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WOOD IDENTIFICATION OF 18th CENTURY FURNITURE. INTERPRETING WOOD NAMING INVENTORIES

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Abstract
The 18th century Portuguese church furniture represents an extraordinary richness recognised worldwide, which demands safeguarding and valorisation. The identification of the wood of furniture artworks is the most important component for its comprehension and preservation. In this work wood anatomical characters of an 18th century Portuguese decorative furniture set from the Colegiada de São Martinho de Cedofeita, in Porto, were analysed to identify the woods used for manufacturing and to clarify their common names. Furthermore, the objectives were to recognise some of the criteria for choice of wood as well as the source of each wood. The woods identified from 16 fragments belong to Apuleia sp., Acacia sp., Neolamarckia sp. and Castanea sativa. Apuleia sp. and Acacia sp. woods most likely arrived from Brazil, while the Neolamarckia sp. woods likely arrived from India and the C. sativa woods from Portugal. The results are in accordance with the known Portuguese colonial sea routes of the 15th -18th centuries. Interestingly the terms found in the inventories can refer to finishing methods instead to the name of the woods, as for instance "oil wood" can refer to "oiled wood" or "linseed oiled wood". The species choice may be related to the mechanical properties of the wood as well as the original tree size. Two large planks of Acacia sp. were used for the top of the "Portuguese arcaz", and Apuleia sp. was found on main structural elements of this set of furniture, suggesting that wood colour was also important. Woods from Neolamarckia sp. and C. sativa, were also identified, being Castanea wood present only in the most recent pieces of the furniture set.

Keywords: *Wood anatomy; Wood identification; 18th century furniture; Cabinet-making; Antique church furniture.*

Introduction

Wood identification has significant applications to an extensive range of professional fields and academic disciplines. It may assist in forensic science and law; impart invaluable support to quarantine and customs and to antique dealers. It may contribute to biology, palaeobotany and pharmaceutics. In disciplines that study cultural heritage, such as anthropology, archaeology, art history and materials conservation wood identification may

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serve to validate existing knowledge or enhance knowledge of an art piece for which information is scarce.

In general, decorative art amateurs employ both visual classification and epochal inventory terminology to identify the main components. This same practice became deep-rooted among the 18th century Portuguese cabinet-makers as well [1]. One of the reasons for this was the outstanding wood assortment that continuously came to Portugal from its eastern and western colonial settlements since the 16th century, which were simply labeled with the local common names.

Church equipment is of great importance for Portuguese 18th century furniture history. Carvers, turners and gilders developed their skills embellishing the primary work of the case furniture makers according to the most modern designs. The final result was a combination of foreign influences and local wood working traditions.

In 1834, a crown law banned Portuguese convents. However, the convents were only closed when its last resident friar or nun died. The furniture described in this paper was a small part of the late 18th century decoration of the São Bento de Avé Maria Convent in Porto [2]. Its contents were listed in 1892, and some of the furniture was delivered to the Colegiada de São Martinho de Cedofeita in Porto where it still remains.

The identification of the wood of an art furniture piece provides therefore important information from the historical and conservation point of view. More specifically, wood identification may serve to augment knowledge about ancient trade, uses and manufacturing techniques. It provides insights into the conservation needs, since the conservation and restoration of historic furniture must be well-matched to their requirements and specific characteristics [3, 4]. Wood identification by validating in historical documentation or revealing misconceptions can increase our understanding of cultural heritage. In this context, wood species identification is of great importance to enlighten the above referred Portuguese inventory as the vocabulary used to describe prime-matter is unclear and ambiguous. In the 18th century, when describing furniture woods, cabinet-markers used the vernacular or 'trade' name and did not use the few scientific names that had been established [5]. The scientific naming is based on a binomial system developed by Carl Linnaeus (1707–1778).

Wood identification is a visual exercise at the macro and microscopic level, which requires therefore the ability to recognize basic differences in wood anatomy and cellular structure. Bearing in mind the unique historical value of furniture artworks, methods must be minimally intrusive. Recently the efficacy of reflected light microscopy, applied to observe unmodified wood surfaces, was evaluated as a tool potentially useful for the study of anatomical features of wooden artefacts [4]. However, this non-invasive technique can only be used on small objects and the identification of tropical species needs a deep accurate histologic analysis. Usually, a small, non-invasive sample is taken from a hidden area and processed for microscopic analysis.

Reliable wood identification can help clarify some issues in Decorative Art studies, including the expressions in use, as well as reveal some of the wood choice criteria used by 18th century cabinet-makers. Tropical and Pantropical woods are strikingly coloured compared to the pale European species. The palette includes red, black, several brown and yellow tones, green, and ivory colours. Before the colonial wood boom, European cabinet-makers developed

dyeing techniques for local temperate climate woods to achieve the most fashionable and multi-coloured furniture marquetry. Colonial woods were thus a boon to furniture manufacturers, and Portugal was the first port for ships arriving to Europe. For instance, and according to Massafra, Portugal was the reference market of tropical wood trading for Italy [6]. This is reflected in the designation "legno di Portogallo" in a 1760 Italian document, and the term is believed to refer to Brazilian dark woods [7]. It is reasonable to assume that woods were identified by their colours as well as their geographical origin [8].

Epochal important wood utilisations were medicine, navy buildings, tissue dying, and building construction. Europe's exhaustion of wooden material as well as the development of transport facilities in the 18th century made colonial exploitation very interesting to the leading and richest kingdoms [9], and Portugal was one of them. Although tropical wood furniture was a sign of status and only rich people could afford to buy it, furniture making as a mechanical activity was of minor importance [10]. Golden metal brass over black furniture was in fashion in Portuguese ecclesiastical [7] and civil cabinet-making following the French André-Charles Boulle fashion for fully contrasted furniture design. Polished metal and ivory and turtle inlays over black ebony were developed in the 17th century and the first quarter of the18th century. Furthermore, Indo-Portuguese furniture production bears the same features. However, Portuguese church architects accomplished a rich and idiosyncratic scenario in the Catholic Church after the Council of Trent. In the 18th century, baroque, rococo, and even neoclassical fully gilded altars made an astonishing contrast with the black church furniture.

In this article we make a multi-disciplinary approach based on different sources of information, such as wood anatomy analyses, furniture history and old documents research to identify the woods of a decorative furniture set of the Colegiada de São Martinho de Cedofeita bringing light to the local common naming of imported species. Furthermore, we identified the origin of the wood used as this is obviously linked to the 18th century timber trade, and briefly discuss the criteria for the choice of woods according to its use in the furniture.

Materials and Methods

Wood samples were coded according to typologies and selected locations. A total of 16 wood fragments were processed from an 18th century Portuguese "arcaz", an 18th century antiphonal lectern, an 18th/19th century neoclassical stool, an 18th century turned leg table as well as from a similar 19th century turned leg table (image not shown), a gilded 18th century side table (one of a pair), an 18th century church stall benches and an 18th century turned leg stool (one of a set of four). Seven images of the set are displayed in Figure 1.

Samples were collected as carefully as possible from hidden and unpainted areas using a scalpel. The size of the fragments ranged from 3 to 10 mm in length, and 0.1 to 3 mm in width. As a result of the size and shape of the samples, it was difficult to cut them, and therefore they were embedded in London Resin White (LRWhite). The samples were first dehydrated using a graded ethanol series consisting of 25, 35, 50, 70, 90 and 100% (v/v) of ethanol with 10 min. intervals. The pieces were then incubated in a series of LR White resin and ethanol (1:3, 1:2, 1:1, 2:1, 3:1, 1:0) at room temperature overnight. The embedded pieces were polymerised at 60ºC in LR White for 24 h in capped vials. Sections of 5-10 μm were cut on a sliding

microtome, stained with safranin and fast green and permanently mounted with Entellan New (Merck). Fibre and vessel analyses were done with the aid of maceration slides, using a modified version of Jeffrey's method, and staining in water containing 1% safranin and mounted in glycerine-gelatine [11].

Descriptions followed the recommendations of the IAWA Committee [12]. Plant species were identified using wood anatomy textbooks [13, 14], atlases [15], INTKEY databases [16, 17] and the Wood Identification On-line Database [18]. The identifications were done at the most detailed level achievable, if possible at the species level.

Fig. 1. Church furniture: A - 18th century Portuguese Arcaz, B - 18th century Antiphonal Lectern, C - 18th century Turned Legs Stool, D - 18th century Church Stall Benches, E - 18th century Side Table, F - 18th century Turned Legs Table, G - 18th/19th Neoclassical Stool.

Results

The results of the microscopic identification of the 16 wood samples are summarised in Table 1, and the diagnostic characteristics for a correct identification are listed in Table 2.

Table 1. Wood samples studied. Name, furniture part and species identification.

Furniture	Part / Sample	Identification
18th century Portuguese Arcaz	Top	*Acacia* sp.
	Drawer front	*Apuleia* sp.
	Drawer side	*Acacia* sp.
18th century Antiphonal Lectern	Body	*Acacia* sp.
	Drawer front	*Acacia* sp.
18th/19th century Neoclassical Stool	Frame and Legs	*Apuleia sp.*
18th century Turned Leg Stool	Legs	*Apuleia* sp.
18th century Church Stall Benches	Back	*Acacia* sp.
	Legs	*Apuleia* sp.
18th century Turned Legs Table	Drawer front	*Acacia* sp.
	Drawer bottom	*Neolamarckia* sp.
19th century Turned Legs Table	Top	*Apuleia* sp.
	Legs	*Apuleia* sp.
	Drawer side runner	*Castanea sativa*
18th century Side Table	Top	*Castanea sativa*
	Frame	*Castanea sativa*

Table 2. Diagnostic characteristics used for wood samples identification.

Species / Feature	*Apuleia* sp.	*Acacia* sp.	*Neolamarckia* sp.	*Castanea sativa*
Vessels	Simple perforation plates Vestured pits	Wood diffuse-porous Solitary vessels common Vestured pits	Simple perforation plates	Wood ring-porous Vessels exclusively solitary, in diagonal/radial pattern
Fibres	Septate and not septate fibres	Fibres with simple pits	Fibres with simple pits, septate fibres present	Vasicentric tracheids present
Axial Parenchyma	Crystalliferous strands in axial parenchyma	Axial parenchyma vasicentric		
Rays	1-3 cells wide Storied rays Silica	Homocellular rays	Rays of two distinct sizes. Disjunctive ray parenchyma end walls distinct	Rays exclusively uniseriate Homocellular rays

Species descriptions

Apuleia sp. (Fabaceae), Figure 2.

Local name: Canafístula, Garapa, Grapia, Ibira peré. Distribution: southern Brazil and temperate South America [14, 16].

Vessels diffuse, solitary; rounded in transverse section; simple perforation plates; intervessel pits circular, alternate to opposite, vestured pits present; vessel-parenchyma pits similar to intervessel pitting. Deposits in vessels brownish-red, infrequent. Fibres with simple pits, septate fibres present. Paratracheal axial parenchyma vasicentric and confluent;

apotracheal axial parenchyma in tangential diffuse and in bands with 1-3 cells wide; storied; crystalliferous strand with prismatic crystals. Rays wide 1-3 cells frequent; homocellular and heterocellular; 5 to 8 cells in height; storied. Silica bodies present in rays cells.

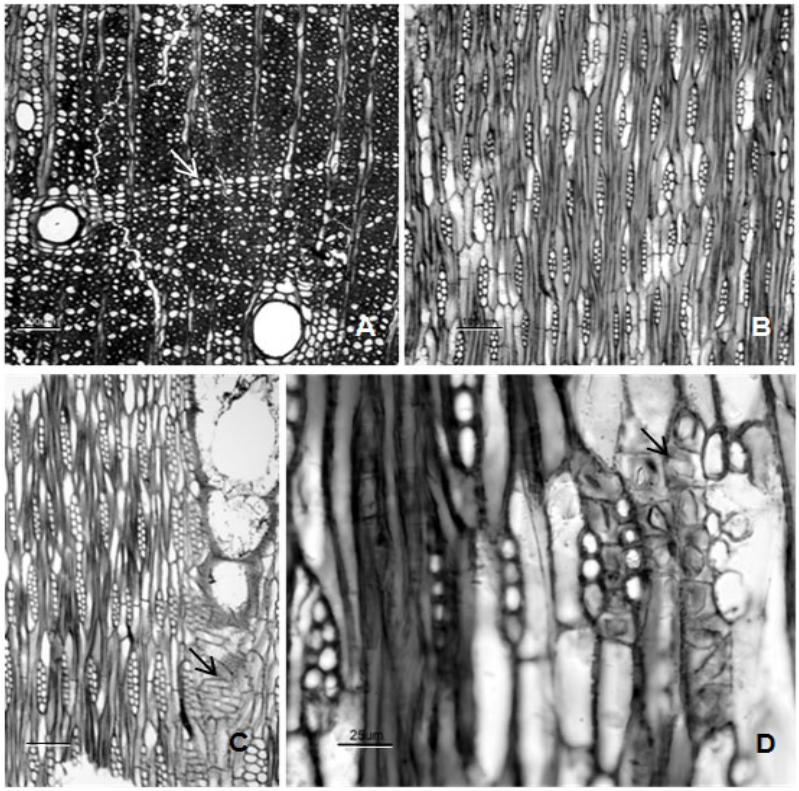

Fig. 2. *Apuleia* sp. A - Transverse section showing tangential bands of axial parenchyma (arrow), B - Tangential section, note the storied rays, C - Tangential section, note the stratification of rays, axial parenchyma and vessel, as well as the presence of vasicentric tracheids (arrow), D - Tangential section, crystalliferous strands of axial parenchyma with prismatic crystals (arrow). The scale bar for A, B, C is 100 µm, while it is 25 µm for D.

Acacia sp. (Mimosoideae), Figure 3.

Distribution: Pantropical [16].

Growth rings boundaries distinct. Vessels diffuse, solitary more frequent, radial multiples of 2 and clusters less frequent; rounded in transverse section; simple perforation plates with tails in the end of walls; intervessel pitting circular, alternate to opposite, occasionally with coalescent apertures; vestured pits present; vessel-parenchyma pits similar to intervessel pitting. Deposits in vessels reddish-yellow, less common. Fibres with simple pits, septate fibres present. Paratracheal axial parenchyma vasicentric, lozenge-aliform and confluent; apotracheal axial parenchyma in bands of 2-3 cells wide; crystalliferous strands with solitary prismatic crystals present. Rays biseriate more frequent, uniseriate less; homocellular, all rays cells procumbent; all rays storied; deposits in rays present. Silica bodies in rays cells.

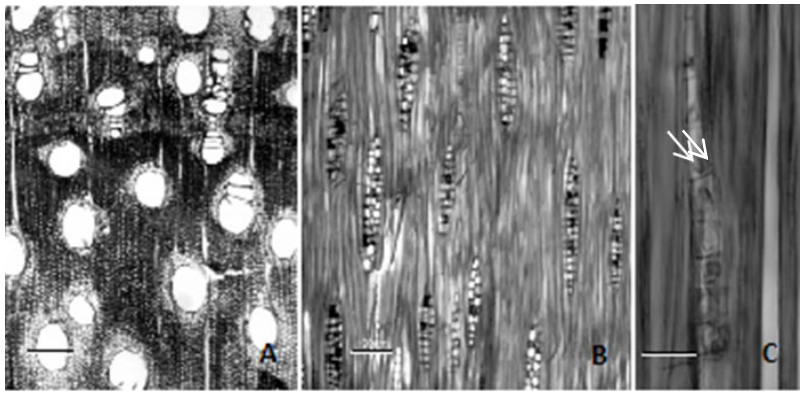

Fig. 3. *Acacia* sp. A - Transverse section, vessels solitary and in clusters, note the axial parenchyma confluent to aliform, some banded. B - Tangential section, showing deposits in ray cells. C - Radial section, crystals (arrow) in the axial parenchyma strand.
The Scale bar for A = 200 µm, for B = 100 µm and for C = 10 µm.

Neolamarckia sp. (Rubiaceae), Figure 4.

Local name: Kelampai. Distribution: India, Pakistan, Sri Lanka, Burma, Thailand, Laos, Vietnam, Cambodia, and Indomalesia (nowadays cultivated worldwide in tropical regions) [16].

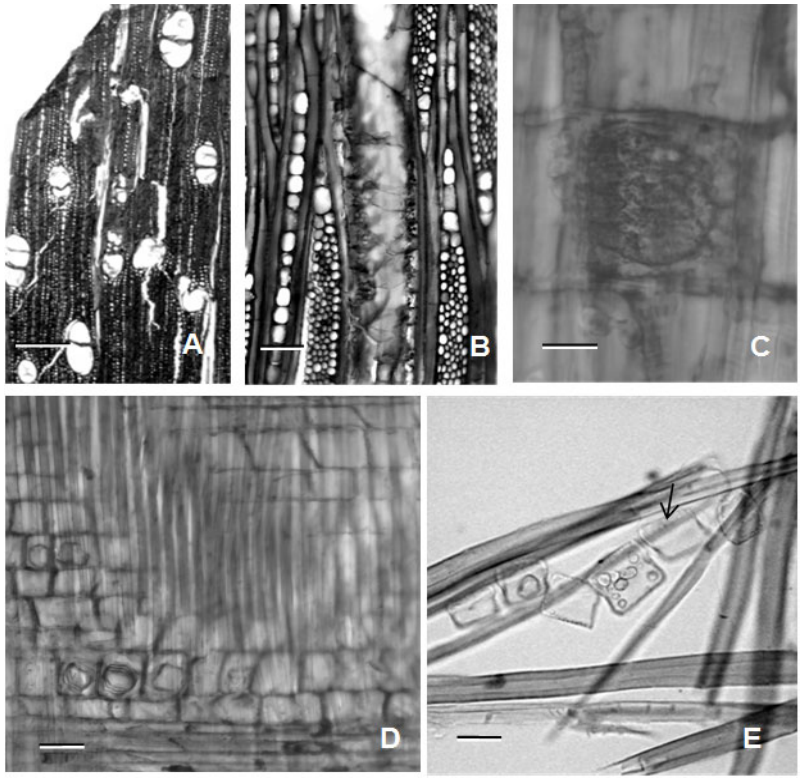

Fig. 4. *Neolamarckia* sp. A - Transverse section, solitary pores and radial multiples of two, B - Tangential section, rays of two distinct size, C - Radial section, showing a silica body in ray cell, D - Radial section, crystals in body ray cells. E - Macerated, note the disjunctive ray parenchyma end wall (arrow).
The scale bar for A is 500 µm. The scale bar for B and D = 100 µm, for C = 25 µm, and for E = 50 µm.

Growth ring boundaries indistinct. Vessels diffuse, solitary and radial multiples of 2 frequent; rounded in transverse section; simple perforation plates; intervessel pitting circular, alternate to opposite, occasionally with coalescent apertures, vestured pits present; vessel-ray and vessel-parenchyma pitting similar to intervessel pits. Tyloses present, thin walled. Fibres with simple pits, septate fibres present. Axial parenchyma vasicentric. Rays of two distinct size, the smaller uniseriate, the larger rays 3 to 6-seriate; the larger rays all heterocellular, the smaller can be homocellular or heterocellular; prismatic crystal present in ray cells. Disjunctive ray parenchyma end wall not easy to recognize.

Castanea sativa Mill. (Fagaceae), Figure 5.

Local name: castanheiro. Distribution: Probably native of south-central Europe, in parts of the Balkan and the Italian peninsulas, extending northwards to Hungary and eastwards to Caucasus; widely cultivated and naturalized in western Europe [19, 20].

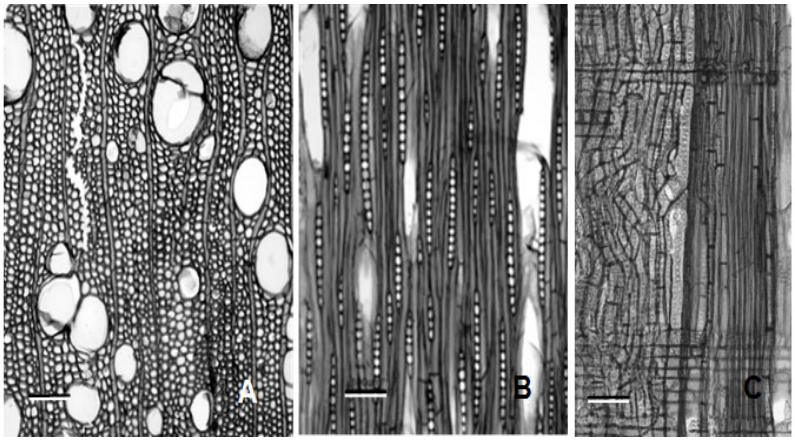

Fig. 5. *Castanea sativa*. A - Transverse section, growth ring boundaries distinctively showing solitary vessels in diagonal and /or radial patterns, note the diagonal pattern,
B - Tangential section, all rays uniseriate,
C - Radial section showing vasicentric tracheids. Scale bar = 100 μm.

Wood ring-porous, vessels arranged in diagonal and/or radial pattern, solitary vessels, rounded in transverse section; simple perforation plates; intervessel pits alternate to opposite. Fibres with simple to minutely bordered pits, septate fibres present. Vasicentric tracheids present. Apotracheal axial parenchyma diffuse; paratracheal axial parenchyma scanty. Rays exclusively uniseriate; homocellular rays cells procumbent.

The microscopic analysis of the xylem anatomy provided results on the wood identity, listed in Table 3, which can justify the 18th century way of identifying the woods that were used in the furniture, particularly in the analysed set.

Table 3. Principal characteristics and interpretation of furniture present in the Colegiada de São Martinho de Cedofeita in Porto (Portugal).

Furniture	Wood Identification and Common name	Sample's location	Portuguese 18th century Phrase	Conceivable interpretation
18th century Portuguese Arcaz	*Acacia* sp. Acacia	Top	"Pau-óleo" ("Oil wood")	Linseed oiled wood
	Acacia sp. Acacia	Drawer side	-	-
	Apuleia sp. Canafistula; Garapa; Grapia; Ibira peré	Drawer front	"Guarnição de pau preto" ("Decorated with black wood")	Blackened dark wood
18th/19th century Neoclassical Stools	*Apuleia* sp. Canafistula; Garapa; Grapia; Ibira peré	Frame and Legs	"Pau preto" ("Black wood")	Blackened dark wood
18th century Turned Leg Stool	*Apuleia* sp. Canafistula; Garapa; Grapia; Ibira peré	Legs	"Pau preto" ("Black wood")	Blackened dark wood
19th century Turned Leg Table	*Apuleia* sp. Canafistula; Garapa; Grapia; Ibira peré	Top and Legs	-	-
	Castanea sativa Castanheiro	Drawer side runner	-	-
18th century Church Stall	*Apuleia* sp. Canafistula; Garapa; Grapia; Ibira peré	Legs	"Madeira de fora" ("Foreign wood")	Imported wood
	Acacia sp. Acacia	Back	"Madeira de fora" ("Foreign wood")	Imported wood
18th century Antiphonal Lectern	*Acacia* sp. Acacia	Body and Drawer	"Madeira de fora" ("Foreign wood")	Imported wood
18th century Turned Leg Table	*Acacia* sp. Acacia	Drawer front	-	-
18th century Side Table	*Castanea sativa* Castanheiro	Top and Frame	"De talha dourada" ("Gilded carving")	Common use of native wood

Discussions

18th century Portuguese "arcaz"

The 18th century Portuguese "arcaz" (Fig. 1A) is a traditional piece of equipment for sacristies where religious clothes were kept flat inside large drawers. The rhythmic pattern of the regular 4 x 4 body and drawers gives it a particular stylish characteristic. It has a confluence of rococo volumetric features with a neoclassical decoration. One of the main features is the astonishing 604 cm x 53 cm two timber planks used on its top. They have been plain sawn (tangentially cut) and originally joined with tight dovetails, which have prevented them to cup. The "arcaz" was likely assembled in situ and remains stable. Furthermore, each drawer front is made of only one plank and the side curved block is also cut from solid wood. The size of the planks suggests that its length and width may be important when we investigate the furniture of this period. In the 18th century, special imported timber could be up to 90 m long when it was meant to be used for ship masts [21]. However, 7 m long planks were common in the market as recorded in epochal cargos. Brazilian forests began to be cut from the seaside to the inland in a continuous effort to seek the rarest or the tallest suitable timber to send to Europe.

Two species were histologically identified. These species are *Apuleia* sp. and *Acacia* sp. (Table 1 and Table 3), and this confirms the 1892 inventory of "oil wood with black wood

decoration". The *Apuleia* sp. wood was darkened, and it was used for the front of the drawers. The top mouldings and applied carving on both sides of the piece appear to belong to the same species although it was not possible to collect samples from those sides. A typical cabinet-making rule was (and still is) to use fashionable wood for the exposed structure. The inner, hidden structure was made from local, cheap wood species, mainly of chestnut wood (*Castanea sativa*). Thus, the drawer fronts are black and display a dyed natural dark colour on the inside. Golden brasses decorate the "arcaz" black surface and are clearly recorded in the Convent works account book in 1794.

Identification of the *Acacia* sp. on the top and drawer side raises several questions (Table 1 and Table 3). Considering the above mentioned rule, how would cabinet-makers use a non fashionable wood on the top, as this is normally an imposing part? Would the wood be darkened? Would it be covered by decorative stones which were in fashion at the time? Furthermore, there are references in both the 1791 and 1792 inventory lists to slate and marble without mentioning its purpose [22]. Another point to consider is the purple-reddish to reddish-brown colour of this species as in 18th century Europe, marquetry furniture with purple wood was in demand. The purple wood called "amaranthe" is often referenced in French cabinet-makers' texts [5]. Mahogany (*Swietenia macrophylla* King) from Honduras, Cuba, Puerto Rico and San Domingo was also in fashion in England and North America. It is possible that the Portuguese "arcaz" top might also have been chosen because of its stylish colour. Cabinet-makers and carpenters were aware of the technological qualities of each type of prime-matter. This timber did not twist or crack for more than two centuries, even when the "arcaz" was moved in one piece to its current location. This means that the qualities are fitted to this type of use. The wood has a straight grain and is hygrometrically fitted. The *Acacia* Mill. species grow in Pantropical regions, and the wood could have arrived from Brazil or even from the Portuguese Island of Madeira. Furthermore, there are some Acacia samples in a 19th century Portuguese wood collection box referred to as native woods from Madeira [23]. However, there are other possible supplying markets. Often cargo ships changed routes; it was common that ships coming from the Levant (at that time India, China, Japan or even Australia) reached the coast of Africa and then continued to the Brazilian coast and then to Lisbon or Porto [24]. Ships were sent directly from Brazil to Eastern countries to bring special cargos. It is thus reasonable that *Acacia* wood could have arrived at Porto from one of those complex routes [25]. *Acacia* and *Apuleia* woods were both at cabinet-maker's disposal and *Acacia* wood was probably used because of its purple-reddish to reddish-brown colour. It was thus, a question of conscientious use of colour as a decorative concept for stressing the "arcaz" front dark design. So it seems clear that *Apuleia* was reputed to be a precious hardwood for high-value cabinet making. The 1793 specific reference to "woods from Brazil" (the likely "arcaz" conclusion year) is a puzzle that may be difficult to solve.

18th century antiphonal lectern, 18th/19th century neoclassical stool, 18th century turned leg stool and 18th century church stall benches

The 18th century antiphonal lectern (Fig. 1B) was meant to bear heavy chorus parchment manuscripts. A rigid column is provided by a range of plank joints, and the black natural colour of the Acacia provides fitted fashion patterns. The technological qualities of softness were also important as complex designs were carved into the wood (Fig. 1B). Cabinet-makers richly embellished the column and the base as they were the most visible parts of the piece. The support for the upper books was hidden by the column.

The 18th/19th century neoclassical stool (Fig. 1G) and the 18th century turned leg stools (Fig. 1F) are both identified as "black wood" (Table 3), while the 18th century church stall benches (Fig. 1D) is referred to as "foreign wood". The histological analysis revealed that the wood was from the *Apuleia* sp. (Table 1 and Table 3). The origin of the prime-matter was obviously known, and its colour really is dark. As mentioned above, the Convent account book states Brazilian wood purchases without naming its species. Cabinet-makers knew the dense properties of the *Apuleia* sp., and therefore the 18th/19th century neoclassical stools (Fig. 1G) were built with three thin bottom cross supports between their slightly thick tapered legs in combination with the upright position of the longitudinal cut wood. The 18th century turned leg stool (Fig. 1C) bears four turned cross supports, and the design is poor with only four turned posts. The stylistic reference is the 18th century turned leg table. Another reason for cross supports is that the stool frame has very basic joinery and the applied upholstery does not appear to be safe enough for a person to sit on. Two and a half centuries later, we discovered another reason for the use of the cross supports. The turners used an outer plank wood – sapwood – of *Apuleia* sp., and over time the wood is crumbling to dust. Sapwood was obviously known by the men who made this piece of furniture as it was dyed black.

The 18th century church stall benches (Fig. 1D) analysed are a small part of a total of more than thirty seats. They were important pieces of church furniture as nuns sat on them for their prayers and all religious events. They display long curved arms made with lengthy gouges, and the carving is very accurate. The wood is soft and silky to the touch. This is an important church furnishing, and dark wood of *Apuleia* sp. considered a precious wood for high-value cabinet making, was used. Similar to the 18th century Portuguese "arcaz", these benches are in quite good condition despite their move from the original convent.

18th and 19th century turned legs tables and 18th century side table

The fact that the 18th century turned leg stool and the 19th century turned leg table (of which the epochal documents were not identified) both have parts made of wood from the same species (*Apuleia* sp.) (Table 1 and Table 3) may confirm that this wood was used continuously for decades. In the 18th century turned leg table, wood from the *Acacia* sp. was found to be part of the top of the drawer. The *Acacia* wood is commonly present in drawers, likely as a result of its mechanical properties. The bottoms of the drawers were made with a different species commonly known as "kelampai". The scientific name for this species is *Neolamarckia* sp. (Table 3), and the use of this species led us to another geographic area of wood supply. This confirms that eastern woods were also used as prime-matters. However, we cannot know if this wood came in Portuguese or foreign boats, as international cargo routes were complex as discussed above. Furthermore, international cargo was often unrecorded.

Castanea sativa wood was mostly used in Portuguese furniture. Trees of *C. sativa*, which are locally called "castanheiro" (Table 3), grew in the northern part of the country. These trees grew mainly around inhabited places as its fruit was an important element for the Portuguese diet [26] before potatoes arrived to Europe from South America. Northern Portuguese convents had a systematic policy to expand "chestnut" plantations [21]. The wood is flexible, and woodworking it is effortless. Thin carving fractures cannot be avoided when the wood is not adequately moist. This is likely what happened in this particular 18th century painted and gilded Side Table (one of a pair) (Fig. 1E). The side table as well as the turning displayed on the 18th and 19th century turned leg tables were a widespread Portuguese typology.

Because *C. sativa* was local and extensively available, it was not in fashion. Exotic and colourful woods were preferred to manufacture modern typologies. The 18th century side table

is thus painted and gilded. The inner structure of the 19th century turned leg table (not shown), also uses *C. sativa* wood, indicating that cheaper local raw-materials and non-fashionable woods were not to be seen. Both cases indicate that *Apuleia* wood had a higher status than *C. sativa*.

Conclusions

Histological identification of woods may reveal unexpected issues in old inventories. Based on the results from this study, another meaning for Portuguese terms may emerge, rather than identifying wood. The Portuguese terms may refer to finishing methods. The 'arcaz' top identification is "oil wood", and *Apuleia* does not fit this denomination. The expression may refer to "oiled wood" or "linseed oiled wood" [27], which is a simple process used by carpenters and cabinet-makers to soften the surface of woods and simultaneously block the cut veins of the longitudinal planks used. This oiling method could also bear a colour, as oil can be a vehicle to plant pigments [28]. Expressions such as "oiled wood" or "oil wood" are found in 19th century Portuguese orphanologic inventories [29]. Large French dressers were finished either by painting or colouring with tinted polish [5]. The inventory of a 1748 Portuguese convent reports "red oil" door finishing [30], while painted carved doors and benches imitating "dark wood" were referred in 1786 [31]. Although coloured oil was also used in wall paintings [30], Portuguese words and phrases are different according to the context. English cabinet-makers in the 18th century commonly used linseed oil over beautiful walnut or mahogany veneers, and their pay rate was 'per foot in length' [32].

The identification of *Apuleia* sp. (six samples), *Acacia* sp. (six samples), *Neolamarckia* sp. (one sample) and *Castanea sativa* (three samples) reinforces that fashionable and colourful woods were in demand by cabinet-makers and carpenters. When sapwood was used, it was dyed to match the main colour. We must also note the importance of the eastern (*Neolamarckia* sp.) and western (*Apuleia* sp., *Acacia* sp.) supplying colonies. The complex international cargo networks offered a range of solutions to cabinet-makers according to their needs for main or secondary structural furniture elements. In addition to mechanically suitable properties, woods were chosen as a mark of status. Furthermore, local non-stylish species (e.g., *C. sativa)* were painted and/or gilded.

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