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## Japanning in Spa at the End of the Seventeenth Century to the Middle of the Eighteenth Century: Historical Context and Materials for Lacquered *bois de Spa*

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### ABSTRACT

This study focuses on the very beginning of lacquerware production with *chinoiserie* decoration in Spa from the end of the seventeenth century to the third quarter of the eighteenth century. Through an interdisciplinary approach, the historical and material-technical context of this important historical lacquer production is elucidated. Archival research was conducted along with a stylistic study of thirty objects, mainly boxes. Furthermore, seventeen of the objects from this study group were chemically analysed for their organic ingredients, pigments and metal applications.

### ARTICLE HISTORY

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### KEYWORDS

*Bois de Spa*; European lacquer; Japanning; *chinoiserie* decoration; Dagly family; eighteenth century

## Introduction







Spa is a village in the former Prince-Bishopric of Liège, Belgium renowned for its springs. Since the sixteenth century, it has been frequented by such illustrious names as Charles II of England, Christine of Sweden, and the Russian Tsar Peter the Great. The place was called the *Café de l'Europe* by Joseph II of Austria. An entire craft tradition developed in the city starting in the seventeenth century. It began with walking sticks sold to the visitors so that they could reach the different springs spread over a steep and mountainous landscape (Peeters and Houbrechts 2016). The craft extended first to small artefacts such as boxes, brushes, and bellows, and by the end of the seventeenth century and the second quarter of the eighteenth century to all sorts of attractive fancy goods and small pieces of furniture: writing cases, mirror frames, snuff-boxes, powder boxes, tables, cabinets, *Quadrille* boxes, cases, dressings cases with fittings, caddies for tea, etc. The makers were first called *bordoni* from 'bourdon', walking stick, and then *fabriquants de vernis* or *toileti* with the development of dressing sets and cabinets. There were artefacts for all budgets, and no guest or servant would leave the thermal town without these *jolités* of Spa, another term by which the *bois de Spa* were designated in the eighteenth century.

Since the middle of the seventeenth century, *bois de Spa* richly decorated with mother-of-pearl and metal

inlays were already being produced, and would continue to be made until around 1730. Additionally, following growing trade with the Far East and the taste for the exotic, the production of lacquerwares started up in Spa. The first examples were aiming to imitate the quality of the Eastern lacquer's surface, the raised and flat decoration, and their exotic representations. The technique of polished coats of varnish to obtain a lustre comparable to Eastern lacquers was soon to be used for *bois de Spa* decorated in a fully European fashion with, for example, views of Spa and the nearby springs drawn in Indian ink on pale bluish ground.

Our examination of thirty-two objects (Table 1), mainly found in Belgian public museums, but also in London, Munster and Paris, and in two private collections, was accompanied by an archival and stylistic study. Seventeen of the objects were chemically analysed. Since they are preserved in a large quantity and are easier to compare to one another than to other more disparate objects, the decision was made to study mainly boxes, and more specifically boxes with *chinoiserie* decoration inspired either directly by Asiatic examples or from European interpretations recalling Asiatic art. Additionally, a microscope with a base of tortoiseshell imitation lacquer and Eastern-inspired motives was also studied (Figure 1).

Despite their artistic value and their historical popularity as souvenirs and today as collector's items, little

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**Table 1.** Overview of most of the boxes discussed in this article. MVES: Musée de la Ville d'Eaux, Spa; IAL: Institut archéologique liégeois, Liège; PC: Private collection Barbara Piert-Borgers and Walter Borgers; RMAH: Royal Museums of Art and History, Brussels; MGCL: Museum Grand Curtius, Liège; MWL: Museum of Walloon Life, Liège.

No.	Loc.	Inv. no.	Description
Period 1			
1*	MVES	B0009	Black box. Oriental landscape with a female figure with feathers, metal powders and sprinkled particles. Red interior (non-original).
2*	MVES	B0006	Black box. Oriental decoration, European woman and Indian man, metal powders and sprinkled part (largely overpainted). Black interior with metal sprinkled particles (original).
3	IAL	I/7122	Black <i>Quadrille</i> card game box with 5 small boxes for counters. Oriental landscape with Chinese figure, metal powders and sprinkled particles. Black interior, metal sprinkled particles, small boxes of different colours (red, ivory, beige, green, dark green).
4	PC		Black box. Oriental landscape with David and Goliath, metal powders and metal sprinkled particles. Black interior, metal sprinkled part of rectangular shape.
5	PC		Red tortoiseshell writing case. Oriental landscape with a man dressed with feathers and a woman, metal powders and sprinkled particles. Black interior, metal sprinkled particles.
Period 2			
6*	MVES	B0235	Blue box. Oriental landscape with one figure, metallic powders. Black interior with metal sprinkled particles.
7*	MVES	B0012	Blue box, small. Oriental landscape, metal powders (original with small touch up from restoration). Black interior with metal sprinkled part (overpainted).
8*	MVES	B0030	Pale blue box. Oriental landscape with an European couple on a terrace, painting. Red interior, metal sprinkled particles.
9*	MVES	B0278	Black card game box with 4 small boxes. Oriental decoration with a woman playing <i>pipa</i> and a Chinese loving figure, metal powders. Rose interior, painting and silk.
10*	MVES	A0046	White small round box, floral design, painting. Black interior with metal sprinkled particles (overpainted).
11*	MVES	B0007	Brown tortoiseshell box (writing box). Oriental landscape with two 'Chinese' figures, metal powders (revarnished). Black interior, metal sprinkled particles.
12	IAL	I.9420	Black box. Oriental landscape with two European figures possibly influenced by black Delft earthenware, metal powders. Back interior, metal sprinkled particles.
Period 3			
13*	MVES	B0016	Black <i>Quadrille</i> game box with 4 small boxes. Two oriental figures in a <i>rocaille</i> decoration, metal powders and painting. Black interior, metal particles.
14*	MVES	B0015	Black <i>Quadrille</i> game box with 4 small boxes. Two Chinese figures in <i>rocaille</i> decoration (restored, revarnished). Black interior, metal sprinkled particles.
15*	MVES	B0018	Black <i>Quadrille</i> game box with 4 small boxes. Two Chinese figures in a <i>rocaille</i> decoration, metal powders and painting (restored, revarnished). Red interior.
16*	MVES	B0211	4 small black boxes of a <i>Quadrille</i> game box. <i>Rocaille</i> decoration, metal powders and painting.
17*	MVES	B0013	Red tortoiseshell box (writing box). Two Chinese figures in a <i>rocaille</i> decoration, metal powders and painting (restored, revarnished). Red interior.
18*	MVES	B0017	Red tortoiseshell box, two Chinese figures in a <i>rocaille</i> decoration, metal powders and painting. Black interior.
19*	RMAH	2013.010001	Box (red tortoiseshell?). Two Chinese figures in a <i>rocaille</i> decoration, metal powders and painting (overpainted). Black interior with metal sprinkled particles (original).
Period 4			
20*	MVES	B1077	Black perfume box. Flowering bushes in a <i>rocaille</i> decoration, metal powders and painting. Interior garnished with rose velvet.
21*	MVES	B0028	Black <i>Quadrille</i> game box. Oriental decoration, painted composition of playing children.
22	MGCL	8/159	Blue writing case. Scene with two Chinese figures sitting at the table, a parasol held by a third figure, pots and exotic landscapes on the sides, metal powders. Black interior.
23	MWL	5015759	Red tortoiseshell base of microscope. Two Chinese figures with a bird and exotic landscapes, metal powders and sprinkled particles.

\*: subjected to chemical analysis.

research has been undertaken on *bois de Spa*. The new richly illustrated book by de Moerloose gives a very good survey of the production of *bois de Spa* from the seventeenth century to the present day (De Moerloose 1987, 2018). A valuable historical study by Albin Body, an indefatigable historian of the city of Spa, was published in 1898 (Body 1898). Small exhibition catalogues (Dethier and Béguin 1967–68), articles in the *Histoire et archéologie spadoises*, leaflets (Canoy 1990), the contribution of Kopplin in her catalogue on European lacquers (Kopplin 2005, 161–166, 168–180) and the article by Schils, '*Jolités et chinoiseries*' (Schils 2009), can also be included.

## Historical sources

The historical context and the knowledge of names related to *bois de Spa* is based mainly on archival documents. The documents consulted by historians,

mainly Albin Body, included the parish registers of births, notarial deeds, and the registers of the successive mayors listing purchases of gifts for the influential people they wanted to please. Printed texts describing the benefits of the waters and the enjoyment of life in Spa, such as the *Amusemens des eaux de Spa* of 1734 and 1735, generally attributed to Karl Ludwig von Pöllnitz (1692–1775), also offer valuable information on the production of *bois de Spa* (Anon. 1734 and Anon. 1735). For this research a re-evaluation and a study of the primary sources such as the archival records were undertaken, which enabled us to gather new information on *fabriquants de vernis* active in Spa, some of whom are still unknown in the literature. Consultation of the parish registers (A.E.L., arrondissement of Liège and Verviers, Spa, parish of St.-Remacle), notarial deeds (A.E.L., Spa, N.D.G.S.), and notes that Albin Body carefully took while analysing the accounts of the mayors



**Figure 1.** Overview of 23 objects commented on in this article, classification per period. The numbers refer to those given in Table 1. Photographs are by the author except for Box 4: © Tomasz Samek; Box 19: © KMKG-MRAH and Box 21: © Monique Noé.

(B.F. Body Notes) were undertaken with interesting results some of which will be published in a future article.

The accounts of the mayors are the richest sources of information on the names of local makers of lacquerware. The first known mention of Spa lacquerware is dated 1689: 'bought for Rousseau, manufacturer of varnish, two boxes in varnish of China' (B.F. Body Notes, 29). The same year, Mathieu Xhrouet is paid for a mirror frame in 'varnish of China' (B.F., Body Notes, sheet n° 68). From 1703, the specification 'of China' disappears from the lists of the mayors in favour of the more general qualification 'varnished', 'in our varnish of Spa' or in the term '*verniss à la mode*', suggesting that they started to consider the method of lacquering as a general part of craftsmanship in Spa. In the documents, items are also described by their respective colouration, black, red, blue or red tortoiseshell. These colours and imitation of material likely refer to lacquered objects with *chinoiserie* decoration. 'White porcelain' can refer either to white lacquers with *chinoiserie* decoration or to lacquers with Indian ink drawings of purely European inspiration (Figure 2).



**Figure 2.** Münster, Museum für Lackkunst, Games box with four small boxes for counters, Jean Gernay?, mid-eighteenth century, inv. 1942-9a-e (Kopplin 2005, cat. 26). © Münster, Museum für Lackkunst, Photo: Tomasz Samek.



### Some makers of lacquerwares

Although the *Amusemens des eaux de Spa* of 1734 indicate that most of the inhabitants of Spa were involved in the production of *bois de Spa* (Anon. 1734, 179), not more than around forty names were counted in connection with the production of *bois de Spa* or the more general activity of painting and drawing in Spa for the period studied. Since we are expecting to publish a study with a more in-depth discussion of the makers of lacquerware in Spa, here we will mention only a few of those who could have made some of the studied boxes. However, in the absence of signatures or workshop-related marks, and the lack of precise descriptions in the archival documents, we have avoided linking any of the *fabriquants de vernis* listed here with any of the studied boxes.

As explained above, Hubert Rousseau (1647–1702) and Mathieu Xhrouet (1647–1721) are the earliest known artisans to be recorded as making lacquerwares with *chinoiserie* decoration in 1689. Both were also making wooden items with mother-of-pearl decoration (Body 1898, 23, 25, 48–50).

Gérard (1660–1715) and Jacques Dagly (1665–1728), natives of Spa, are the two brothers who made an international career as lacquerers in Berlin and Paris starting from 1686/87 to 1689, respectively (Wolvesperges 1995; Kopplin 2015). However, they are not known as having produced lacquerwares in Spa. The present research helped to clarify the role of other members of the Dagly family working in Spa within the field of lacquering. The most important is certainly their cousin Nicolas Dagly (1651–1736) who was living at the White Pigeon at least since 1709 till death (A.E.L. N.D., Spa, G.S., 16 Aug. 1709, 28 May 1737). He produced items described as ‘in varnish’ from at least 1703–1704. He was cited in *Amusemens des eaux des Spa* of 1734 as the best maker of varnishes and as having a peculiar taste for *chinoiserie* decoration:

Dagly at the White Pigeon made the best varnish, resisting fire and water. This last person had a peculiar taste for fruits and figures of China and Japan that he was making in the most perfect manner, whether flat or embossed. (Anon. 1734, 178)

According to a notarial deed dated 6 December 1731 Nicolas Dagly was then assisted by his wife Catherine de Coe (died in 1737) and their elder son Jean Dagly (1680–1737). Dagly and his wife bequeathed their workshop to Jean to thank him for assisting them in their craft (Body 1898, 67–8). Body mentions one recipe for lacquer found in an old ledger in connection with this notarial deed. Since this ‘old ledger’ is now lost, there is no proof that the recipe came directly from Nicolas Dagly. The importance of this recipe is however taken well into consideration further in this article (see: The lacquer recipes related to Spa).

Charles Dagly (1688 – after 7 December 1739) was the second son of Nicolas Dagly. In 1717 representatives of the tsar of Russia ordered a wooden paneling from him to be decorated with black varnish ‘worked in the manner that is done in Spa’ and ‘intermingled with mother of pearl’ intended for the ornamentation of a palace in Russia (Body 1898, 55–7). During our research it was found that Charles Dagly had sold Spa lacquerware as a burgher merchant of the city of Aachen since at least 1724 (A.E.L., N.D., Spa, G.S., 24 Nov. 1724). Thus, Charles was most certainly the Dagly who was said to work in Aachen in the *Amusemens des eaux d’Aix-la-Chapelle* (Anon. 1736, 241–242). He was still in Aachen in 1739, as testified by a note in which he asks Jean le Drou (1710 –?), a ‘*vernisser*’ in Spa, to pay a debt (A.E.L., city of Spa, n°15, 7 Dec. 1739). According to this last document, metallic powders were sent by Charles Dagly to le Drou in Spa for the execution of cases: ‘4 packets of yellow powders’, ‘2 packets of straw’ [?] and ‘one packet of silver powder’. The packet of straw (*‘palle’* in French) might correspond to metal sprinkled particles to decorate the lacquer. This document proves to be important since most of the boxes studied for this project have *chinoiserie* decoration made with metallic powders and sprinkled metal particles. It is significant that they were sent by Charles Dagly from Aachen since the best metallic powders and particles reputedly came from Nuremberg in Germany. It also confirms what the *Amusemens des eaux d’Aix-la-Chapelle* says about Dagly in Aachen, that he was in fact solely selling boxes from Spa and not varnished items made in Aachen, as was claimed.

A certain Elisabeth Hurllet and her son Jean Lemaire were active in Spa in the 1720s and the 1730s. After the death of her husband Pierre Lemaire in 1715, Elisabeth Hurllet (1680–1741) was left with three young children. As revealed by archive documents, she sold *bois de Spa* from at least 1725 to 1732 (A.E.L., city of Spa, n°15, 16 May 1725 (unsigned); 7 Nov. 1725 and 2 January 1732 (double dated, signed); 24 June 1731 and 17 Feb. 1732 (double dated, unsigned)). The notes in her handwriting mention card game boxes (*‘cadrille’*), toilet sets (*‘assortiment de toilette’ ‘garnitures de toilette’*), powder boxes (*‘boite a poudre’*), brushes (*‘brousse’*) and small cases (*‘etuis’*) in white porcelain, tortoiseshell and red colours and painted imitations of materials that might refer to lacquered *bois de Spa* with *chinoiserie* decoration. Her eldest son Jean Lemaire (1705 – after 1733, 1734?) was making the same type of Spa lacquer as indicated by a note dated 1733 (A.E.L., city of Spa, n°15, 15 October 1733).

For the period after around 1735, information on *bois de Spa* in the lists of the purchases of the mayors decreases drastically. The *Nouveaux Amusemens des eaux de Spa* published in 1763 no longer give any name of a maker of lacquerware. Information can still

be found in notaries' deeds and old manuscripts written in the eighteenth and the nineteenth century that are archived at the Body Fund in Spa.

For the period after 1750, Jean Gernay (1719–1791) became one of the most important makers of lacquerwares in Spa after his return from Paris in 1756. He was renowned for his very fine paintings in ink on white background (Figure 2) but also made lacquerwares with *chinoiserie* decoration (Body 1898, 93; Paquay 1976, 22; Kopplin 2005, 170).

### The boxes and their decoration

The lacquerwares studied, dating between the end of the seventeenth century and the third quarter of the eighteenth century, were divided into four stylistic periods. An overview of a selection of twenty-three *bois de Spa* is given in Figure 1 (Dethier and Béguin 1967–8, cat. 21, 20, 22, 48, 47, 74, 75, 72, 76, 73; De Moerloose 2018, 38–39 and 42; Grzeskowiak and Quoilin). All are immediately recognisable as being produced in Spa (Figure 1). No analysis of the wood was undertaken. Observations during this study tend to confirm earlier observations that the indigenous beech was indeed used (De Moerloose 1987, 33). In our selection, all joints are made of rabbits, secured by 1 to 3 small wooden pins with a diameter of 1 to 2 mm., depending on the box size, and glued with a proteinaceous glue. For the period from the middle of the seventeenth century to c. 1825–1835, De Moerloose also indicates flat seal joints for small boxes (De Moerloose 2018, 186).

Bronze ornaments for keyhole plates and hinges are imitated in the lacquer decoration (Figure 6). The decoration at the sides typically crosses the joint between body and cover of the box (Figures 5 and 6), which was not yet the case for the boxes with mother of pearl inlays made previously. This novelty can be only explained by the influence of Japanese lacquers.

#### *Period 1, from the end of the seventeenth century to the beginning of the eighteenth century, the influence of Japanese lacquer*

The first known lacquered boxes seem to have been directly influenced by Japanese lacquers (Figure 1, Boxes 1–5).

Slightly bulging lids are a new development with regard to the domed top form for the wood boxes with mother-of-pearl-inlays that were already produced in Spa (Canoy 1990, 11). Most of the boxes have a carved border of 13 to 20 mm. wide, decorated with gilded ornamental friezes. Four boxes are covered with black lacquer, such as Box 3, which is a very early example of a game box for the card game called *Quadrille*. It contains five boxes for counters that are bright orange-red, cream white, beige, pale



**Figure 3.** Box 3, *Quadrille* box open with the five little boxes for card game counters. © Ville de Liège (big open box at the left).

green and dark green (Figure 3). The imitation red tortoiseshell in Box 5 was highlighted in matte red at a final stage, a rather unusual feature that gives the box a very vivid appearance (Figure 1).

The compositions on the top of the boxes share many iconographic details that are placed a bit differently from one box to the other. The large trees and the small isles with the pavilions are direct copies of Japanese export lacquers that are today dated 1680–1730 (Impey and Jörg 2005; Papist-Matsuo 2016). The decoration at the sides of the boxes with either 'Japanese' isles or simple flower bushes and flying insects is again clearly inspired by Japanese examples. In contrast, the ornamental lattice fence, represented on most of the boxes of this period, seems inspired by Chinese Coromandel lacquer or export porcelain. The ornamental motifs of these lattice fences are however of European fashion (Figure 4).

The scene with David and Goliath on Box 4 is unique in the corpus. Men and women dressed as Indians with feathers on their hips and heads can be seen on several examples (Boxes 1, 2, 5). This suggests that the Japanese lacquers that the Spa manufacturers could have seen – certainly small artefacts such as dishes,



**Figure 4.** Box 1, detail, decoration with metal powders and sprinkled metal particles.



teapots, vases or boxes – were likely devoid of human figures. A Chinese figure is represented on large scale on Box 3.

Metallic powders and sprinkled metal particles (small metallic fragments), of different colours, sizes and shapes are applied either on embossed surfaces or on flat surfaces. The metallic surfaces can be locally modulated by glazes. Effects are also given by a variation in the density of the metallic applications. The interiors of the boxes are covered by a uniform black lacquer decorated with sprinkled metal particles.

### **Period 2, first decades of the eighteenth century, assimilation of Eastern influences**

While the number of workshops in Spa making lacquerwares increases, production becomes more heterogeneous, and along with it, there is also a variation in quality (Figure 1, Boxes 6–12). Black boxes remain common, but imitation of tortoiseshell backgrounds appear more frequently. Boxes are also bright blue or pale white-bluish (Boxes 6–8).

The main composition on the lids' top is no longer surrounded by an ornamental border as in period 1. It occupies the whole surface, sometimes with a decoration on the corners of typically Asiatic motifs of *shippo* (Box 8).

The representation of Asiatic figures, mostly Chinese or Mongols, starts to be more convincing, even if not corresponding to an exact model, and with types of clothes with diverse provenances (De Moerloose 1987, v.1, 106). Flower bushes on the sides are from then on a common characteristic of all of the boxes (Figures 5 and 6). An effort is first made to vary them in some way, but soon one form of flower bushes with long and elegant stems and a variety of flowers is widely adopted and repeated over and over again until the middle of the eighteenth century.

As in period 1, metallic decorative effects are still popular for creating scenery such as figures, grounds of the islands, floral and flying wildlife depicted on the lids and sides of the boxes. However, the range



**Figure 5.** Blue Box 7, side with flowering bush.



**Figure 6.** White-bluish Box 30, front and back side with flowering bushes.

of tones of the metallic powders is generally reduced in favour of a gold-like aspect (as in Boxes 6, 8 and 11). Metal sprinkled particles still frequently decorate the inside of the boxes.

Some boxes have a particular decoration. Box 12, for instance, seems to be inspired from black Delft 'porcelain' produced between 1724 and 1740 by the De Metaale pot factory, which imitated Chinese and Japanese porcelains and lacquers (Van Aken-Fehmers 2003, spec. 135) (Figure 7).

Box 9 has many stylistic connections to a large box with a pale bluish background (Box 8) despite the diversity of the technique. For Box 8, the composition was indeed entirely painted and then varnished without any metallic application. A European couple is standing on a built terrace with a staircase. In the black box, number 9, a lady playing a sort of *pipa*<sup>1</sup>, a Chinese lute, is accompanied by a Chinese lover, in line with the new taste for gallantries introduced by the French painter Antoine Watteau (1684–1721). Due to the similarity of the exotic landscapes we consider the two boxes to have been made in the same workshop.

Other boxes with pale bluish underground and painted decoration can be compared with Boxes 8 and 9, as two large elegant toilet caskets dated of the middle of the eighteenth century (illustrations in De Moerloose 2018, 43, 50).

### **Period 3, after c. 1735, chinoiserie in rocaille decoration**

The third phase is characterised by its rococo style (Boxes 13 to 19). The large number of *bois de Spa* with small scenes of *chinoiserie* framed by a rich *rocaille* decoration testify to the great success they encountered. The colour of the backgrounds is mainly black and red tortoiseshell but also vivid red, and blue.



**Figure 7.** Box 12, detail of the raised and gilded decoration compared to a black Delft earthenware (manufactory De Metaale Pot), c. 1724–1740, Royal Museums of Art and History of Brussels, inv. Nr. Ev. 270 A-E. © KMKG-MRAH (vase).

The gilded shells and the grounds are profusely decorated with flowers and also the typical Spa vegetation conceived under the Asiatic influence during the two previous periods (Figure 8). This vegetation and the flowers are often painted with bright colours, contrasting with the plain gildings, surfaces of silvery and coppery aspect, and metal powdering and shading off effects. The use of metal sprinkled particles is still frequent for the insides but rare on the outside. The central compositions are generally reduced to two stiff Chinese figures with a minimum of accessories, separated by one flowering bush or a vase. Chinese porcelain or porcelain of Meissen by Johann Gregorius Höroldt (1696–1775) might have been an influence here.

The *rocaille* decoration adopted in most of the boxes seems to have been copied originally from engravings of Gabriel Huquier (1695–1772) after Juste-Aurèle Meissonnier (1695–1750) as for example the project of a *canapé* for Count Bielinski of 1735 or a table, both published between 1742 and 1748 in the *Oeuvre de Juste-Aurèle Meissonnier. Peintre Sculpteur Architecte & Dessinateur de la chambre et Cabinet du Roy* (Fuhring 1999, vol. 2, 240, n° 55 and 338, n°51). This collection of



**Figure 8.** Box 18, detail of the central scene with rococo framing.

engravings contributed to the diffusion of the *rocaille* style in Europe. The *bois de Spa* with this type of *rocaille* decoration could have thus been produced since 1735 but was more probably in the 1740s and 1750s.

#### Period 4, after 1750, French influence

In this period, an evolution is observed in the *rocaille* decoration corresponding to the evolution of the *rocaille* style in general, as shown by Box 20 and a tea box in the Victoria and Albert Museum, London (Inv. W.20 & A to G-1914). The colour palette evolves toward intense blue–green or pale yellow even when black and tortoiseshell imitation remained popular options. Entirely painted compositions with *chinoiserie* decoration inspired from engravings or painted compositions, mainly French, become common in the second half of the eighteenth century (Kopplin 2005, 168, 173–180). Box 21 with Chinese children playing in a landscape would illustrate this tendency.

Other types of *chinoiserie* decoration with metallic applications but without the *rocaille* frame were also produced in this period as testified by Box 22, a blue writing case. This box can be dated 1760–1770, as shown by the composition directly inspired from an engraving of Jean-Baptiste Pillement (1728–1808). The engraving was published around 1760 in *The Ladies Amusement or Whole Art of Japanning Made Easy* by Robert Sayer. The microscope in Museum of the Walloon life ('Box' 23) dated from 1766 has a lacquered base of fine quality (Grzeskowiak and Quoilin). The figurative scene and landscapes are made with metal powders in golden, silver and copper colours but also with metal sprinkled particles as mainly in the first period (Figure 9).

#### Chemical and stratigraphic study of the lacquer

The chemical analysis of 17 Spa boxes sheds light on the materials used in the early lacquer production in





**Figure 9.** Detail of the lacquer decoration on the base of a microscope dated 1766 (Box 23).

the village of Spa. The stratigraphy and use of pigments and metals were investigated, but the main focus was on the organic composition of the lacquer. Next, the issue of whether the found compositions correspond to any surviving lacquer recipe was examined.

## Methods

### XRF / MA-XRF

Different methods were combined to find out the most detailed information about the objects. A general screening on pigments and metals was performed with X-ray fluorescence (XRF). The objects conserved at Spa were examined with mobile XRF equipment (InnovX-Olympus Delta Professional p-XRF with silicon drift detector). The box from the Royal Museums of Art and History in Brussels was examined with a macro-XRF (MA-XRF) instrument which allows surface scanning, giving information on the distribution of the elements (Bruker M6 Jetstream XRF).

### Sampling and cross-section preparation

Spa boxes were utilitarian fancy goods and suffered from wear over time. Most of them have been restored to a certain extent: strengthening with glue in the joints of the construction, covering with an additional

varnish, replacement of the yellowed varnish, or even extensive repainting of the decoration. Even with careful observation under visible and ultraviolet (UV) light, it was a challenge to recognise nonoriginal materials when sampling pure original material. The aim was to sample both a full stratigraphy and individual layers from both the interior and exterior lacquer decoration. Usually, it was not possible to sample in decorative parts, and many samples were taken close to joints and corners. Sample sizes were extremely small, and stratigraphies were sometimes incomplete, or at least not always fully representative of the object. Because restoration campaigns affected the exteriors of some boxes to the extent that original material could hardly be found, or sampling would leave traces on their new glossy surface, many boxes were only sampled on the inside. One or two samples for stratigraphic study were taken from most objects under study. Even after careful observation, analysis showed that some cross-section samples were taken in non-original areas (Box 10, and one cross-section of Box 1).

The stratigraphic samples were embedded in polymethyl methacrylate resin and polished mechanically and manually with abrasive sheets. The cross-sections were observed and photographed with an optical microscope (Zeiss Axio M.1 Imager), using polarised white light and UV light.

### SEM-EDX

The inorganic composition of layers or particles was determined by analysing cross sections and powder samples with a scanning electron microscope coupled to an energy-dispersive X-ray detector (SEM-EDX; Zeiss EVO 15LS instrument equipped with a back-scattered electron four-quadrant BSE detector and EDX-detector Oxford Instruments X-MAX<sup>N</sup>80 silicon drift detector, 15 kV).

### Micro-Raman spectroscopy

In some cases, additional measurements by dispersive micro-Raman spectroscopy (MRS) were necessary to identify certain pigments (Renishaw inVia instrument with a diode laser at 785 nm (Innovative Photonic Solutions) in combination with a 1200 l mm<sup>-1</sup> grating, with the aid of a Leica DMLM microscope at a magnification of 500x).

### THM-GC/MS

To determine the presence and identity of oils, resins, and, to a lesser extent, proteins, powder samples were analysed with thermally assisted hydrolysis and methylation-gas chromatography-mass spectrometry (THM-GC/MS). In the pyrolysis unit (Frontier Lab EGA-PY3030D), the sample is quickly heated and methylated (480°C, in presence of 5% tetramethyl ammonium hydroxide (TMAH) in MeOH). Different compounds are

separated in the column (Supelco SLB-5 ms, length 20 m, internal diameter 0.18 mm, film thickness 0.18  $\mu\text{m}$ ) of the chromatographic system (GC, Thermo TraceGC). The following oven temperature programme was used: 1 min at 35°C, followed by heating at 10°C min<sup>-1</sup> until 240°C, followed by heating at 6°C min<sup>-1</sup> until 315°C. This end temperature is held for 5 min. The separated compounds are detected by the ion trap mass spectrometer (MS, Thermo PolarisQ, scanned between 35 and 650 amu, 220°C transfer line at 290°C).

The resulting pyrogram was both manual and semi-automatically searched for marker compounds for natural and synthetic resins, oils, waxes or proteins (Mills and White 1994; van Keulen 2009; Wei et al. 2011; van Keulen 2015, and references therein). Use was made of several reference databases<sup>2</sup> (Schilling et al. 2016), including an in-house compiled library based on 52 natural resins, some of which were artificially aged.

### FTIR

If sufficient material was available, additional information was obtained with Fourier transform infrared spectroscopy (FTIR). The sample was measured in transmission mode using the instrument's microscopic setup (Bruker, Vertex 70, with Hyperion 3000 microscope, spectrum measured between 600 and 4000  $\text{cm}^{-1}$ ).

## Results and discussion

Table 2 shows an overview of the analysis methods applied to each object, and the results of THM-GC/MS analysis are summarised. Locations where non-original material were detected, consisting of modern pigments or resin ingredients, are not included in order to avoid confusion.

Bringing the analytical results together, the use of pigments, resins, oils, metal and proteins in the production of the Spa boxes in the early eighteenth century was assessed, giving a general insight into the methods used.

### Stratigraphy

In general, the wooden substrate is covered with a thin layer of glue, one or more decorative layers and one or more transparent top layers.

Directly onto the wooden substrate's surface, a UV-fluorescent, protein-rich layer, probably isinglass or another animal glue, was applied as an isolation layer, in order to lower the substrate's porosity and hygroscopicity (Koller and Baumer 1997, 77; Koller, Walch, and Baumer 2000). For fine-grained beechwood, as used in Spa, a thin layer of glue is sufficient for preparing the wooden surface before lacquering. This

technique was practiced by European artisans, even before the emergence of the art of lacquering.

The most complex stratigraphies are found on the exterior of the boxes. Several coloured layers can be superposed: in the black boxes, three black layers were seen in Box 14 (Figure 10), five black layers in the early Box 1, while thinner structures of one or two layers were found in the other black boxes. On this pigment-charged background, decoration with metal powders and/or pigment is applied directly, or some transparent varnish is applied in between (Box 1, 5 layers of 20  $\mu\text{m}$  transparent varnish between background layer and decoration). Next, the object is covered with one or more layers of transparent varnish (up to 50  $\mu\text{m}$  of thickness in some early boxes, but usually only a few  $\mu\text{m}$ ).

The interior's lacquer is typically black or red in colour, and thinner: most often the thin glue layer is followed by a pigmented layer (30–60  $\mu\text{m}$ ) and one transparent varnish. There is no convincing evidence that any of the transparent layers were tinted.

### Pigments and decoration

As expected, the use of pigments depends on the intended background colour and decoration. In the lacquer of all black boxes except for Box 16 and the rather late Box 20, the presence of soot and the fine grain of the pigment indicate the use of lamp black. Tortoiseshell imitation repeatedly contains vermilion; additionally, in a cross-section of Box 18, black particles not containing soot were interpreted as coal black. The detection of iron and manganese in the tortoiseshell imitation of Box 18 suggests the additional presence of earth pigments. For the white box, lead white was applied (Box 10). The blue boxes, all early eighteenth century, were coloured with Prussian blue, lead white and ultramarine (Box 6), Prussian blue and lead white (Box 8), or with smalt (Box 7). The use of expensive ultramarine in Box 6 suggests a greater than average luxury.

For the figurative painted decorations, lead white, vermilion, Prussian blue, yellow ochre and copper containing green were frequently found in the boxes produced in periods 2, 3 and 4. In the later box 21, Naples yellow and red iron oxide were found.

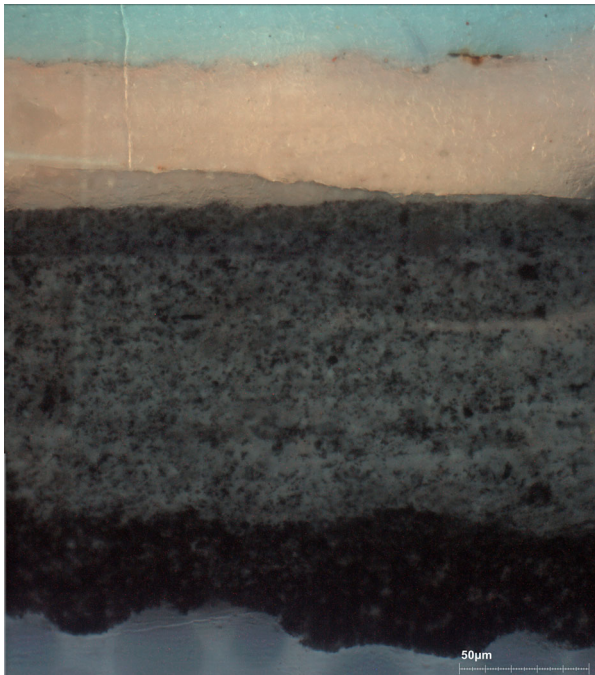
For some boxes, including all earliest boxes, almost exclusively metal powders and particles of different shades were applied (Boxes 1, 2, 5, 6 and 11; see further in this article 'The use and application of metals').

For black coloured interiors, soot was detected in almost every case (though not in the early Box 1), probably related to the use of lamp black. In case of red interiors, a red layer of vermilion is seen. In some cases, a red layer covers a black layer, and could be of later date as in Box 1.

**Table 2.** Overview of analysis methods applied to the objects under study. Table of organic materials identified after analysis by THM-GC/MS. x – ingredient clearly present; (x) – ingredient weakly present, traces; ? – ingredient detected but uncertain. Samples that are certainly or likely contaminated are in italics. The analytical results for non-organic materials are not shown.

object number	period	object colour	cross sections	SEM	XRF	MA-XRF	MRS	FTIR	THM-GC/MS (summary of results)												
									layer	oil	shellac	<i>Pinaceae</i>	sandarac	cedar	copal	larch	mastic	soot	proteins	elemi	gum benzoin
1	P1	black	interior and exterior	x	x	–	x	–	<i>interior – transparent</i>	(x)	x	x	x	–	–	–	–	x	–	–	–
									<i>interior – black</i>	(x)	x	x	x	–	–	–	–	–	x	–	–
2	P1	black	interior	x	x	–	–	–	<i>interior – black</i>	–	x	x	x	–	–	–	–	x	x	–	–
6	P2	blue	interior and exterior	x	x	–	x	x	<i>exterior – blue</i>	(x)	–	x	x	–	–	–	–	–	–	(x)	–
									<i>exterior – transparent</i>	–	–	x	x	–	?	?	x	–	–	(x)	–
									<i>exterior – filling under gold</i>	–	x	x	x	–	?	?	x	–	–	–	?
									<i>interior – black</i>	–	x	x	x	?	–	x	x	x	x	?	?
									<i>interior – black (other location)</i>	–	x	x	x	–	–	x	x	x	–	?	–
									<i>interior – transparent</i>	–	x	x	x	–	–	x	x	x	x	x	–
7	P2	blue	interior and exterior	x	x	–	x	x	<i>interior – black</i>	–	–	x	x	–	–	–	–	x	x	–	–
8	P2	light blue	interior and exterior	x	x	–	x	x	<i>exterior – light blue</i>	x	–	x	x	–	–	–	–	–	x	–	?
									<i>exterior – gold size</i>	x	x	x	–	–	–	–	?	x	–	–	?
									<i>exterior – transparent</i>	x	–	x	(x)	–	?	–	–	–	–	–	–
									<i>exterior – black bottom</i>	(x)	x	x	(x)	–	?	–	–	x	x	–	–
									<i>interior – red and black lacquer (red partly not original)</i>	(x)	x	x	x	–	–	–	–	x	x	–	–
9	P2	black	exterior	x	x	–	–	x	<i>exterior – black with filling of raised decoration</i>	–	x	x	x	–	–	–	–	x	–	–	–
									<i>interior – black (weak)</i>	?	?	x	x	?	–	–	–	x	x	–	–
10	P2	white	exterior	x	x	–	x	–	<i>interior – black (contaminated by restoration with alkyd)</i>	–	–	x?	x	–	–	x	–	x	–	–	–
11	P2	tortoise	interior	x	x	–	–	x	<i>interior – transparent</i>	–	x	x	x	–	x	–	?	x	(x)	?	–
									<i>interior – black</i>	–	x	x	x	–	x	–	?	x	x	–	–
15	P3	black	–	x	x	–	–	x	<i>interior – red</i>	–	?	x	x	–	(x)	–	x	–	x	–	–
14	P3	black	exterior	x	x	–	–	–	<i>interior – transparent</i>	–	x	x	x	–	–	–	–	x	–	–	–
									<i>interior – black</i>	–	x	x	x	–	–	–	–	x	x	–	–
13	P3	black	exterior	x	x	–	x	–	<i>exterior small box – transparent</i>	–	x	x	x	–	–	–	–	x	x	–	?
									<i>interior small box – black</i>	–	x	x	x	–	–	x	–	x	x	–	–
16	P3	black	exterior	x	x	–	–	–	<i>exterior – all layers (probably contaminated by restoration)</i>	(x)	x	x	x	–	–	–	–	–	x	–	–
17	P3	tortoise	–	x	x	–	–	–	<i>interior – red</i>	–	x	x	x	–	–	–	–	–	–	–	–
18	P3	tortoise	interior and exterior	x	x	–	x	x	<i>exterior main box – transparent</i>	?	x	x	x	–	–	–	–	–	x	–	–
									<i>interior main box – black (weak)</i>	–	–	x	x	–	–	–	–	x	–	–	–
									<i>interior main box – black</i>	–	x	x	x	–	–	–	–	x	x	–	–
									<i>interior main box – transparent (weak)</i>	–	–	x	x	–	–	–	–	x	–	–	–
18bis	P3	black	exterior	x	–	–	–	–	<i>exterior small box – black</i>	(x)	x	x	x	–	–	–	–	x	x	–	–
									<i>exterior small box – black</i>	–	x	x	x	–	–	–	–	x	–	–	–
									<i>interior small box – red</i>	–	–	(x)	x	–	–	–	–	–	–	–	–
19	P3	black	interior	x	–	x	–	–	<i>interior – black</i>	–	–	x	x	–	–	–	x	x	x	–	–
									<i>interior – transparent</i>	(x)	–	x	x	–	–	–	x	x	(x)	–	–
20	P4	black	exterior	x	x	–	–	x	<i>exterior – black</i>	?	x	x	x	–	–	–	?	–	–	–	–
21	P4	black	–	x	x	–	–	x	<i>interior – red</i>	–	–	x	x	–	–	?	–	x	x	–	–





**Figure 10.** Cross section of sample taken at the exterior of Box 14. Digital stitching of two photos. 500x magnification, UV illumination.

### Organic composition of the lacquer

Because the boxes' interiors are usually better preserved and underwent fewer restoration interventions, most of the information on the materials could be obtained from there. In the interior black, red and transparent lacquers, oil was not present, while sandarac and a *Pinaceae* resin (colophony, rosin, ...) occurred in every case studied (Boxes 1–2, 6–11, 13–15, 17–19, 21), indicating a strong preference towards spirit varnishes. This seems consistent with the statement by Watin that the lacquers produced at Spa are fake (*'faux'*) lacquers, meaning spirit-based lacquers, as opposed to the 'true' oil-based lacquers (Watin 1773, 287–8; Lacombe 1789, 16; Body 1898, 28). Shellac, still with fatty acid impurities, was almost always added (however, not in the black interior of Boxes 7, 19 and the red 18 and 21). Other possible ingredients for the interior lacquer were larch resin (also called Venetian turpentine; in black Boxes 6, 13 and possibly in red Box 21), copal (in black Box 11, possibly in red Box 15), elemi (in black Box 6 and possibly in Box 11) and mastic (in black Boxes 19, 6, and in red Box 15). The black or red layer is covered by a transparent varnish of the same organic composition as the coloured layer.

The (presumed) presence of additional non-original layers of varnish or paint on the exterior of many studied objects (some samples of Boxes 1, 6, 8, 10, 20 and possibly 18, 16) urged us to interpret those analyses with caution. The exterior lacquers of only seven objects were considered reliable for the identification of the resins (Boxes 6, 8, 9, 13, 18, 18bis, and the lower layer of 20).

The organic composition of the exterior lacquer seemed rather consistent with the analysis of the box's interiors. Again, sandarac and *Pinaceae sp.* resin were detected in all (presumed) original lacquer layers, both coloured and transparent. Shellac, often with fatty acid impurities, was detected in all black layers, tortoiseshell imitation layers and transparent layers covering those (Boxes 8, 9, 13, 18, 18bis, 20). The detected fatty acid impurities can be indicative for a specific grade of shellac, such as seedlac or sticklac.

The imitation of tortoiseshell remained popular throughout the seventeenth and early eighteenth century. One box with tortoiseshell imitation has been analysed (Box 18), containing sandarac, *Pinaceae sp.* resin and shellac, both on the exterior and the interior. The use of shellac as an ingredient for tortoiseshell imitation can be found in several historical recipes (for example Stalker and Parker 1688, 80–1; Anon. 1696, 17–9; Schreck 1798, 18). The combination of sandarac and *Pinaceae sp.* resin, together with spike oil, to counterfeit tortoiseshell, can be found in the 1685 and later editions by William Salmon (Salmon 1685, 222, 1701, 872). Due to its volatility, the use of spike oil would remain undetected in our analysis. A lacquer inspired by this recipe is therefore possible.

Boxes 8 and 9, light to middle shade blue, are remarkably different from the black and tortoiseshell imitation boxes. Shellac was absent in the blue lacquer of both, and in the transparent layers covering them. Historical sources confirm that shellac-based varnish is not supported by white, blue and green ground layers (De Limbourg 1763, 386: '... some make good varnish, with shellac, that the white, blue and green backgrounds do not bear ...'). Artisans consciously avoided shellac, with its intrinsic reddish colour, when creating light coloured opaque lacquers and transparent lacquers covering them (Bonanni 1720, 23; 1723, 33; Rembold 1744, 33; De Pecker 1756, 35; Dossie 1758, 412–3; Koller and Baumer 1997, 33).

Oil was present in the light blue lacquered Box 8, while absent (or present in minor quantities) in all black and tortoiseshell imitation boxes, as well as in two other darker blue boxes. If original, it is likely that specifically for the use of this light-coloured object, a recipe with drying oil, probably linseed oil, was preferred. In the black on the bottom side of the light blue box 8, and at its interior, only minor traces of oil were detected. For the exterior lacquers, additional ingredients were found only in the blue Boxes 8 and 6: presence of mastic and possibly also copal and larch in the transparent varnish covering blue (Box 6); possible presence of copal in the transparent varnish on Box 8 and in the black bottom on the exterior of Box 8, and possible presence of gum benzoin in the light blue lacquer.

Based on stylistic similarities, it is most likely that the light blue Box 8 and the black Box 9 both were created in the same workshop in the same period. However, important differences were still seen when they were analysed: the composition is related to the colour of the object. The black bottom side of Box 8 contains shellac, *Pinaceae sp.* resin and (degraded) sandarac, but does not contain oil in significant amounts, nor does its black interior (overpainted with red); the upper light blue part does contain oil, lacking shellac in the same time. In both black and transparent lacquer layers, sandarac seems degraded as if heated; many specific markers are lacking, and copal could be present. The black Box 9, on the other hand, shows the more expected sandarac/*Pinaceae*/shellac combination.

Although the analytical results are not conclusive regarding the ingredient benzoin (Boxes 6, 8, 13), its potential presence in the lacquers should not be overlooked. Benzoin has a pleasant smell and might have been added to the lacquer so that upon opening the Spa box a pleasant fragrance is released, which would fit perfectly in the context of *bois de Spa* (see for example for Period 1 Kunckel 1707, 12; for period 2 Cröker 1729, 131–133; Cröker copied several recipes from Kunckel's work. Also see Kunckel on fragrant lacquers 'At will, one can also add a pleasant smell to the lacquers' (Translation from German), see Anon. 1696, 28.).

### The use and application of metals

The black lacquer interiors of the objects from P1, P2 and P3, are usually garnished with metallic fragments to imitate Japanese *maki-e* (sprinkled metal particles). They are all small and irregular in shape except for Box 4, which has rectangular metal particles (Figures 3 and 11). These particles almost always consist of brass (copper–zinc alloy of varying ratios, attested in Boxes 1, 2, 7, 8, 10, 11, 13, 14, 19). In a rare case, pure red copper (Box 9) was used. The studied objects of period 4 no longer exhibit this *maki-e* imitation.

For the exterior of the boxes, the decoration combines techniques of painting and the use of metal particles and powders of diverse hues applied in various densities. These vary most in size, from visual particles to fine powder. In the first period mainly, there is a clear

intention to reproduce the many variants of the Japanese techniques such as *maki-e*, and more precisely by the techniques of *fundame*, *hirameji tsukegaki*, *maki-bokashi*, *nashiji*, *usuniku-takamaki-e* (Kopplin 2002, 230–234). Brass (Cu-Zn), finely ground, is used, both in the decoration and to imitate decorative hinges. It is found most frequently for gold imitation throughout the entire period of time studied, being present in all box exteriors except for a late one (Box 21). Additionally, other metals such as silver (Box 1), copper (Boxes 1, 6, 17, 18), tin (Boxes 1, 18, 19), bronze (Boxes 6, 10) and gold (Box 7) were found.

The XRF/MA-XRF/SEM analyses did not enable us to determine the ratio of the metals in the brass alloys. However, it is likely that the ratio of copper to zinc in the brass alloy was varied to obtain different metal colours.

Such variety in both size and composition of metallic powders and particles is reflected by historical sources. These historical sources explain in detail a variety of metallic particles to be used for decorating European (imitation) lacquers. For example, Stalker and Parker elaborately describe up to nine different metals used for japaning (Stalker and Parker 1688, 5–8). They state that the best quality of 'Brass dust' comes from Germany, probably referring to the famed Nuremberg (Stalker and Parker 1688, 5). One of the earliest sources on the art of European lacquering that mentions the use of metallic particles to decorate the lacquer surfaces is John Evelyn (1620–1706) second edition of *Sylva. Or A Discourse of Forest-Trees, and the Propagation of Timber*. This briefly refers to the use of aventurine (or '*venturine*') to decorate European lacquer items (Evelyn 1670, 199). Nine years later, Kunckel wrote about the production techniques and use of '*Nürnbergischen oder Hautschischen Gold oder Streu-Glanz*' ('Nuremberg or Hautsch-gold, or strewings') for European lacquers (1679, 35, 45). '*Hautsch-gold*' likely refers to the Nuremberg toolsmith, inventor and possible copperplate engraver Johann (Hans) Hautsch (1595–1670) (Beckmann 1784, 594; Jacobson and Rosenthal 1794, 475; Schießl 1998, 78; Eis 2005, 5, 12, 16–17). On bibliographical aspects, see Grieb (2007, 593).

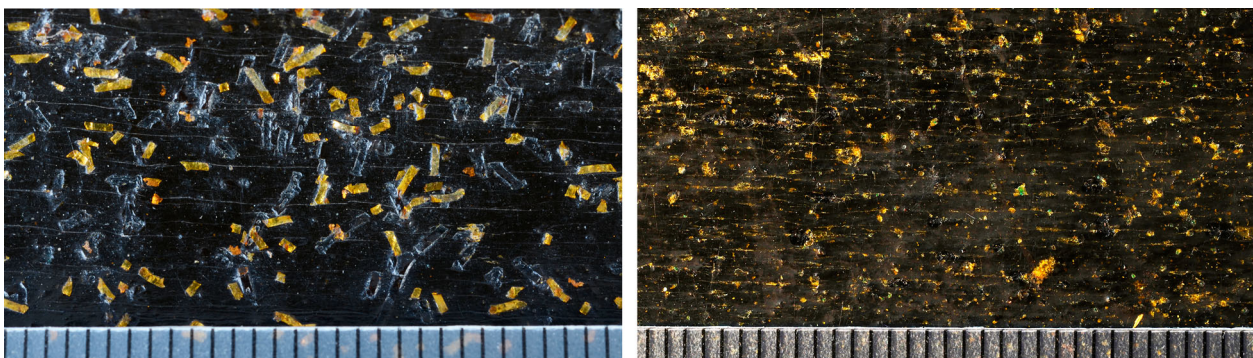


Figure 11. Box 4 and Box 19. Inside of the boxes, details of the sprinkled metal particles imitating the Japanese technique of *maki-e*.

Several studies on the metallic decoration for lacquers and polychrome objects contextualise the production technique for metallic particles (Bernstein 1992; Eis 2005, 2007; Prieur and Sanyova 2012; Lamfried, Müller, and Bartoll 2016; Dorscheid et al. 2019; Klinzmann 2019). The rectangularly shaped particles from the interior of Box 4 suggest the use of wire clippings for embroidery, described by John Evelyn in context of European imitation lacquers from as early as in 1670, London (1670, 199). On the other hand, the small and irregular shaped particles reveal that these were produced by either grinding or rubbing a piece of metal on a stone or by sieving a metal leaf (Lamfried, Müller, and Bartoll 2016).

The larger metal particles are applied directly on the lacquer, while finely ground metal powder is usually applied on a thin layer of orange-red gold size, containing vermilion. Some analyses seem to suggest the additional presence of lead (red lead?) under the metal powder which can be related to the recipe instructions for gold-sizes throughout the seventeenth and eighteenth centuries. In Box 8, the metal adhesive could be identified as a mixture of drying oil, shellac, *Pinaceae* sp. resin and possibly mastic.

Metallic powder decorations are in many cases raised. Sampling of this material was rarely possible due to the contamination of material from other layers, but a transparent, fluorescent, resinous organic material of 250 µm or 40 µm thickness was seen in a few cross-sections (Boxes 6, 13). Only in Box 6, ingredients of these fillings could be separately identified from the overlaying gold size and top varnish. A mixture of shellac, *Pinaceae* sp. resin, sandarac, mastic and possibly larch, copal and gum benzoin was detected. In context of black lacquers similar composition have been observed (Anon. 1724a; Cröker 1743; Varrentrapp 1773; Tingry 1804).

To conclude, the chemical composition of the lacquer and technology of the construction seems rather stable during the period studied (c. 1689–1770). Generally, the number of materials decreases slightly. In the early Box 1, for example, the analytical results seem to suggest a more elaborate layered stratigraphy and greater diversity in the types of metallic powders and particles, both of which are more time consuming than the techniques of decoration used in later objects. Later items seem to be more limited in the number of layers. Most variability, however, seems rather to occur in the colour of the box. While most lacquers consist of spirit varnishes based on sandarac, *Pinaceae* sp. resin, and shellac, with possibly other ingredients added, shellac is consistently avoided in the lacquerwares of lighter colours.

### The lacquer recipes related to Spa

Few historical sources mention lacquer recipes directly related to the city of Spa, such as from Romain (1908).<sup>3</sup>

Also, as mentioned above, a recipe from a primary source dated 1731 was likely written by Nicolas Dagly himself (Body 1898, 67–68).<sup>4</sup> It appears that this recipe significantly differs from the analytical observations on the boxes studied. First, this recipe does not mention the commonly observed ingredient shellac. Secondly, the analysed historical lacquer samples showed no proof of the use of ground glass although this might have been filtered out in the final step of the recipe.

In the search for historical recipes that match compositionally and contextually with the lacquers analysed here, both historical sources that are directly linked with Spa lacquer production and the ELinC recipe dataset<sup>5</sup> were studied. The ELinC dataset currently contains 819 lacquer and varnish recipes published in Europe (namely, in Belgium, France, Germany, Italy, the Netherlands and the UK) between 1390 and 1884.

An ELinC database search yielded two recipes containing the ingredients sandarac, *Pinaceae* sp. resin, and shellac. The first, published in Nuremberg, Germany, in 1696 and succeeding editions, is called '*Chinesischer oder Lac-Fürnis auf eine andere Art*' ('Chinese or lac-varnish of another kind'). This spirit-based lacquer recipe of a 'Chinese varnish' mentions shellac, sandarac and colophony as ingredients but does not specify any pigment (Anon. 1696, 21; Cröker 1729, 222–3, 1736, 229–30, 1743, 229–30). It is not uncommon for early modern authors not to mention a pigment(s) in the description of a particular recipe. Instructions on combining pigments or dyes with certain lacquer recipes can occasionally be found elsewhere in the source, for example in the chapter title, preceding or succeeding recipes. In relation to this recipe, the recipe's title is indicative for the colouration: 'Chinese lac-varnish'. Thus, this first recipe is considered to be primarily intended for the making of black European imitation lacquers. However, using shellac as one of the main film-forming ingredient, this recipe is likely not limited to solely black pigments. For example, Kunckel mentions that a shellac-based spirit lacquer can be used with a variety of dark and red colours (Anon. 1696, 4). This recipe mentions only two ingredients: shellac and spirit. The fact that Kunckel limits the use of this recipe to red and dark colours ('*rothe und dunckele farben*'), and not for light coloured lacquer, is due to the intrinsic reddish colouration of shellac, giving the reader a certain artistic freedom. Therefore, the '*Chinesischer Fürnis*' recipe might have been used for the making of red, dark (black) or mimetic lacquers (tortoiseshell); similar to our observations for the bois de Spa investigated here.

The second recipe matching compositionally with our analytical results<sup>6</sup> was published in 1724 (Anon. 1724b, 90–1). Recipe 2 demands the use of the pigment ivory black instead of the lamp black (soot) observed during analysis. Despite the difference, the



type of black pigments combined with this recipe might well be a matter of preference of the artisan, as is mentioned by Stalker and Parker (1688, 19). Both recipe publications mentioned are contemporary with the studied objects and contextually related to the production of European imitation lacquers.

## Conclusion

This interdisciplinary study combined archival, stylistic and technical research on a series of Spa lacquerware boxes with *chinoiserie* decoration ranging from the end of the seventeenth to the third quarter of the eighteenth century. This resulted in new insights into their decorative and art technical evolution throughout time. During the early period, the Eastern influence appears to have been inspired by small imported Japanese lacquers and probably also by Chinese porcelain, and later by European sources such as Meissen porcelain and Delft earthenware and later French engravings. The Spa lacquerers were at first very keen to imitate the Japanese techniques with metal powders and sprinkled metal particles. Later, the use of metal sprinkled particles decreases in favour of metal powders of different hues, first mostly of gilded aspect but then also of silvery and coppery aspect. Meanwhile, the use of pigments increases with the introduction of more painted details in the decoration.

The ongoing archival study brought new names of makers of lacquerwares, made it possible to clarify the activity of some members of the Dagly family living in Spa, and has already proved useful in better understanding the functioning of the workshops working at a familial level. The organisation at familial level would explain the difficulty encountered in attempting within this project to clarify groups of items that may have been made by the same workshop.

Our material and technical research revealed for the first time the methods and materials used by the artisans in Spa. The boxes are decorated with metals, and with pigments frequently used in this period such as lead white, lamp black, Prussian blue and vermilion.

The lacquers are in most cases composed of spirit varnishes, combining the ingredients sandarac, *Pinaeae sp.* resin and shellac, throughout the entire period studied. Other additional resins were found less frequently: larch resin, copal, elemi, and mastic. In light-coloured lacquer shellac was avoided.

The use of spirit varnishes might reflect the high demand for the Spa boxes; using the faster curing spirit varnishes instead of oil-based varnishes significantly increases the production rate. This base composition of shellac, pine resin, and sandarac was widely applied by different workshops and artisans for a variety of lacquer colours on *bois de Spa*. Since the earliest sources mentioning this rare composition have been found in contemporary German recipe books,

one might ask whether the technological knowledge for the Spa lacquer production originated in Germany. Indeed, two Dagly brothers made their careers at the court in Berlin and could have shared technical information with their family in Spa. The historical research also showed other ties to Germany: metallic particles were sent from Aachen to Spa and fully lacquered objects from Spa were sold in Aachen. Moreover according to historical treatises, the best quality of 'Brass dust' came from Germany, and more specifically from Nuremberg.

## Abbreviations

A.E.L.: Archives de l'Etat à Liège (State Archives of Liège); B.F.: Body Fund in Spa; G.S.: G. Storheaux; N.D.: Notaries' Deeds

## Notes

1. According to Claire Chantrenne and Anne-Emmanuelle Ceulemans (Museum for Musical Instruments, Brussels) who identified the instrument, the representation of the Chinese *pipa* was distorted by the lacquerer as a result of his own conception of stringed instruments, as shown by the fanciful tipped up peg and S-shaped sound-holes (instead of no sound-holes or crescent moon shaped sound-holes).
2. NIST Peptide Mass Spectral Reference Data' 2013. <http://peptide.nist.gov/>.
3. Romain 1908, 240–1. Translated by the author. 'We have prepared two different solutions: one of sandarac (125 g) and spirit (96%, 375 g); and the other: shellac (60 g) and spirit (375 g). We mix and add Venetian turpentine (60 g). Foremost you should use the most transparent resins, and in case of any colour, strain it through carbon black ('*noir animal*'). This varnish can also be used on painted objects like *les bois de Spa*.
4. Body 1898, 67–8. Translated by the author. 'For three quarts of a Paris pint (or *demi-pot* of Liège), spirit at 32°, ½ livre gum sandarac, 1 ounce gum mastic in tears, ½ ounce of Venetian turpentine, 2 ounce oil of turpentine, a nutshell camphor, 4 ounce ground glass. Pour the spirit onto the sandarac, add ground mastic. When both ingredients are dissolved put the whole on a gentle fire or *au bain-marie*, add the Venetian turpentine, then the oil of turpentine and the camphor, without reboiling. Mix the solution with a stick. The next day, strain it through cotton. N.B. use grain spirit and not that of wine. Take leaves of the '*hebdomadaire*' of our city [...] After applying seven or eight coatings of varnish, we give the object its first polishing. This operation is called the '*prélage*', since it is executed with Dutch rush ('*jonc appelé préle*'). Hereafter, add another few coatings of varnish and we polish it a second time. The polishing is done by rubbing pulverised pumice stone or slacks found at iron foundries. Finally, we finish the coating with spirit and we polish it with French chalk. We notice that the varnishing and polishing process is time-consuming and complicated, and it will take some time to master the method of manipulation and application'.

5. Vincent Cattersel, University of Antwerp, Belgium, *European Lacquer in Context* (ELinC) project, vincent.cattersel@uantwerpen.be.
6. ELinC Dataset rec. n°244 'Vernis noir' (black varnish): spirit (unspecified), shellac (4 ounces), sandarac and colophony (1 ounce), ivory black.

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