Antwerp in the 16th and 17th centuries. Conversely, information about the activities and regulations of 17th-century panel makers in the Northern Netherlands is scant and has hitherto never been thoroughly researched. Here, we present our research on a panel maker who sold his products to painters within the Dutch Republic. He stamped his house mark, consisting of two letters 'M' above each other and crowned by the cipher '4', into the back of his panels. This mark has been found on panels from several painters active between 1632 and 1648. To narrow down the location of the unknown panel maker's workshop, the source of the wood and the eventual interrelationships between the boards he used for the panels were investigated. In addition, the painters who painted on his supports were studied. This paper presents a novel dendrochronological examination of eight of his twenty-three known panels, combined with art historical research into

the works of his customers. We propose that Rotterdam could have been the location of the panel maker's workshop, based on the Baltic provenance of the wood of the panels, the painters who used them, and the supply of timber to the Dutch Republic in the first half of the 17th century. Our understanding of the panel maker's practices in the 17th century is increased by this interdisciplinary attempt to unravel an unknown Dutch panel maker and his practice. To comprehend the complexity of the booming art market of the 17th-century Netherlands, further research into Dutch frame- and panel-makers and their regulations and practices is urgently needed.

### Keywords

art history – Baltic oak – dendrochronology – marks on art – Netherlandish art – *Quercus* – panel paintings

## 1 Introduction

In 1940 the Dutch art historian and art dealer Albert Heppner (1900–1945) published an article on brands and stamps, and their importance for the provenance and making of panel paintings (Heppner 1940). He argued that young art historians, without a collection to care for, were unaware of the wealth of information presented by the reverse of paintings for understanding artworks and their genesis. Heppner urged the field to turn around the paintings and examine their backsides carefully for the signs of guild brands or other sorts of stamps (Fig. 1). Fifty years later, this was initiated by a few art historians and conservators who recognized the importance of compiling and organizing information on the presence of these marks, ideally coupled with archival research (Wadum 1990; Van Damme 1990). Until now, research has focused entirely on makers' marks or brands on Flemish panels from the 16th and 17th centuries. The current paper is the first to study the occurrence of makers' marks on North Netherlandish panels (i.e., produced in the current Netherlands).

Aligning with the research promoted by Heppner (1940), and in addition to the ongoing research into Flemish panel makers, we have investigated a panel maker who sold products to painters within the Dutch Republic. The reason for a panel maker branding his panels in the Northern Netherlands, the young Dutch Republic, was investigated. The still anonymous panel maker stamped his house mark in the back of the panels: two letters 'M' above each

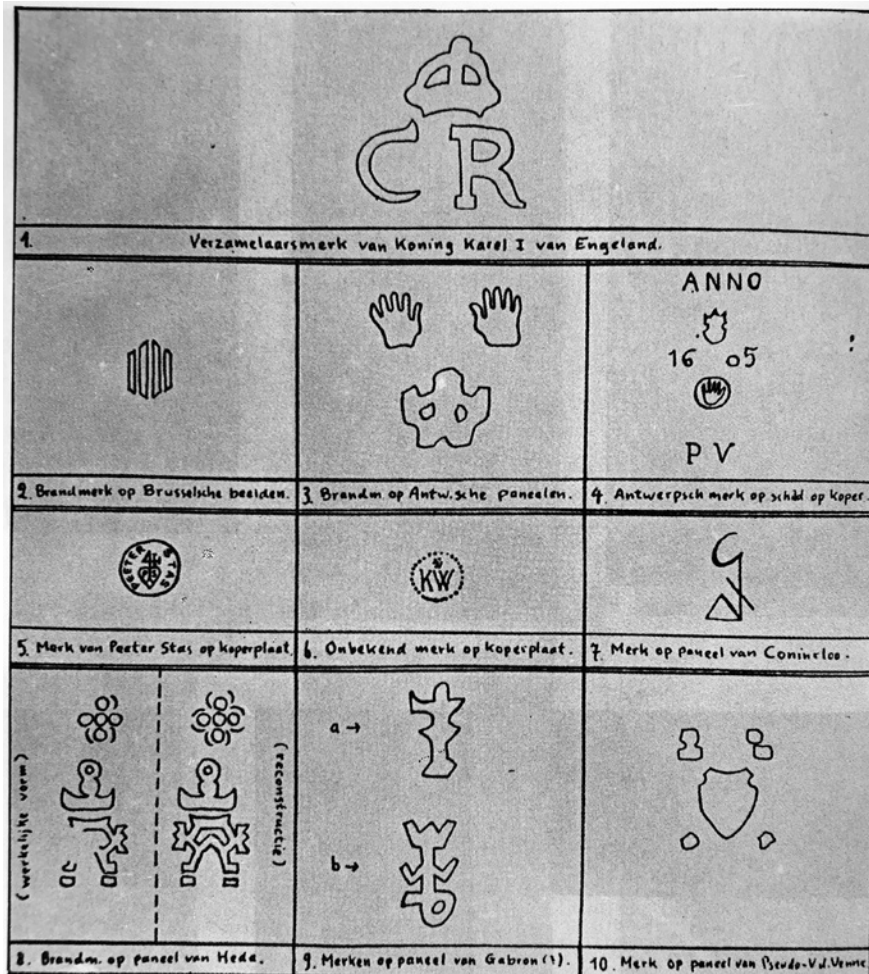


FIGURE 1 Guild brands and other marks on panels reported by Albert Heppner, *Oud Holland* (1940). Bottom row center the '4MM' upside down, recorded on painting no. 20 in Table 1 (attributed to Guilliam Gabron at the time)

other and crowned by the cipher '4' (Fig. 2). This mark, which appears upside down as '4MM' in Heppner (1940), is suspected to be related to the family name of the panel maker. To date, this mark has been found in twenty-three panels painted by seventeen different artists (Table 1). Some of the paintings are signed by the artists, with some also including the dates, ranging from 1632 to 1648. The diverse provenance of the paintings does not suggest single ownership of the paintings, and we believe the 4MM mark can be discharged as a



FIGURE 2  
 '4MM' mark on the back of the painting 'Portrait of a 36-year-old woman' by Jan Daemen Cool, signed by the artist in 1632 (painting no. 7 in Table 1)

PHOTO: FRANKFURT A. M., STÄDEL MUSEUM

collector's mark. Conversely, all the reverses of the panel paintings examined display comparable tool marks, pointing to one workshop making panel supports for painters. However, the main challenge is that knowledge of North Netherlandish panel makers and their marks is limited; therefore, our goal is to fill in this gap. Hence, dendrochronology and (technical) art history were combined to shed light on the woodworking practices, determine the location of the workshop, and possibly uncover the identity of the 4MM panel maker.

TABLE 1 Catalogue compiled by the authors of known panel paintings bearing the 4MM mark

Nr.	Artist, <i>Title</i> , signature and/or date if applicable, support, dimensions. Collection.
1	Anonymous Dutch artist, <i>Portrait of a family</i> . No signature or date. With art dealer Lambertus de Vries, Berlin 1940 (Heppner 1940)
2	Anonymous Dutch artist, <i>Portrait of a young boy aged 12</i> , inscribed and dated "Aetatis 12. Ano 1645 (or 1641). fe ...". Oil on panel, 158.5 × 102 cm. Paris, Louvre Museum, inv.no. MNR 424 (as Wybrand Symonsz. De Geest)
3	Anonymous Dutch artist, after Adriaen Pietersz. van De Venne, <i>Group portrait with William I of Nassau, his 3 sons and Counts of Nassau and an orange tree with coats of arms</i> . No signature or date. Oil on panel, 74 × 121 cm. Sale Ghent, Maison Jules Veilinghuis, 15-5-2022, lot 642

TABLE 1 Catalogue compiled by the authors of known panel paintings (*cont.*)

Nr.	Artist, <i>Title</i> , signature and/or date if applicable, support, dimensions. Collection.
4*	Anonymous Dutch artist, <i>Te Riviere Castle before destruction in 1574</i> . No signature or date. Oil on panel, 59 × 81.5 cm. Stedelijk Museum Schiedam, inv.no. H-00000086.1-12.01
5	van Anthonissen, Hendrick, <i>Dutch ships in a harbour firing salute, probably Delfshaven</i> , signed “HVANTHONISSEN”, no date. Oil on panel, 73 × 107 cm. Antwerpen, Koninklijk Museum voor Schone Kunsten, inv.no. 359
6*	Avercamp, Barend, <i>Winter landscape</i> . Oil on panel, 38 × 51 cm. No signature or date. Amsterdam, Rijksmuseum, inv.no. SK-A-3286
7**	Cool, Jan Daemen (attributed to), <i>Portrait of a 36-year-old woman</i> , inscribed “Aetatis. 36. / Ao. 1632”. Oil on panel, 103.4 × 76.5 cm. Frankfurt, Städel Museum, inv.no. 716
8	Monogrammist DG, <i>Golden eagle with a heron and a sparrowhawk in a landscape</i> , monogrammed “DG”, no date. Oil on panel, 93.5 × 133 cm. Soissons, Musée municipal, inv.no. 93.34.1 (as J. De Gheyn II)
9	Fonteyn, Adriaen Lucasz, <i>Merry company, drinking and making music in an interior</i> , indistinctly signed middle left on the virginal, no date. Oil on panel, 48.5 cm × 65 cm. Sale Hilversum, Van Spengen, 1-3-2022, lot 1222
10*	van der Helst, Bartholomeus, <i>Portrait of Maria Pietersdr. de Leest</i> , signed and dated “B. van der helst 1646”. Oil on panel, 68 × 58 cm. Amsterdam, Rijksmuseum, inv.no. SK-A-144
11*	van der Helst, Bartholomeus, <i>Portrait of Samuel van Lansbergen</i> (pendant of nr. 10), signs of an inscription. Oil on panel, 68 × 58 cm. Amsterdam, Rijksmuseum, inv.no. SK-A-143
12	van der Helst, Bartholomeus, <i>Portrait of a 62-year old woman</i> , signed and dated “B. van der Helst Aeta 62 1648”. Oil on panel, 64.5 × 54.5 cm. Private collection Lady Colum Crichton Stuart, widow of the 6th Marquis of Lansdowne, London, 1954
13	Lois, Jacob, <i>The Baptism of Christ</i> , signed and dated “Jacobus Lois fecit: 1647”. Oil on panel, 95.2 × 80 cm. Sale New York, Christie’s, 4-10-1996, lot 108
14**	Ossenbeeck, Willem, <i>Landscape with shepherds and cattle</i> , signed lower left ‘Ossenbeeck’. Oil on panel, 49 × 65 cm. Rijksmuseum SK-A-2095
15	Palamedesz, Anthonie, <i>An elegant company in an interior</i> , signed “A. Palamedesz”, no date. Oil on panel, 48.6 cm × 65.2 cm. Sale London, Philips, 6-7-1993, lot 217

TABLE 1 Catalogue compiled by the authors of known panel paintings (*cont.*)

Nr.	Artist, <i>Title</i> , signature and/or date if applicable, support, dimensions. Collection.
16	Saftleven, Cornelis, <i>Barn interior</i> , indistinctly signed on stool “cs...?”. Oil on panel, 37.8 × 52.5. Private collection Poland
17*	Saftleven, Cornelis, <i>Drinking Company outside a Tavern</i> . No signature or date. Oil on panel, 67 × 90. Stockholm, Nationalmuseum, inv.no. NM 693
18*	Saftleven, Herman, <i>Christ Preaching from a Boat</i> , signed and dated “HSL 1642”. Oil on panel, 75 × 108 cm. Edinburgh, Scottish National Galleries, inv.no. NG 1508. Bequest of Mrs. Nisbet Hamilton Ogilvy of Biel 1921
19**	Sorgh, Hendrick Martensz., <i>The fish market</i> , signed “HM. Sorgh”. Oil on panel, 47.5 × 65 cm. Rijksmuseum SK-C-227
20*	Verelst, Pieter Hermansz., <i>Portrait of a young girl</i> , signed and dated “P. VERELST 1642”. Oil on panel, 68 × 53.4 cm. Art dealer Floris van Wanroij Fine Art, Dommelen, 2022
21	de Vlieger, Simon, <i>Coastal landscape with sailors</i> . No signature or date. Oil on panel, 90 × 120 cm. Lyon, Musée des Beaux-Arts de Lyon, inv.no. H 2129 (cat. No. 46)
22	de Vlieger, Simon, <i>Jesus sleeps during the Storm on the Sea of Galilee</i> , signed on a barrel in the water ‘S/DE/VLIEGER/1637’. Oil on panel, 84.5 × 101 cm. Göttingen, Kunstsammlung der Georg-August-Universität Göttingen, inv. no. 188
23	van Vucht, Gerrit <i>Still life with cut ham, glass of beer and lemon</i> , signed “Gvv”. Oil on panel, 33.2 × 41.5 cm. Rijksdienst voor het Cultureel Erfgoed, inv.no. NK 1913 (RKD images no. 7122)

\* Paintings subjected to dendrochronological research for this study.

\*\* Dendrochronological research on these paintings was carried out by P. Klein (the data is available at <https://rkd.nl/explore/technical>). We have integrated the results with ours on Table 2.

## 2 Antwerp Marks and Brands

Research on the markings of a multitude of artifacts produced in Flanders from the 15th–17th century culminated with the publication of *Merken opmerken* (registration of marks) (Van Vlierden & Smeyers 1990). The study of disputes and new petitions of carpenters and joiners’ guilds in Antwerp considerably increased our understanding of their practices and that era’s art

market (Van Damme 1990). The Antwerp Joiners' guild issued a petition on 13 November, 1617. It ordered thereafter that panels should be marked with a) the individual mark of the panel maker, and b) the hallmark of the St. Luke's guild, where most crafts producing luxury commodities were organized, in the form of the coat of arms of Antwerp (two hands and the Antwerp castle) (Van Vlierden & Smeyers 1990). The panel makers' marks as a dating tool for paintings should be critically reviewed, as several apparently 16th-century panels were marked with the maker's monogram from the early 17th century (Wadum 1993, 1998b). Upon review, the marks show neither a *terminus post quem* nor the panel maker's date of death a *terminus ante quem* of the painting in question. Recently, the focus on specific Antwerp panel makers (Guilliam Aertssen, Guilliam Gabron, Michiel Vriendt, Michiel Claessens) has unraveled intriguing connections and networks between the panel makers and their clientele (Moortgat & Wadum 2021; The Jordaens Van Dyck Panel Paintings Project (JVDPPP), <http://jordaensvandyck.org/panel-makers/>). The present research, however, aims to elucidate this topic with a unique focus on the Northern Netherlands and an unknown but reoccurring mark by a North Netherlandish panel maker.

### 3 North Netherlandish Panel Makers' Marks

The study of North Netherlandish panel makers is still nascent, perhaps because of the seemingly infrequent occurrence of these marks on panel paintings from the north. There has never been systematic research conducted into the phenomenon, and only a few studies referring to marks on North Netherlandish panels exist. These include the exhibition catalogue *Prijs de Lijst*, where several marks are illustrated (Van Thiel & De Bruyn Kops 1984), and a poster presentation on marks found on Northern Netherlandish panels (Wadum 2014). The latter underscored the diversity of makers' marks for the first time and simultaneously highlighted the main difference between Northern and Southern Netherlandish panels: most northern boards display fine parallel saw marks typical of a wind-driven sawmill, contrary to the hand-sawn boards from the south that show the typically curved marks left by the teeth of a handsaw laboring its way through the thin wood. Studying the relationships between marks and the production line in the panel makers' workshops with the Early Modern trade in commodities, paintings, and painters' materials, is an ongoing undertaking that can provide crucial insights into workshop practices and the art market in the Northern Netherlands during the first half of the 17th century.

## 4 Dendrochronological Research

In art-historical studies, dendrochronology is a well-established discipline used to determine the date and provenance of the wood used to make objects such as sculptures, furniture, or panel paintings (e.g. Klein 1981; Fraiture 2009, 2014; Domínguez-Delmás et al. 2021; Daly & Tyers 2022). While the date of the wood making up the panels provides a *terminus post quem* date for the object (i.e., the earliest possible production time), the provenance of the wood informs about historical trade connections and their shifts through time (Daly & Tyers, 2022). Furthermore, the comparison of tree-ring data from boards used in different paintings can reveal wood from the same tree employed in panels used by different artists. This indicates that the artists could have been supplied by the same panel maker and allows further inferences to be made about wood-working and panel-workshop practices.

In this study, given that several of the paintings in our catalog were dated by the artist (Table 1), and that panel paintings seldom contained sapwood rings needed to estimate the felling of the tree within a range of years, the dendrochronological research was devised to determine, beyond the date of the wood, its provenance, and whether the panels bearing the same mark share wood obtained from the same tree.

### 4.1 Selection of Panel Paintings and Recording of Tree-Rings

A subset of eight paintings from the 23 identified with the 4MM mark was selected for dendrochronological examination, based on their accessibility at museums and/or art galleries. The selection included unattributed and undated panels in addition to the signed and dated ones. We ensured the inclusion of panels of different formats. Additionally, the tree-ring data of three paintings previously researched by P. Klein (paintings no. 7, 14, and 19 in Table 1), which are openly available at the Dendro4Art database (<https://rkd.nl/explore/technical>), were also added to the dataset for comparison. Dendro4Art is an online portal with dendrochronological reports, metadata, and raw data, including more than 16 000 tree-ring measurements produced by Prof. Peter Klein and others through dendrochronological research of panel paintings and sculptures.

The research was carried out along the transverse section of each selected panel. To visualize the tree rings, the wood was slightly prepared by cleaning a shallow 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)



following standard dendrochronological procedures for oaks described by Baillie (1982) and Baillie and Pilcher (1973).

#### 4.2 Characteristics of the Panels and Woodworking Features

The panels selected for dendrochronological research comprised either two or three boards, and only one of the paintings previously analyzed by P. Klein consisted of only one board (painting 19 in Table 1). When the panel is comprised of three boards, the 4MM mark(s) always appear on the central board. During the examination of the panels, differences in the finishing details were obvious. Most of them display similar evenly spaced saw marks produced by a mechanical saw, most probably a sawmill, (Fig. 3a) on the reverse of the boards, and have uniformly thick boards with smooth edges beveled by a plane at the four sides (Fig. 3b). However, others have boards of different thicknesses, or show coarse marks typical of a *roffelschaaf* [scrub plane], in addition to the plane ones from the beveled areas (Fig. 3c, d) (van der Sterre 2001). The tool has a rounded, convex edge, producing characteristic shavings. Research has



FIGURE 3 Woodworking marks observed on the panels. (a) Evenly spaced saw marks produced by mechanical sawing (this image corresponds to painting no. 16 in Table 1); (b) smooth beveled edges (painting no. 17); (c and d) local thinning by a scrub plane is found in several panels (corresponding to paintings no. 18 and 10 respectively)

PHOTOS: (A) CA. HEISSER, NATIONALMUSEUM STOCKHOLM;

(B–D) M. DOMÍNGUEZ-DELMÁS



FIGURE 4 Multiple '4MM' marks in two panels. (a) Two marks on panel no. 20 in Table 1; (b) four marks on panel no. 11

PHOTOS: M. DOMÍNGUEZ-DELMÁS

demonstrated that the *roffel* plane was common in Rotterdam, whereas the smaller *gerfschaaf* was preferred by the Amsterdam carpenters (van der Sterre 2001: pp. 51–55). This regional differentiation of preferred tools used by woodworkers provides the first clue towards the potential location of the 4MM-panel maker workshop, pointing towards Rotterdam.

Sapwood has been fully removed in all but five boards in three paintings, which retain partial sapwood (one board of painting no. 4, the three boards of painting no. 7, and one board of painting no. 19). Sapwood is the weakest part of oak wood because it is very susceptible to insect infestation and degradation. Therefore, its full removal was considered a necessary step towards a high-quality product in art-production centers of the Southern Netherlands (current Belgium) (Van Damme 1990). Furthermore, while most panels only have one mark stamped at the back, some of them have two (painting no. 23 in Table 1; Fig. 4a), and one shows as many as four 4MM marks on the same board (no. 11; Fig. 4b). We suspect that multiple marks on one particular panel are the result of the first attempt leaving only a partial mark, triggering subsequent attempts to leave a fully readable mark. This could be the result of the work of an apprentice. However, more panels should be examined to reach a plausible conclusion.

### 4.3 Date and Provenance of the Wood and Timber Products

From a total of twenty-two boards researched from the eight paintings selected for this study, all but one were successfully dated (Table 2). Alongside the six boards of the three paintings previously researched by Klein, there is a dataset of twenty-seven dated boards, all of which have end-dates in the 16th or early 17th century (Table 2, Fig. 5). These dates are consistent with the production of the paintings within the range of years of the ones signed and dated by the artists (the earlier dates corresponding to boards obtained from parts of

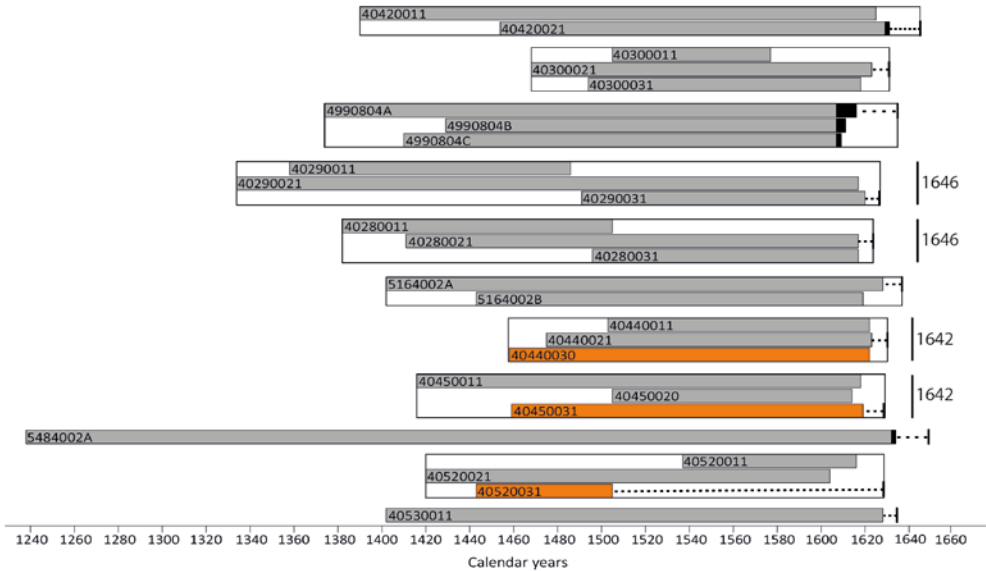


FIGURE 5 Bar graph illustrating the number of rings present on each board and the period they cover. This graph also illustrates that some boards (those dating earlier) were obtained from the inner part of the tree, being presumably leftovers of wider boards

the stem closer to the pith), indicating that this panel maker was likely active between 1618 and 1655 (Table 3). Furthermore, the results revealed that the wood employed in the paintings examined originated almost exclusively from the Eastern Baltic, more specifically from Lithuania (area assigned by Daly & Tyers, 2022 for the 2021BLT3 reference chronology). Only three boards originated from a different area (Table 2). Present-day Lithuania seems to have supplied high-quality oak timber products to the Dutch Republic during the first decades of the 16th century and up to around the middle of the 17th-century (Daly & Tyers, 2022). After that, the trade of oak in the Baltic declined in favor of conifer exports (Zunde, 1998–1999). In Dutch markets, it was replaced by German oak (Jansma et al. 2004).

The consistency in the source of the Baltic timber throughout the examined paintings suggests that the workshop was located either in a major city with a large trading harbor, where cargo ships involved in the Baltic trade would arrive with timber products from the East, such as Amsterdam or Rotterdam, or in a town close to or with a short connection to the coast via waterways.

The Sound Toll Register Online (<http://www.soundtoll.nl/index.php/en/>), a historical database containing the digitized toll registers of the Sound strait between Denmark and Sweden from 1497 to 1857, provides information about different timber products imported into the Dutch Republic. One of the timber products exported from the Baltic region was oak wainscots, i.e., radial

TABLE 2 Results of dendrochronological research

Painting no./Board	Keycode	<i>N</i>	sw	wk*	Start year	End year	TBP
4/Board 1	40420011	236	0	> 6	1390	1625	9.45
4/Board 2	40420021	178	2	(4–16)	1454	1631	4.67
6/Board 1	40300011	73	0	> 6	1505	1577	4.45
6/Board 2	40300021	157	0	> 6	1467	1623	9.44
6/Board 3	40300031	125	0	> 6	1494	1618	9.95
7/Board 1	4990804A	243	9	(0–18)	1374	1616	4.68
7/Board 2	4990804B	183	4	(2–14)	1429	1611	7.01
7/Board 3	4990804C	200	2	(4–16)	1410	1609	10.50
<i>10/Board 1</i>	<i>40290011</i>	<i>129</i>	<i>0</i>	<i>&gt; 6</i>	<i>1358</i>	<i>1486</i>	<i>7.43</i>
<i>10/Board 2</i>	<i>40290021</i>	<i>284</i>	<i>0</i>	<i>&gt; 6</i>	<i>1334</i>	<i>1617</i>	<i>7.62</i>
<i>10/Board 3</i>	<i>40290031</i>	<i>130</i>	<i>0</i>	<i>&gt; 6</i>	<i>1491</i>	<i>1620</i>	<i>4.83</i>
11/Board 1	40280011	126	0	> 6	1380	1505	5.10
11/Board 2	40280021	207	0	> 6	1411	1617	9.98
11/Board 3	40280031	103	0	> 6	1515	1617	4.11
14/Board 1	5164002A	227	0	> 6	1402	1628	8.83
14/Board 2	5164002B	177	0	> 6	1443	1619	6.75
17/Board 1	40440011	120	0	> 6	1503	1622	7.66
17/Board 2	40440021	149	0	> 6	1475	1623	7.95
17/Board 3**	40440030	165	0	> 6	1458	1622	6.45
18/Board 1	40450011	203	0	> 6	1416	1618	9.24
18/Board 2	40450020	113	0	> 6	1502	1614	4.38
18/Board 3**	40450031	161	0	> 9	1459	1619	11.90
19/Board 1***	5484002A	397	2	(4–16)	1238	1634	13.6
20/Board 1	40520011	80	0	> 6	1537	1616	6.85
20/Board 2	40520021	185	0	> 6	1420	1604	9.79
20/Board 3**	40520031	63	0	> 123	1443	1505	6.21
23/Board 1	40530011	227	0	> 6	1402	1628	7.75
23/Board 2	40530021	25	0	–	–	–	–

*N*, number of measured rings; sw, number of sapwood rings; wk, bark edge; –, absent/number in parentheses indicates estimated number of missing rings to bark edge; TBP, Student's *t*-value according to Baillie and Pilcher (1973); %PV, percentage parallel variation (Eckstein and Bauch, 1969); SL, significance level of %PV ( $## p < 0.01$ ,  $### p < 0.001$ ); MRW, mean ring width. Boards of painting no. 10 highlighted in italics originate from the same tree. The statistical values provided represent the best match with published chronologies, even when some (mostly those here showing TBP < 5) have higher values with other unpublished chronologies. All matches have been visually verified.

%PV	SL	MRW (mm)	SD (mm)	Estimated felling date*	Reference chronology
71.4	###	1.23	0.33	After 1631	2021BLT3
64.5	###	1.49	0.58	Between 1635–1647	2021BLT1X
71.2	###	1.21	0.30	After 1583	2021BLT3
75.0	###	1.88	0.41	After 1629	2021BLT3
74.8	###	1.01	0.22	After 1624	2021BLT3
59.7	##	1.02	0.30	Between 1616–1634	2021BLT2
66.4	###	1.35	0.37	Between 1613–1625	2021BLT3
64.8	###	1.15	0.47	Between 1613–1625	2021BLT3
63.6	##	1.05	0.25	After 1492	2021BLT3
62.7	###	1.02	0.23	After 1623	2021BLT3
68.1	###	1.03	0.28	After 1626	2021BLT3
63.71	##	1.09	0.26	After 1511	2021BLT3
66.9	###	1.34	0.42	After 1623	2021BLT3
68.0	###	1.03	0.27	After 1623	2021BLT2
69.2	###	0.95	0.37	After 1634	2021BLT3
65.0	###	1.19	0.5	After 1625	2021BLT3
75	###	1.38	0.31	After 1628	2021BLT3
72.5	###	1.51	0.50	After 1629	2021BLT3
63.9	###	1.33	0.41	After 1628	2021BLT3
70.7	###	1.36	0.44	After 1624	2021BLT3
65.0	###	1.39	0.44	After 1620	2021BLT3
75.2	###	1.52	0.58	After 1628	2021BLT3
71.3	###	1.08	0.54	Between 1638–1650	2021BLT3
77.5	###	1.39	0.40	After 1622	2021BLT3
69.7	###	1.75	0.35	After 1610	2021BLT3
78.6	###	1.82	0.66	After 1628	2021BLT3
66.3	###	1.19	0.35	After 1634	2021BLT3
–	–	–	–	–	–

\* Estimation based on Sohar et al (2012) for the 95% confidence interval.

\*\* Boards from different paintings that derive from the same tree.

\*\*\* In this tree-ring series, the ring corresponding to the year 1504 was missing. The series has been corrected now, therefore the end date is one year later than initially reported by P. Klein (<https://rkd.nl/explore/technical/5003142>).

TABLE 3 Earliest possible production dates for the paintings considering the estimated felling date and adding 2 to 5 years of seasoning time (Klein et al. 1987; Wadum 1998)

Painting no./artist/ title	Estimated felling date of most recent tree	Earliest possible production time for the painting	Likely production date	Reference
4/Anonymous Dutch artist/Te Riviere Castle	Between 1635–1647	Between 1637–1652	–	Domínguez-Delmás (2021)
6/Avercamp, Barend/ Winter landscape	After 1629	Between 1631–1634	–	Domínguez-Delmás (2022a)
7/Cool, Jan Daemen/ Portrait of a 36-year-old woman	Between 1616–1634	Between 1618–1639	1632 (signed)	<a href="https://rkd.nl/explore/technical/5004528">https://rkd.nl /explore/technical /5004528</a>
10/van der Helst, Bartholomeus/Portrait of Maria Pietersdr. de Leest	After 1626	Between 1628–1631	1646 (signed)	Domínguez-Delmás (2022b)
11/van der Helst, Bartholomeus/ Portrait of Samuel van Lansbergen	After 1623	Between 1625–1628	1646	Domínguez-Delmás (2022c)
14/Ossenbeeck, Willem/Landscape with shepherds and cattle	After 1634	Between 1636–1639	–	<a href="https://rkd.nl/explore/technical/5003049">https://rkd.nl /explore/technical /5003049</a>
17/Saftleven, Cornelis/ Drinking Company outside a Tavern*	After 1629	Between 1631–1634	1642	Domínguez-Delmás (2022d)
18/Saftleven, Herman/ Christ Preaching from a Boat*	After 1628	Between 1630–1633	1642 (signed)	Domínguez-Delmás (2022e)
19/Sorgh, Hendrick Martensz./The fish market	Between 1638–1650	Between 1640–1655	–	<a href="https://rkd.nl/explore/images/247304">https://rkd.nl /explore/images /247304</a>
20/Verelst, Pieter Hermansz./Portrait of a young girl*	After 1628	Between 1630–1633	1642 (signed)	Domínguez-Delmás (2022f)

TABLE 3 Earliest possible production dates for the paintings (*cont.*)

Painting no./artist/ title	Estimated felling date of most recent tree	Earliest possible production time for the painting	Likely production date	Reference
23/van Vucht, Gerrit/ Still life with cut ham, glass of beer and lemon	After 1634	Between 1636–1639	–	Domínguez-Delmás (2022g)

Likely production dates are indicated when known (signed by the artist) or when inferred from the presence of wood from the same tree in different paintings.

\* Panels with boards obtained from the same tree.

portions of oak resulting from splitting straight oak stems along the grain with wedges and axes (Wazny 2005; Eckstein & Wrobel 2007). Baltic oak's reputation was characterized by a slow and regular growth that resulted in wood with a fine grain (i.e., a narrow tree-ring structure). The split surfaces of wainscots have many advantages because they remain more flexible, stronger, and less exposed to cupping than a sawn surface as no fibers have been cut (Van Tussenbroek 2015). Hand-sawn radial and semi-radial boards were well known based on our examination of Flemish panels. Similarly, all the boards by 4MM that we examined were processed in a (semi)radial fashion. However, they display fine, evenly-spaced, saw marks resulting from mechanical sawing. Therefore, these boards could derive from wainscots sawn at sawmills, a process that also would deliver boards and panels with high dimensional stability.

Sawmills were introduced to the Dutch Republic in 1594. Cornelis Cornelisz van Uitgeest (ca. 1550–ca. 1600) built a small mill with a crankshaft, making it possible to change a circular motion into a back-and-forth swing (Bonke 2004). The revolving cogs, driven by the sails of the mill, were altered to a vertical sawing motion. This allowed the machine to run a framesaw, which revolutionized windmills as sawing machines because tree trunks and boards could be sawn much faster and cheaper than sawing by hand. The flourishing timber trade in and around Dordrecht, a river town close to Rotterdam and once the largest in the province of South Holland, naturally entailed the necessity of processing timber by sawmills, many of which were located on the west side of the island of Dordrecht. The long and often several inches thick wainscots would be sawn into thinner boards, which were subsequently glued together by the panel makers to form the supports for paintings. The sizes of the boards

TABLE 4 Correspondence of the measurements of paintings in our catalogue (Table 1) with the formats of panels produced in the Netherlands in the 17th century and their trade name as hypothesized by Bruyn (1979), although later disputed by Jager (2020: p. 110, note 38)

Painting no.	Height	Width		Tradename 17th c
20	41.5	33.2		Kleyne stooter
15	52.5	37.8	small	
6	51	38		Groote stooter
9	65	48.5		
14	65.2	48.6		Salvators maat
12	64.5	54.5		
18	68	53.4	medium	
11	68	58		
10	68	58		Grote troniemaat
4	81.5	58		
16	90	67		12 stuyversmaat
5	107	73		
3	121	74	large	
17	108	75		26 stuyversmaat
7	103.4	76.5		
13	95.2	80		
19	120	90		
8	133	93.5	largest	daeldersmaat
2	158.5	102		

produced by 4MM ranged from small and medium standard sizes to larger ones (Table 4) (Bruyn 1979). We encountered landscape formats made of two or more joined planks and vertical portrait panels composed of three planks. In the latter, the central board is the widest to avoid a joint running down the middle of the portrait.

#### 4.4 *Three Panels with Wood from the Same Tree*

The dendrochronological research also revealed interesting results when comparing among the tree-ring series from the boards of the examined paintings (Figs 6 and 7). Strong visual agreement (i.e., tree-ring patterns with the same growth magnitude and trend that result in high statistical values) between the three boards used in the portrait of Maria Pietersdr. de Leest suggests that





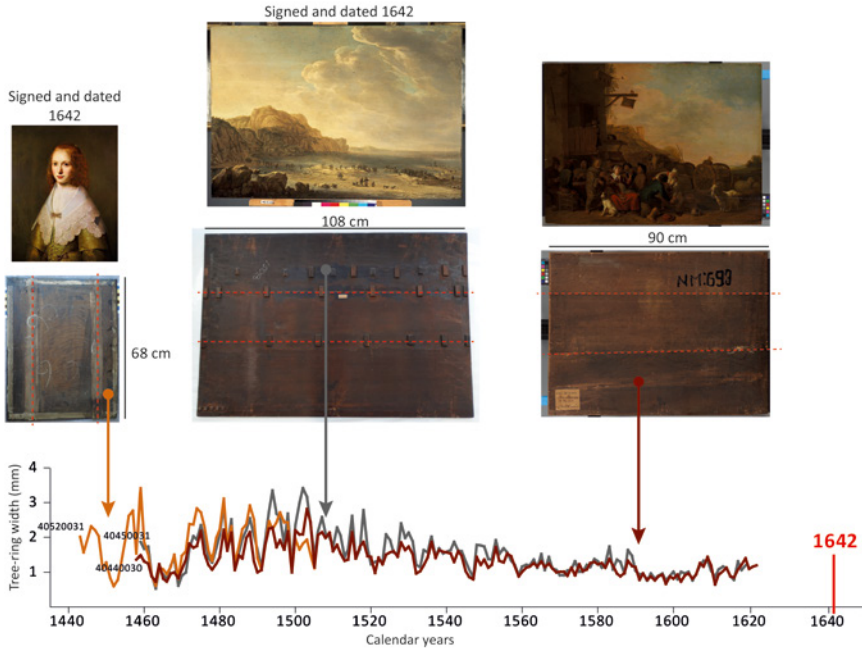


FIGURE 7 Panels with boards from the same tree (painting nos. 16, 17 and 18 in Table 1)

stored smaller fragments of wider boards left over from producing other panels to complete the size and format required for new panels. Fast consumption of wood for the production of panels is suggested by two paintings with wood from the same tree being signed in the same year.

## 5 Art Historical Research: The Artists and the Commissioners

The artists' place of activity during the production of the painting provides information about the city where the panel support was likely purchased (Fig. 8). In this section, the signed and convincingly attributed works in our catalog are focused on (Table 1). Biographical information on these 14 artists point towards Rotterdam as the location of the 4MM panel maker's workshop.

Six of these painters — Jan Daemen Cool (1589–1660), Adriaen Lucasz. Fonteyn (d. 1661), Jacob Lois (ca. 1620–1676), Willem Ossenbeek (active 1632), Hendrick Martensz. Sorgh (ca. 1609/1611–1670) and Cornelis Saftleven (1607–1681) were citizens of Rotterdam. Fonteyn, Lois, and Sorgh (nos. 9, 13, and 19) appear to have worked in Rotterdam their entire lives (Van der Zeeuw 2014: pp. 279, 287, 299–300). After an apprenticeship in Delft, Jan Daemen



FIGURE 8 Historical map indicating the cities where painters used panels by 4MM. Nicolaes Visscher (1), *Map of the Republic of Seven United Netherlands*, ca. 1658. Rijksmuseum Amsterdam, inv. no. RP-P-AO-1-50 (<http://hdl.handle.net/10934/RM0001.COLLECT.604516>)

Cool had permanently returned to his birth city of Rotterdam in 1618 (Ekkart 1997), and was certainly present in 1632 when he painted *Portrait of a 36-year old woman* (no. 7). Cornelis Saftleven was in Rotterdam for most of his life, besides a supposed brief visit to Antwerp around 1632 and visits to his brother Herman Saftleven in Utrecht between 1633 and 1637 (Van der Zeeuw 2014: pp. 295–296; Denucé 1932: pp. 69, 228; Schoemaker 2022: p. 88). Therefore, it is highly likely that Cornelis Saftleven painted the two paintings in our dataset in Rotterdam (nos. 16 and 17). There is little biographical information available on Ossenbeek (no. 14), but he is generally considered to be under the Rotterdam School (Van der Zeeuw 2014: p. 291).

Two painters in our dataset have been recorded to have lived and worked in Rotterdam in the year they signed and dated the panels from the 4MM workshop. The leading Amsterdam portrait painter Bartholomeus van der Helst

(ca. 1613–1670) was active in Rotterdam in at least 1646 and 1647, demonstrated by the twelve identified portraits from this period (Van Gent 2011: pp. 41–43, cat. nos. 30–33, 38–41; Hillegers 2014: p. 38). These include two paintings in our dataset: the portraits of the Rotterdam remonstrant preacher Samuel van Lansbergen (1588–1669) and his wife Maria Pietersdr. de Leest (nos. 10 and 11). The 62-year-old woman that Van der Helst portrayed in 1648 remains unidentified (no. 12), and one can only speculate that she may have resided in Rotterdam as well. Pieter Hermansz Verelst (1618–ca. 1678) was in Rotterdam in 1642 where he portrayed Agatha van Hartigsvelt (1627–1697), the daughter of the then recently deceased Rotterdam mayor Cornelis Jansz Hartigsvelt (1586–1641) (Musée des Beaux-Arts de Dijon, inv.no. 77). Verelst's painting in our catalog, *Portrait of a young girl*, is dated 1642 (no. 20), and corresponds in size, style, and likeness to the Dijon portrait of Agatha van Hartigsvelt. Therefore, it is likely that Verelst painted this work in Rotterdam as well, but further research is required to determine whether the two paintings are part of a larger series of siblings.

Simon de Vlieger (ca. 1600/1601–1653), the painter of two works in our dataset, started his career in Rotterdam (ca. 1624–1633). However, he moved to nearby Delft (1634–1638), and later to Amsterdam (1638–1648) and Weesp (1649–1653). He regularly visited Rotterdam (documented in 1637, 1644, and 1652) and remained connected with Rotterdam painters, patrons, and art dealers. In 1637, while living in Delft, De Vlieger purchased a house in the Rotterdam *Schilderstraat* (Painter's Street) from the art dealer Crijn Hendricksz. Volmarijn (1601–1645). They agreed that the painter would pay for the house by supplying the art dealer with paintings: works valued at 31 guilders monthly for three years. De Vlieger had the choice to make one painting of *groot soort* or two smaller paintings of the sizes *sevestuiverspaneel* and *seewaterspaneel* (Giltaij & Kelch 1996: pp. 181–182; compare with Table 4). The painting shop that Volmarijn managed together with his wife Trijntge Pieters had large stocks of supports and pigments, which suggests that they provided materials to the painters who produced for them (see also Henny 1994). *Jesus sleeps during the Storm on the Sea of Galilee* (no. 22) is dated 1637 and De Vlieger was recorded in Rotterdam that year; *Coastal landscape with sailors* (no. 21) does not carry a date.

Two artists in our database were active in smaller towns around Rotterdam, such as Schiedam and Delft. Schiedam, 6 kilometers from Rotterdam, was not a center of art production in the 17th century. Nevertheless, Gerrit van Vucht (ca. 1610–1697) (no. 23) lived there and painted simple still lifes for the Rotterdam dealer Volmarijn, whose shop in 1648 included 57 paintings by Van Vucht (exh.cat. Schiedam 1966). The painter owed the shop 37 guilders and 9

stuivers, presumably for delivered painters' materials. Another painting that must have originated in the vicinity of Schiedam was the unsigned painting of the Riviere Castle in Schiedam (no. 4), which was most probably painted by a local artist or an artist from nearby Rotterdam.

In contrast to Schiedam, Delft was a center for art production in the period. Delft is approximately fifteen kilometers from Rotterdam and was well reachable by public tow barges. Anthonie Palamedesz. (1602–1673) was a successful painter who spent almost his entire adult life in Delft. His painting *An elegant company in an interior* (no. 15) most probably originated there. While little is known about where artists in smaller towns purchased their materials, a large city nearby is a plausible option (Wadum 1998a; Koopstra 2010). Original sources on artists' materials are rare, but the three documents we have from Delft mention art dealers or painters who obtained their pigments from Rotterdam (Montias 1982: pp. 206–207). The already mentioned dealer Volmarijn was one of these suppliers.

Three painters are not known to have worked in or near Rotterdam during the painting of the work with 4MM. Hendrick van Anthonissen (1605–1656) mainly resided in Amsterdam, but has also been recorded in The Hague (1631), Leiden (1631–1635), Leiderdorp (1635–ca. 1642), and Rijnsburg (1651). As he witnessed the arrest of preacher Petrus Backerius in the city's inn De Steur in 1645, he must have visited Rotterdam on occasion as well (Haverkorn van Rijsewijk 1890: pp. 203–204). It is not certain if *Dutch ships in a harbour firing salute* (no. 5) was painted in Rotterdam, but the harbour view is strongly reminiscent of nearby Delfshaven (Schoemaker, RKD, personal communication). Herman Saftleven (1609–1685), brother of the above-mentioned Cornelis Saftleven, was born in Rotterdam but moved permanently to Utrecht in 1632 or early 1633 (Schoemaker 2022). There was a direct connection by tow barge and the brothers visited each other regularly, but we can only speculate where Herman procured the panel from the 4MM workshop. Barend Avercamp, brother of the better-known painter Hendrick Avercamp, has never been recorded in or in the vicinity of Rotterdam. He lived in Zutphen (1640–1649) and Kampen (1649–1679) and was also active in the timber trade. *Winter landscape* (no. 6) is not signed, like the majority of the oeuvre attributed to him.

In summary, most of these painters' biographies point towards Rotterdam as the location of the 4MM panel maker's workshop. It is too premature to use the occurrence of the mark to adjust attributions. Further research into the oeuvres and materials used by lesser-known artists from Rotterdam and other production centers of art in the Northern Netherlands might bring forth more

marks by the 4MM workshop and other workshops, allowing us to refine our preliminary conclusion.

Interestingly, several artists in our dataset were involved with *'t Hemelrijck*, the Rotterdam art and artists' supplies shop managed by Trijntge Pieters and Crijn Hendrickszn Volmarijn. Simon de Vlieger and Gerrit van Vucht supplied paintings to the shop. The contract De Vlieger had with Volmarijn has already been mentioned. The inventory of *'t Hemelrijck* made up after the death of Trijntge Pieters in 1648 lists fifty-seven paintings by Van Vucht, three by De Vlieger, and one by 'Overbeeck' (possibly Ossenbeeck). Anthonie Palamedesz. had a small debt of seven guilders to the shop. Furthermore, Hendrick Martensz. Sorgh was a brother-in-law of Volmarijn. Future research should focus on whether it was *'t Hemelrijck* who sold panels from our panel maker.

## 6 Archival Research on Panel Makers in Rotterdam

The attributions and dates of the paintings on which the mark 4MM can be found point to a panel maker active in Rotterdam between the years 1632 to 1648. To investigate this hypothesis further, we searched the notarial archives for documents related to the history of the profession in Rotterdam.

On 10 March, 1639, the frame- and panel makers of Rotterdam sent in a request to join the turners, foot stove makers, and pulpit makers, in the Guild of Sint Maria (Couvret 1774: pp. 24–25). On 12 April of the same year, the headmasters agreed to their inclusion and arranged an appropriate examination test for this branch of the guild with the frame- and panel makers (Stadsarchief Rotterdam (SR), Archieven van de Notarissen te Rotterdam en daarin opgegane gemeenten (ONA) [18], inv.no. 327, not. Arent van der Graeff: pp. 241–243, 12-04-1639). Hereafter, the frame- and panel makers who passed the exam and had paid their guild dues were the only ones in Rotterdam authorized i) to produce and sell frames made from logs of conifers or similar softwood (*"vuurehoute of van diergelyke zaght hout"*) for their use of paintings, mirrors, prints and such; and ii) to produce panels for painters. Conversely, the ebony workers had permission to produce frames from ebony or veneer, but they could not make panels for paintings (SR, ONA [18], inv.no. 586, not. Adolf Gommelraet: pp. 483–484, 12-04-1656).

From Antwerp, we know that when guilds became involved in regulating the production of panel supports and maintaining certain quality standards, producers started marking their panels with a monogram for identification and differentiation. In Antwerp, this marking became a rule in 1617. As far as

we know, this was never the case for Rotterdam or the entirety of the Dutch Republic. However, more research is required to reach solid conclusions, because no systematic registration of marks on Dutch paintings has been carried out thus far.

## 7 Conclusions

With the combination of dendrochronology with art history and archival research, we can conclude that the 4MM panel maker was active (at least) from 1632 to 1648 (possibly from 1618 till 1652) and had his workshop in Rotterdam. While the marking of panel paintings in the 16th and 17th centuries in the southern Netherlands is known to be a well-established practice, this practice does not seem to have been widespread in the Dutch Republic. It is possible that 4MM and a few other northern panel makers marked their panels to help consumers recognize their quality, setting standards in this process that were comparable with what had been introduced in Antwerp a few decades earlier. The possibility of panel makers bringing this idea along as refugees from the Southern Netherlands should also be considered (Janssen 2016/2017). Further research is needed to discern the number of panel makers that developed this marking system in the Northern Netherlands, its length of use, and if they were connected. The RKD — Netherlands Institute for Art History is currently developing the Marks on Art database (present version available online <https://rkd.nl/nl/projecten-en-publicaties/projecten/124-nieuw-ontwikkelde-marks-on-art-database>), which will become accessible online in the course of 2024 (<https://rkd.nl/en/projects-publications/projects/285-new-marks-on-art-database-under-construction>). This database will allow the systematic study of the typology and chronological and geographical occurrences of marks on panel paintings and wooden sculptures. Large potential also exists in combining marks data with the data of dendrochronological research and identifying the provenance of the timber as found in the Dendro4Art Database.

Dendrochronological research has provided crucial insights about the material used by 4MM, and their processing and use of boards in the panels. Boards obtained from the same tree were found in three paintings, two of which were signed in 1642, indicating that the panels are contemporary. This implies that the panel maker was preparing boards tailored to the commissions of specific panels by the artists. Our research suggests that a stock of narrow boards, left-over from wider ones, was quickly used to meet the format or size required by the artist.

Furthermore, preliminary archival research has brought to light that, in Rotterdam, regulations for woodworkers were made in 1639. The results were that from that date onwards only frame and panel makers connected to the Guild of Sint Maria were allowed to supply panels to painters in the city. The date coincides with the increased frequency with which we find the 4MM mark on panels, the large majority of which were dated after 1638. One panel by the Rotterdam artist Jan Daemen Cool, *Portrait of a 36-year-old lady*, inscribed 'AEtatis. 36./Ao. 1632', is the exception. Nonetheless, we believe that this only provides further weight to Rotterdam as the place of 4MM's activities and that they actually may have been instrumental in initiating the marking of panels in the Dutch Republic. Additionally, we have several examples of panel makers in Antwerp who initiated marking their panels several years before the establishment of this practice by the 1617 petition (Wadum 1993).

Further procuring of dendrochronological data obtained from 4MM's panels and registration of the marks on the back of other North Netherlandish panels should become a standard. In combination with targeted archival research, the revelation of networks and trade in luxury commodities, such as paintings in the 17th century, will benefit not only history but also art history.

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