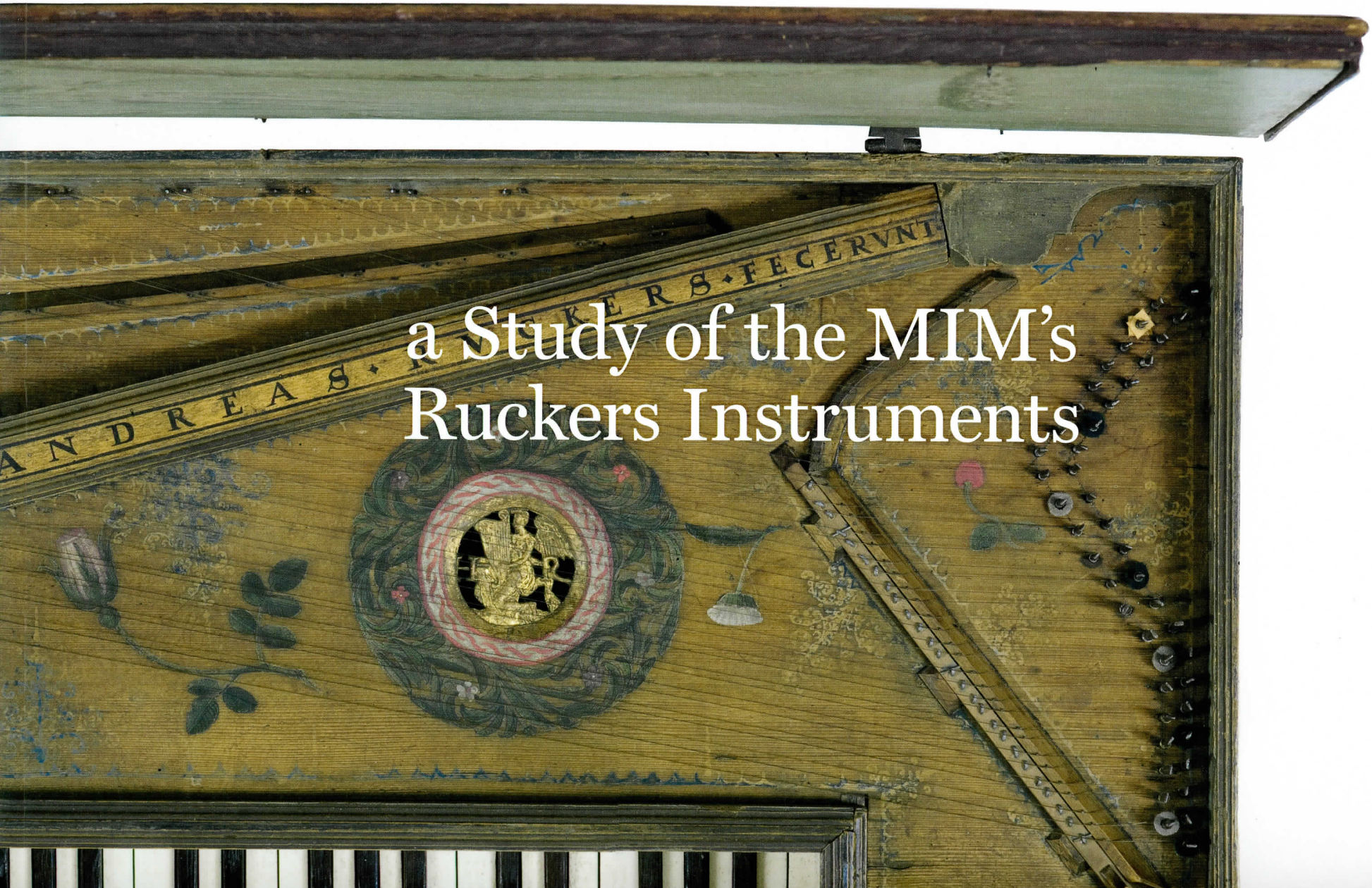
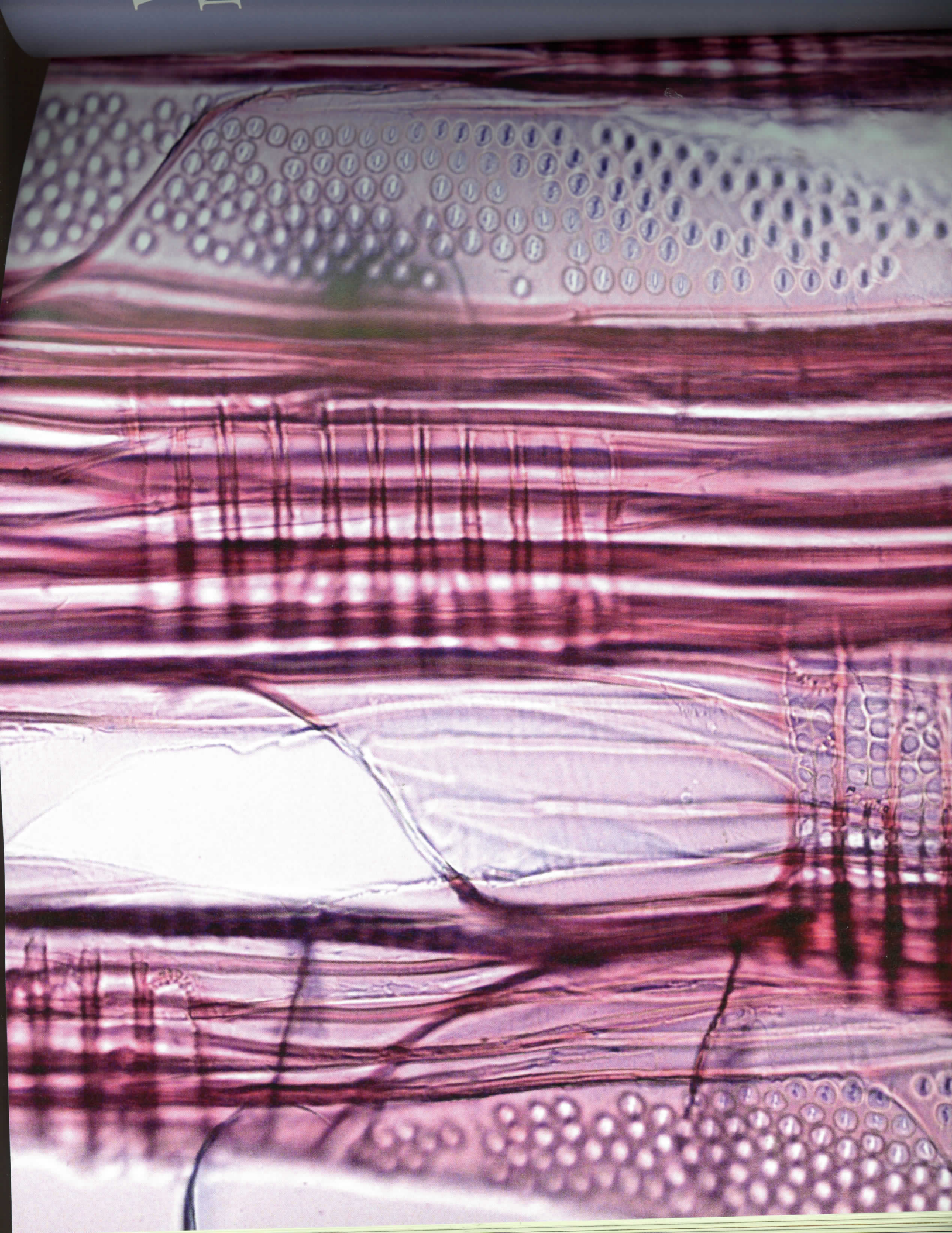
The Golden Age of Flemish Harpsichord Making



a Study of the MIM's Ruckers Instruments



Wood Identification of the 1610 HR Mother-and-Child Muselar Virginal

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This contribution includes almost the entire wood species identification report prepared by the Royal Institute for Cultural Heritage (KIK-IRPA) and the University of Liège in June 2016 at the request of the Museum of Musical Instruments (MIM).[1]

PRINCIPLE OF THE ANALYSIS

Most gymnosperms and angiosperms can be identified on the basis of their secondary xylem (wood) thanks to the specificity and the large diversity in the organization of the cells in this heterogeneous tissue (vessel distribution, shape of perforation plates and pits, number of cells in rays, presence or absence of resin canals, of spiral thickenings, of ray tracheids, ...).

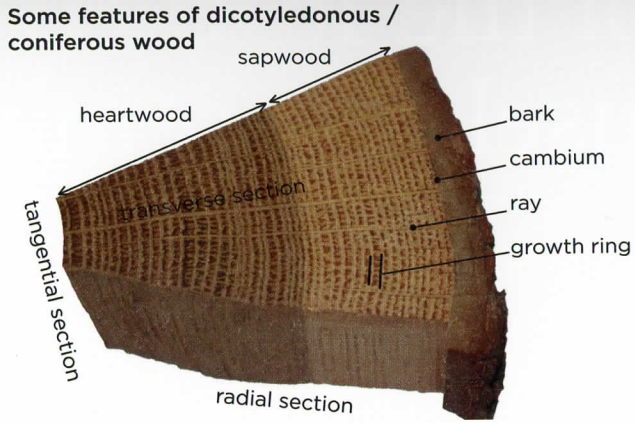
OPERATING METHOD

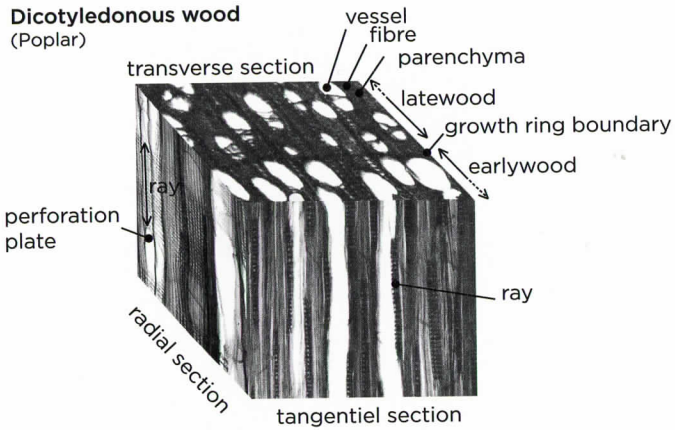
The method of analysis is based on the observation of the microscopic structure of the wood along the three anatomical planes (transversal, longitudinal tangential and longitudinal radial) [fig. 1].

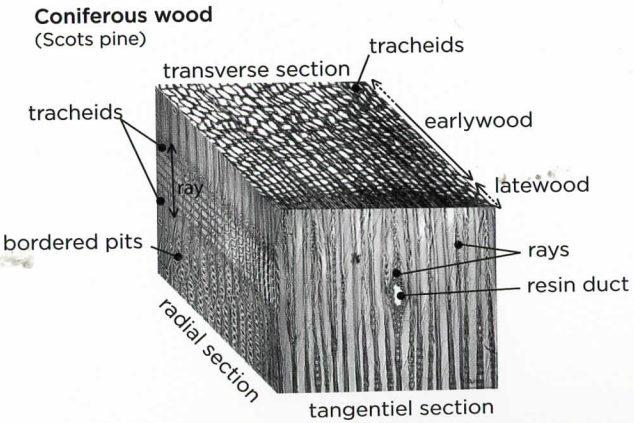
The samples are oriented and, using a razorblade, sections are made in the three anatomical planes. To improve visibility, the sections are treated in successive baths, which allows to unclog the pores and to colour the structure for better contrast. The sections are then observed with an optical microscope and the plant genus to which the wood specimen belongs is identified using specialized literature [fig. 2-3].

PRESENTATION OF THE RESULTS

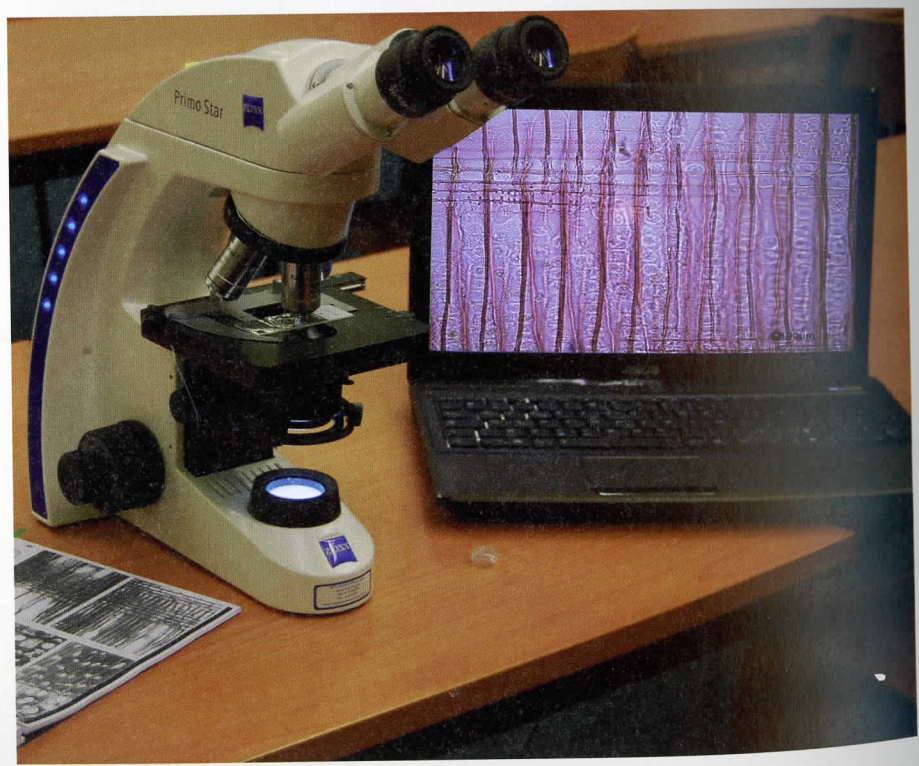
Photos of the sections under the optical microscope or SEM are used to illustrate the results. The result of the wood identification is presented in a table with the description of the object, the identified wood species, a short description of the observed anatomical characteristics and the photos taken during the process.







1. Diagram of the three anatomical planes of a dicotyledonous and coniferous wood.



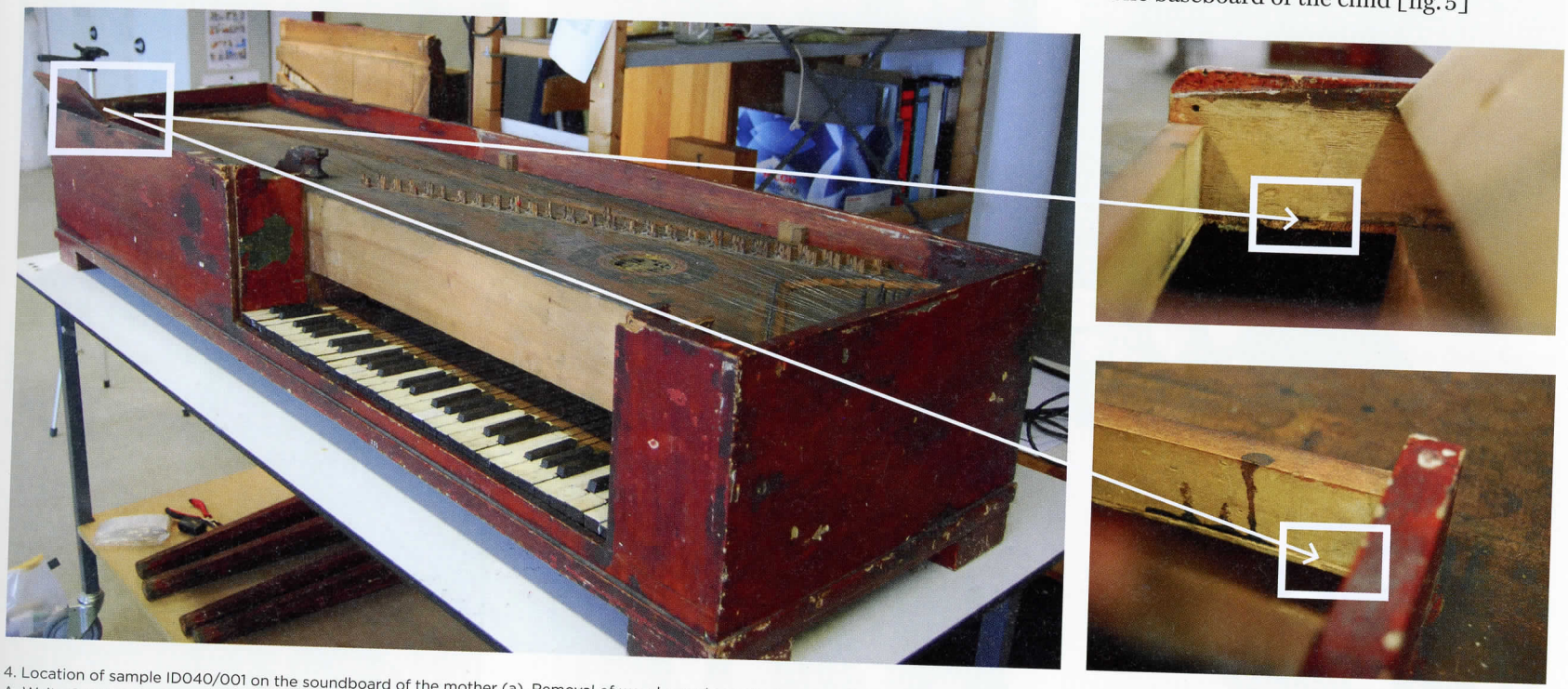
2-3. Room where the thin sections are prepared and observation with a transmission microscope, PPP-ULg, Liège.
© A. Weitz, 2011.

CONTEXT OF THE STUDY AND SAMPLING

The objective of these analyses was to verify if the information found in the literature about the plant genus used to manufacture Ruckers instruments was correct. It was decided to focus on a single instrument, the mother-and-child muselar virginal by Ioannes Ruckers, made in Antwerp in 1610.

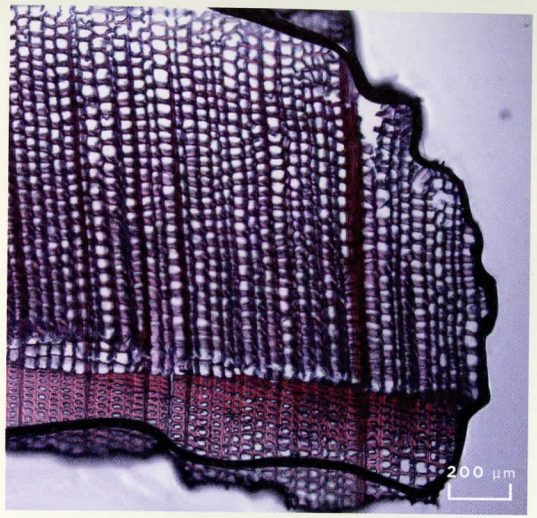
Given the accessibility and preservation state of the wood, two samples were chosen for analysis:

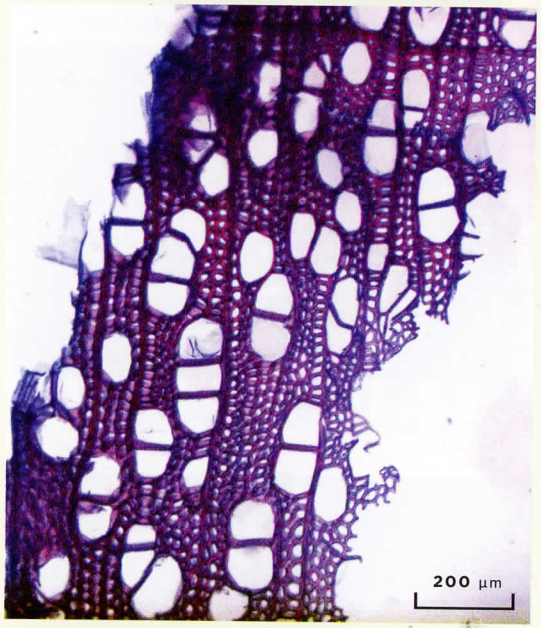
- The soundboard of the mother [fig. 4]
- The baseboard of the child [fig. 5]

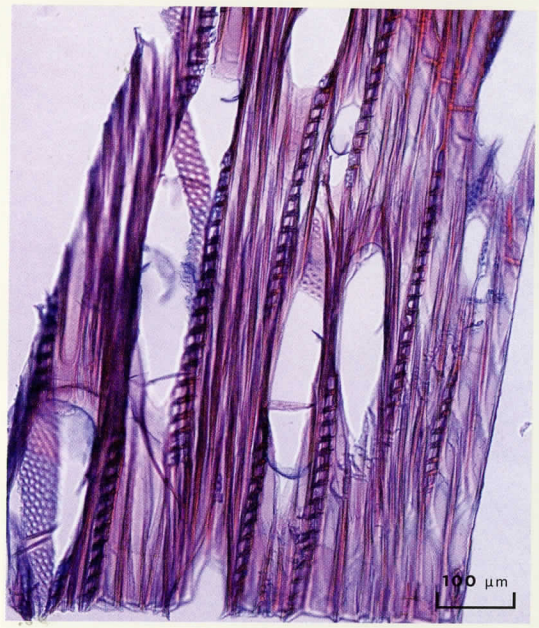


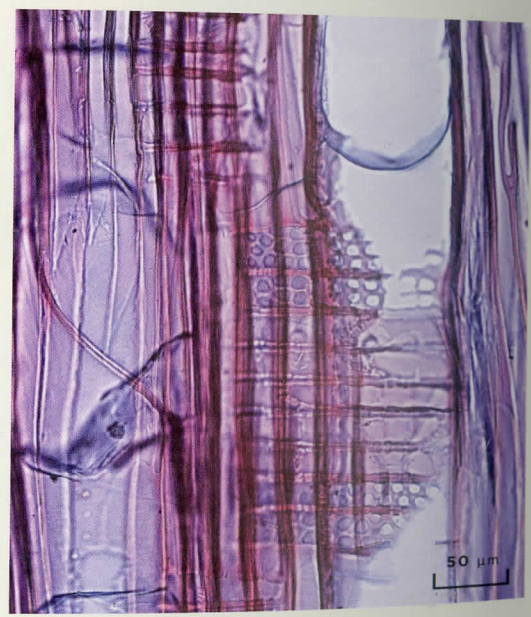
4. Location of sample ID040/001 on the soundboard of the mother (a). Removal of wood sample on the transversal plane (b) and removal of a wood sample on the radial plane (c). (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).

5. Location of sample ID040/002 on the baseboard of the child. General view (a) and detail (b). (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).









6. ID040/001. *Picea* sp. Transverse section in transmitted light (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).

7. ID040/001. *Picea* sp. Tangential section in transmitted light (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).

8. ID040/001. *Picea* sp. Radial section in transmitted light (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).

9. ID040/002. *Populus* sp. Transverse section in transmitted light (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).

10. ID040/002. *Populus* sp. Tangential section in transmitted light (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).

11. ID040/002. *Populus* sp. Radial section in transmitted light (Working photo, 2016, A. Weitz © KIK-IRPA, Brussels).

IDENTIFICATION

ID040/001: SOUNDBOARD OF THE MOTHER

Identification: Spruce (*Picea* sp.)
Short description : softwood; presence of resin canals; wood rays 10-25 cells high with tracheids. Piceoid pits in the cross-fields of the earlywood.
At the microscopic level, spruce and larch wood cannot be differentiated with certainty; some aspects are, however, more characteristics of one genus or the other.
In spruce, the transition from early- to latewood is continuous and the biseriate bordered pits are rare on the radial section of the tracheids.[2] The horizontal resin channels are surrounded by more than nine thick-walled secretory cells, most often dividing the rays into two equal parts.[3] The aperture of the ray/tracheid pits is typically longer than the diameter of the border of the pit.
In larch, the transition from early- to latewood is particularly sharp and the biseriate bordered pits are common on the radial walls of the tracheids of the earlywood. The horizontal resin canals are surrounded by more than nine thick-walled cells[4] or 7-12 secretory cells[5] and are often eccentric in rays.
Here, the transition from early- to latewood appears to be continuous in proportion to the width of the ring. No biseriate bordered pits were observed on the sample. The only resin canal present on the tangential cut is surrounded by seven secretory cells and it is centred in the ray. The aperture of the ray/tracheid pits is longer than the diameter of the border of the pit. Identification of spruce is thus more likely [fig. 6-8].

ID040/002: BASEBOARD OF THE CHILD

Identification: Poplar (*Populus* sp.)
Short description: diffuse-porous hardwood, with pores solitary or in radial rows of 2-3. Uniseriate wood rays, homogeneous, 5-30 cells high. Presence of large vessel-ray pits. Perforations simple.
Comment: aspen, black and white poplar cannot be anatomically differentiated [fig. 9-11].

CONCLUSION

For both samples, the identification of the genus was possible without difficulty.
For the soundboard, the different traits observed are consistent with the identification of spruce (ID040/001).
For the sample from the baseboard of the child (ID040/002), the different traits observed are consistent with the identification of poplar. The different species of poplar (aspen, white and black poplar) cannot be anatomically differentiated.
These two results thus confirm the hypotheses proposed by the restorers and the data found in the literature.

easily. The cambium is the source of reproductive cells that form the sapwood toward the inner trunk. It is found on the periphery of the trunk between the sapwood and the bark.

19 The number of sapwood rings is relatively stable for a given population. As such it can be estimated on the basis of statistical studies and/or experimental research on the trees of a particular region. It can nevertheless vary considerably from one tree to another, according to parameters that are still poorly defined: growth rate, age of the tree, height of the trunk, width of the crown, conditions of the site, etc. Estimation ranges thus remain rather broad. G.-N. Lambert, C. Lavier *et al.*, "Pratique de la dendrochronologie", *Histoire et Mesure*, 3/3 (1988), 279-308: 295; M. Rybnícek, H. Vavrcík & R. Hubeny, "Determination of the Number of Sapwood Annual Rings in Oak in the Region of Southern Moravia", *Journal of Forest Science* 52 (3) (2006), 141-146: 142.

20 The heartwood is the biologically inactive part of the wood. A tree ring is formed in the sapwood; after a few years, it is transformed into heartwood.

21 This is on the transverse radial section of the plank, which is generally inaccessible for a soundboard.

22 M. Beuting, "Dendro-organology? The Dendrochronological Method Applied to Musical Instruments", in P. Fraiture (ed.), Tree Rings..., op. cit., 273-283.

23 For example, 30 years are recommended according to R. Ille, "Eigenschaften und Verarbeitung von Fitchtenresonanzholz für Meistergeigen, *Holztechnologie*, 16 (1975), 95-101 (cited in M. Beuting, *op. cit.*).

24 D. Houbrechts & P. Vandervellen, *op. cit.*

25 J. Topham, email, 5 Jun. 2013.

26 See A. Versteeg, *Tree-Ring Analysis Report of the Virginals and Harpsichords of the Ruckers Family, Instruments of the Musical Instruments Museum*, report for the MIM's internal use and Arjan Versteeg's article in this same volume.

27 See Armelle Weitz & Philippe Gerrienne's article in this same volume.

28 A. Versteeg, *op. cit.*, 12.

29 *Ibid.*

30 Hypothesis proposed by researchers external to the MIM, that the sponsor of the study wished to objectively verify (P. Vandervellen, personal communication, 12 Apr. 2016).

31 P. Gassman, personal communication, 12 May 2016.

WOOD IDENTIFICATION OF THE 1610 HR MOTHER-AND-CHILD MUSELAR VIRGINAL

1 A. Weitz & P. Gerrienne, *Rapport d'identification d'essence. Double virginal, "moeder en kind" (inv. 0275, Musée des Instruments de Musique, Brussels)*, Royal Institute for Cultural Heritage-Université de Liège, file no. 2016.13108, ID040, June 2016.

2 F.H. Schweingruber, *Anatomie microscopique du bois, Institut fédéral de recherches sur la forêt, la neige et le paysage*, Birmensdorf, 3th ed. 1990; F.H. Schweingruber, *Anatomy of European woods*, Verlag Kessel, Remagen-Oberwinter, 1990.

3 C. Jacquiot, *Atlas d'anatomie des bois des conifères*, Paris, Centre technique du bois, 1955.

4 C. Jacquiot, *op. cit.*

5 F.H. Schweingruber, *op. cit.*

A NOTE ON THE SO-CALLED "RUCKERS/TASKIN" DOUBLE-MANUAL HARPSICHORD ("1612 HR")

1 M. Awouters, "A Ruckers-Taskin Harpsichord, Brussels Museum of Musical Instruments, inv. 3848", *Kielinstrumente aus der Werkstatt Ruckers.* Bericht über die internationale Konferenz von 13. bis 15. September 1996 im Händel-Haus Halle, Halle, 1998, 294-305.

2 The X-rays currently available do not allow to give a definite answer.

3 The oldest dated French harpsichord with this compass is an instrument signed by Jean Denis in 1648, preserved in the Musée de l'Hospice Saint-Roch, Issoudun, France.

4 From the end of the 1660s, certain harpsichords built in France had a broken sharp on the E key, which allowed to play B_1 or B_1 ♭ on the front part of the sharp, and E ♭ on the back part, according to the requirements of the music. The compass was then of 51 notes. A few years later, some instruments were given a second broken sharp on the C♯ key, sounding A_1 on the front part and et B_1 ♭ on the back part, the back part of the E ♭ being tuned to B_1. The compass was then of 52 notes, and the bass octave sounded G_1, A_1, B_1 ♭, B_1 C, D, E ♭, E, etc.

5 "Les Clavessins ordinaires contiennent cinquante, ou cinquante une touche, lors que la seconde feinte d'enbas est coupée lesquelles touches, sont d'un semiton plus hautes les unes que les autres, à la réserve des cinq ou six premieres, ou cet ordre n'est pas gardé, dautant qu'elles n'ont ni bemol, ni dieze, toutes les autres ont leur dieze, ou leur bemol, excepté celles lesquelles se trouvant entre le dieze de la note qui les précede et le bemol de celle qui les suit ne peuvent avoir naturellement ni l'un ni l'autre. "Pour trouver les notes sur le Clavessin, on remarquera que la première touche d'enbas est un sol, le la, se prend sur la première feinte, le si, sur la seconde, l'ut sur la seconde marque, le re, sur la troisieme, le mi sur la quatrieme, après quoy toutes les notes se suivent naturellement avec leurs diezes, et leurs bemols, jusqu'au cinquie[me]. ut d'enhaut, qui est la derniere note du Clavessin.
"Il y a des Clavessins extraordinaires, qui contiennent cinquante trois touches, lesquels commencent et finissent par les mesmes notes que les Clavessins ordinaires, sur lesdits Clavessins toutes les notes se suivent naturellement avec leurs diezes et leurs bemols." É.D. Delair, *Traité d'accompagnement pour le théorbe et le clavessin*, Paris, 1690/R 1972, 9.

6 It is often difficult to precisely date certain alterations, because some instruments had "exceptional" dispositions, either very precocious or "archaic", compared to the vast majority of the instruments built during a given period: the previously mentioned harpsichord, dated "Diem 1679", thus has an unusually large compass for the time (G_1, A_1– d^3), while the one made by Nicolas Pigalle in Dijon in 1737 (Fondazione Withaker, Villa Malfitano, Palermo) still had a short-octave keyboard, from G_1/B_1, with a broken E ♭, to d^3, which was obsolete at the time, even in the provinces.

7 A. & M.C. Anselm, "La collection Yannick Guillou", *Musique-Images-Instruments*, 2 (1996), 134-135. See also A. & M.C. Anselm, "Petit prélude à l'étude des clavecins français du XVII[e] siècle", *Musique-Images-Instruments*, 2 (1996), 227-230: 228, Nos. 26 & 27 of the list of French seventeenth-century harpsichords. This information was taken over by R.D. Anderson in "Extant Harpsichords Built or Rebuilt in France, Part I", *Early Keyboard Journal*, 19 (2001), under Nos. A46 & A47. Later on (2002), to this family we added yet another instrument (private collection, France) marked "mis au grand clavier par Joseph Collesse en 1748", unknown at the time of the publication of our list.

8 Given the small number of surviving specimens compared to the variety of practices in seventeenth-century French harpsichord making, this type of dating is always delicate, and often too normative.

9 The dating takes into account the dendrochronological analyses, which suggest 1747 as a *terminus post quem* for the wrestplank veneer, but this ravalement could have been considered in the 1730s already.

10 Probably the same workshop where the present stand of the 1628 Ruckers harpsichord of the Château