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DENDROCHRONOLOGICAL ANALYSES OF PAINTINGS OF GDANSK PAINTERS OF THE 15TH TO THE 17TH CENTURY*

Key words: Paintings, oak-wood, master chronology, Gdansk-pomerania.

Parole chiave: quadri, legno di quercia, cronologia principale, Danzica Pomerania.

ABSTRACT

The dating of the wood of 30 paintings of Gdansk painters of the 15th to the 17th century was performed with the new master chronology Gdansk-Pomerania.

In comparison with the chronology «Netherland-Art-History» it is evident that the wood for the most Netherlandish panels is originating from the Polish/Baltic region.

INTRODUCTION

In the years 1984 and 1985 art-historical dendrochronology was called into doubt (BAILLIE 1984; BAILLIE ET ALII 1985; BUNNEY 1985). There were three main points of criticism: some reference chronologies were not absolutely dated, the provenance of the panels of paintings was not known, and the allowance for sapwood was uncertain. These three points can be considered as being solved (ECKSTEIN ET ALII 1986; KLEIN ET ALII 1987; WAZNY 1990). The reference chronology for the dating of Netherlandish paintings has to be shifted by six years to the present, the oak timber of the 15th to 17th century used for the support of most of the Netherlandish

* We dedicate this publication to Professor Dr. Dr. d.c. mult. Walter Liese, on the occasion of his 65th birthday (31 January 1991).

paintings was imported and is of Polish/Baltic origin, and the sapwood allowance is 13...15...19.

REVIEW

In order to explain how these open questions came about some general information is necessary. Some 20 years ago dendrochronology was introduced into art-history as a dating tool. A few years later the first results were published (BAUCH, ECKSTEIN 1970; BAUCH ET ALII 1972). That study dealt with paintings of the Dutch painter Philips Wouwerman who spent all his life in Amsterdam. The panels were successfully dated using the South German oak tree-ring chronology. At that time only three long-term oak chronologies were in existence in Central and Western Europe. There was a high similarity between the tree-ring series of the Wouwerman panels and the South German references series (HUBER ET ALII 1969; HOLLSTEIN 1980). Since the 16th/17th century section of the reference series contained mainly timber from Hesse in central Germany, the panels were assumed to be from trees cut in the Hessian hills and transported to the Netherlands.

However, more important than the question of provenance was the establishment of a likely felling range and the possible time span between the felling of the tree and the creation of the painting. Many of these panels had some sapwood remaining, so the felling dates of the oak trees were estimated using an allowance for sapwood of 20 ± 5 years. This figure is of the same order of magnitude as one derived from some 500 oaks from along both sides of the river Rhine (HOLLSTEIN 1980). Thus the tree-ring series of the Wouwerman paintings and later on of numerous panels of Dutch, Flemish, and German painters were precisely placed in time and the cutting years of the respective oaks estimated.

The problem with art-historical dendrochronology arose when during the analysis of the oak panels used by Rembrandt (BAUCH, ECKSTEIN 1981), Rubens (BAUCH ET ALII 1978) and other painters between the 14th and the middle of the 17th centuries a new tree-ring pattern appeared which did not cross-match with any of the existing oak chronologies.

Since most of the tree-ring series of these panels matched each other extremely well, a floating chronology covering 530 years was established, and this new tree-ring pattern was initially thought to be

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Since most of the tree-ring series of these panels matched each other extremely well, a floating chronology covering 530 years was established, and this new tree-ring pattern was initially thought to be

characteristic for the Netherlands and called Netherlands Type II. This assumption was supported by the fact that the panels of English paintings showed the very same tree-ring pattern (FLETCHER 1977). Thus a growing region along both sides of the Channel was assumed for the oaks in question.

In an attempt to tie down this alternative chronology, a complete Netherlands tree-ring chronology was constructed using living oaks and successively older timbers from wind-mills and other buildings. This resulted in a chronology back to 1036 A.D. (ECKSTEIN ET ALII 1975; BAUCH 1978). However, the alternative tree-ring pattern still failed to crossdate with this Netherlands chronology. It became apparent that two tree-ring chronologies existed for the Netherlands, Type I relevant to building timbers, and Type II from panel paintings.

Within the natural distribution of oak in Europe (Fig. 1), Eastern Europe and especially the coastal range of the Eastern Baltic Sea represent the most possible export source for oak timbers to the Netherlands. According to historical and archival evidence (KRANNHALS 1942; RATHS 1927; WAZNY, ECKSTEIN 1987), the Vistula river (Weichsel) and its tributaries made the large Polish forests accessible. In addition, some altar pieces in Hamburg and Luebeck contained the Type II tree-ring pattern. This suggested strongly that Type II could not be of Dutch origin. As this picture was emerging, an independent investigation of the England-Art-History chronologies which matched with Netherlands Type II, suggested that the timber had derived from Eastern Europe, possibly Poland or Lithuania. But it was acknowledged that a positive dendro-chronological proof was still missing.

In order to finally resolve this question, we have undertaken a study of building timbers from churches and other historical buildings, from art-historical objects and archaeological excavations in North Poland around Gdansk. A chronology has now been constructed from 1985 back to 996 A.D. using some 300 tree-ring series. This chronology matches the Type II chronology with a high *t*-value and a high percentage of parallel variation. Accordingly, the Netherlands Type II chronology now covers the time span from 1115 to 1643 and thus has to be shifted by six years towards the present from our original tentative placement (ECKSTEIN ET ALII 1986; KLEIN ET ALII 1987; WAZNY 1990).

With the origin of the Type II timbers resolved it is interesting to

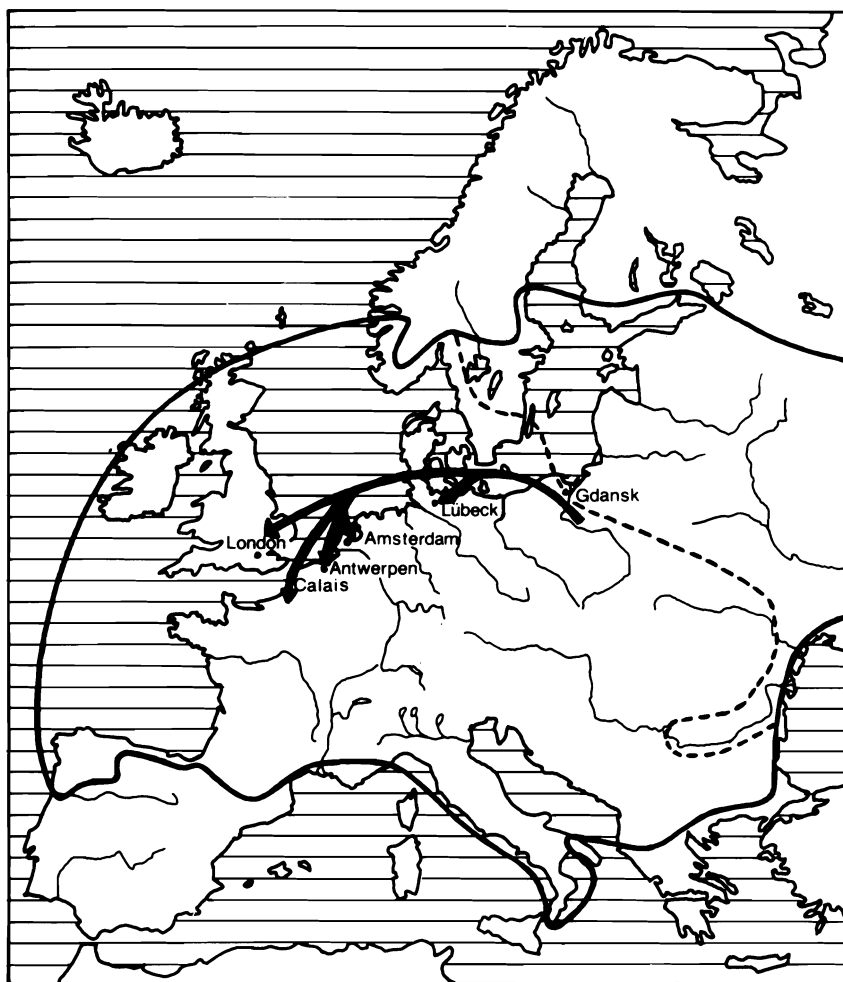


Fig. 1: The areas of the natural distribution of oak. Distribution of *Quercus robur* L. (European oak) is shown as a heavy line, and *Quercus petraea* Liebl. (sessile oak) as an interrupted line. European oak goes further north-east than sessile oak. The source of oak timbers of type II three-ring pattern and the places of their utilization as panels are indicated (arrows).

trace their occurrence. They occur in paintings of Rembrandt in Leiden and Amsterdam (BAUCH, ECKSTEIN 1981), Rubens in Antwerp (BAUCH ET ALII 1978), van der Weyden in Brussels (KLEIN 1989) and van Eyck in Bruges (KLEIN 1987). They are present in some altars of unknown early German painters in Cologne (BAUCH ET ALII 1990) (in some cases alongside panels possessing the West German tree-ring

pattern in the same altar), in some monuments and parts of churches in Luebeck and Hamburg thus confirming the trade connections as indicated in Figure 1. Timbers with the Type II ring pattern have only once been found as building timbers in Amsterdam (cut around 1615), a finding which supports the view that most of the Baltic oak was exported in the form of planks and boards. An explanation of why Type II timbers are never found after 1650 can be seen in the political and economic consequences of the Thirty Years War which cut the trade routes across the Baltic Sea. Finally, the Second Swedish/Polish War from 1655 to 1660 had caused the total breakdown of the Weichsel trade.

With the detection of the provenance of oak panels with Type II ring-patterns and with their re-dating forward by six years, new evidence for the sapwood allowance arises. An analysis of the number of sapwood rings from living oaks, building timbers with bark, and archaeological timbers with bark, all from North Poland, resulted in a median value of 15 with 50% of all values lying between 13 and 19, the lower and upper extremes are 9 and 36, so far (WAZNY, ECKSTEIN 1991). The indication of a west-east gradient of decreasing sapwood rings is thus supported. In each case of dating of art-objects the provenance of the wood must be considered. Furthermore, it must be acknowledged that dendrochronology can give only an exact date for the last measured ring on the art object. The considerations about the sapwood range are based on statistical evaluation and can only provide a more precise estimate.

	Felling-date	t-values						
		Gdask-Pomerania	NL South	NL North	NL total	REF 1 Engl.	REF 2 Engl.	REF 3 Engl.
1. St. Elisabeth	1390 + x/-2	5.4	2.0	2.9	5.2	4.4	3.5	—
2. St. Aghate	1434 + x/-2	5.8	4.1	2.8	5.9	2.7	2.7	—
3. The Judgement of Salomon	1556 + x/-2	3.7	5.3	5.1	6.8	3.4	3.3	
4. St. Katherine Baptistry	1583 + x/-2	2.1	2.7	0.1	3.4	2.3	8.8	8.3
5. Fire of Gdansk	1600 + x/-2	3.5	5.3	2.7	6.8	5.7	5.4	3.8
6. Banquet of Balthazar	1605 + x/-2	4.9	3.5	0.8	3.7	3.3	6.4	5.6

Table 1 - Comparison between tree-rings of the oakwood of some art objects and «Netherlands-Art-History-Chronologies» (BAUCH, ECKSTEIN, KLEIN, unpubl.) and «England-Art-History» Chronologies» (FLETCHER 1977). Estimated felling date with a median of 15 + x/-2 growth rings.

Painter	Title	Youngest annual ring	Earliest felling date: 9 sapwood rings	Felling date with sapwood in the range 13..15....19 years	Art-historical attribution
1. Unknown	St. Elisabeth	1375	1384	1388..1390...1394	1410
2. Unknown	St. Cathrine	1417	1426	1430..1432...1435	1435
3. Unknown	St. Agathe	1419	1428	1432..1434....1437	1435
4. Unknown	Portrait of a Young Man	1465	1474	1478..1480....1484	1507
5. Unknown	Licinius Crassus	1536	1545	1549..1551....1555	ca. 1568
6. Unknown	The Judgement of Salomon	1541	1550	1554..1556....1560	ca. 1568
7. Unknown	A Knight	1542	1551	1555..1557....1561	ca. 1590
8. Unknown	Christ at the Mount of Olives	1558	1567	1571..1573...1577	ca. 1579
9. Unknown	Epitaph Wagner	1559*	1568	1572..1574....1578	after 1571
10. Unknown	Bapstistery	1574	1583	1587..1589...1591	1585

* This panel contains 1 sapwood ring.

Table 2 - Dendrochronological datings of panels of 15th and 16th century.

Painter	Title	Youngest annual ring	Earliest felling date: 9 sapwood rings	Felling date with sapwood in the range 13..15....19 years	Art-historical attribution
1. Unknown	Noah before the Flood	1440	1449	1453..1455....1459	beginning 17th century
2. Unknown	Kain and Able	1574*	1583	1587..1589....1593	beginning 17th century
3. Milwitz, B. 1590-1656	Fire of Gdansk	1585	1594	1598..1600....1604	ca. 1656
4. Block, v.d.j.	Balthazar	1590	1599	1603..1605....1609	1600/1610
5. Unknown	Resurrection	1615	1624	1628..1630....1634	17th
6. Unknown	Ascension of Christ	1622	1631	1635..1637...1641	17th
7. Stech, A. 1635-1697	Self-Portrait	1638**	—	— 1654...1657	1675

* This panel contains 8 sapwood ring.

** This panel contains 16 sapwood ring.

Table 2 - Dendrochronological datings of panels of 17th century.

DATING OF PAINTINGS

In this context the analysis of thirty panel paintings of Gdansk painters from the 15th to the 17th century was one of the most important proofs. It is very improbable that Gdansk painters should have imported wood from the Netherlands, but they used the wood from their own forests. For the support of Polish paintings linden, poplar, pine and fir were normally used, whilst the Gdansk painters preferred oak wood. Regarding the style these painters were influenced by Bohemians at the end of the 14th century and then by Netherlandish painters. Above all the «Last Judgement» (H. Memling 1435/40 - 1494) painted in the Netherlands and then exported to Gdansk influenced the style (GOSIENIECKA 1957). The names of the Gdansk painters are normally unknown, only L. Ewert and A. Moeller in the 16th century, A. Stech, B. Miltwitz, B. Strobel and S. Wegener in the 17th century are more important.

In Table 1 the t-values of growth-ring measurements on different works of art are presented in comparison with different master chronologies (BAUCH, ECKSTEIN, KLEIN, unpubl.; FLETCHER 1977; WAZNY 1990). It is evident that the growth-rings for the works of art from the end of 15th century normally possess high similarities with the master chronology Gdansk-Pomerania and the chronology «Netherlands-Art-History», whilst the growth-rings of the panels of the 17th century could be dated with the chronologies «Netherlands-Art-History» and «England-Art-History».

Therefore, it is not possible to determine the exact region from which the wood for the construction of the panels had been imported. For the wood of the paintings of Gdansk, trees from different sites within Poland or the Baltic were used. It is only possible to establish «regional» chronologies based on high similarities of a limited number of trees without being able to establish the exact geographical location. Therefore, the different Netherlandish chronologies Type II (Netherlands-South, Netherlands-North, BAUCH 1978 a,b) mean only unidentifiable regional chronologies in the Baltic. This hypothesis has been confirmed above all by the datings of different Gdansk-paintings of the 15th to the 17th centuries (Tables 2 and 3).

New knowledge about the dating of the paintings can be derived by dendrochronological dating in some cases, where only the century was known (Table 3). By determining of the felling date of the tree used for the panel, new criteria for the creation of the painting can be

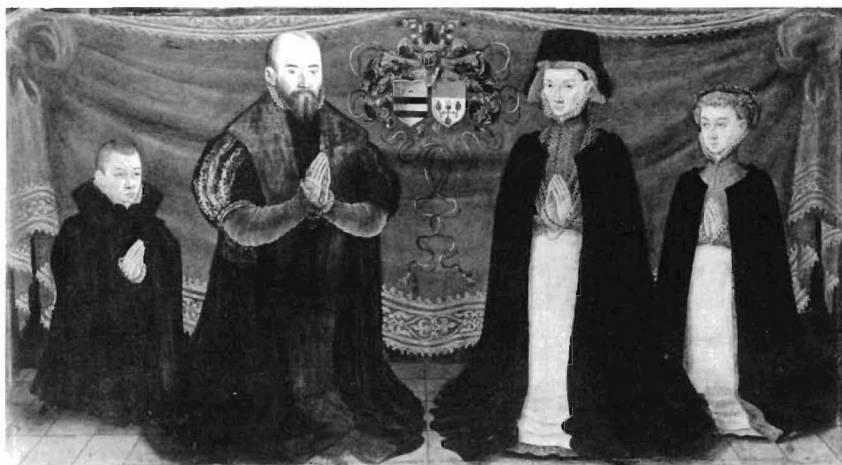
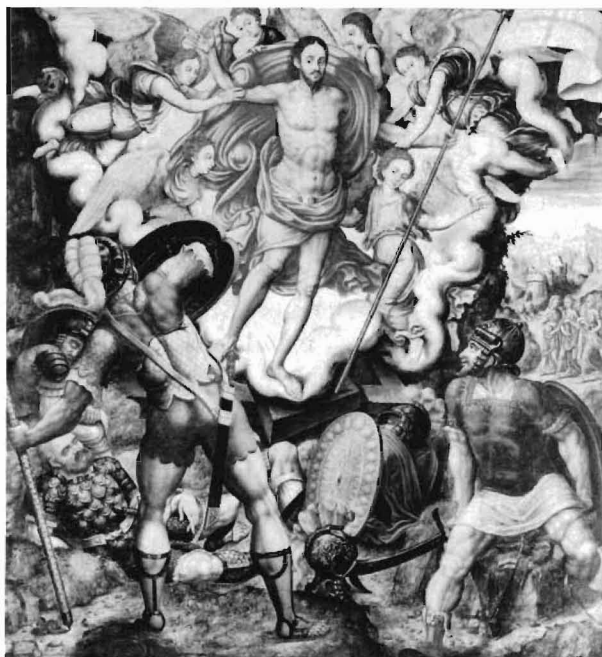


Fig. 2: «The Epitaph Wagner» consists of two paintings. Above: «The Resurrection of Christ», 5 boards; below: «The Donors», 3 boards. Art-historical attribution: after 1571; dendrochronological dating: under the assumption of a median of 15 sapwood rings and a minimum of 2 years storage time, the painting can be created from 1576 upwards.

established or the art-historical attribution could be exactly confirmed (Fig. 2). On the basis of this new evidence the art-historians may have to reconsider sometimes previous style-critical attributions.

In comparison with exactly dated paintings, contrary to the Flemish or Dutch paintings (16th - 17th century) it is evident that a high correlation for the storage time of the wood does not exist. The craftsmans rules applying to the manufacture of panels were evidently not exactly defined as for Netherlandish panel makers. Those assumptions must be substantiated by further analyses.

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SUMMARY

Dendrochronological analyses of paintings of Gdansk painters of the 15th to the 17th century.

The re-dating and re-interpretation of the so-called «Netherlands Type II» chronology by the «Polish/Baltic» chronology have led to a succesful resolution of the problem of absolute dating. Furthermore, interesting implications for the study of medieval trade patterns were found. In comparison with the analyses of Gdansk paintings with Netherlandish paintings it is evident that the wood for the Netherlandish panels is originating from the Poland/Baltic region and a new confidence in art-historical dendrochronology is sustained.

ZUSAMMENFASSUNG

Dendrochronologische Untersuchungen an Gemälden Danziger Maler des 15. bis 17. Jahrhunderts.

Das Problem der sog. Niederländischen Eichenholzchronologie Typ II bei der Datierung von Gemäldetafeln ist seit einiger Zeit gelöst. Die Herkunft des Holzes aus Polen und dem Baltischen Raum ist absolut gesichert. Aus den Vergleichen zwischen dem Holz unbekannter Danziger Gemälde mit dem Niederländischer Gemäldetafeln ließ sich einer der Hauptbeweise für die «neue» Chronologie erbringen.

RIASSUNTO

Analisi dendrocronologica di quadri dei pittori di Danzica dei secoli XV-XVII.

Il problema della cosiddetta Cronologia olandese della quercia (Typell) per la datazione dei dipinti è stato risolto da qualche tempo e la provenienza delle tavole da piante d'origine polacca e baltica risulta ormai accertata.

Dai confronti tra le tavole di dipinti di Danzica e le tavole olandesi viene confermata la validità dei risultati e l'affidabilità della Dendrocronologia nelle ricerche sui manufatti d'interesse storico e artistico.

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