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*Efthalia Ntalouka, Daphne Kyriaki – Manesis, Konstantinos Choulis; Costas Vassilakis*

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# Decorated papers in bookbinding: A proposal for the creation of metadata for its documentation

Efthalia Ntalouka<sup>1</sup>, Daphne Kyriaki-Manesis<sup>2</sup>, Konstantinos Choulis<sup>1</sup>, Costas Vassilakis<sup>3</sup>

<sup>1</sup>Department of Conservation of Antiquities and Works of Art, University of West Attica, Athens, GR

<sup>2</sup>Department of Archives, Library and Information Studies, University of West Attica, Athens, GR

<sup>3</sup>Department of Informatics and Telecommunications, University of the Peloponnese, GR

[entalouka@uniwa.gr](mailto:entalouka@uniwa.gr) [ORCID: 0000-0002-3649-9398], [dkmanessi@uniwa.gr](mailto:dkmanessi@uniwa.gr) [ORCID: 0000-0002-3310-6616], [kchoulis@uniwa.gr](mailto:kchoulis@uniwa.gr) [ORCID: 0000-0001-7233-6185], [costas@uop.gr](mailto:costas@uop.gr) [ORCID: 0000-0001-9940-1821]

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### Abstract:

#### Purpose

The purpose of this study is the formulation of a metadata schema that represents the structure, methods, materials and designs of bookbinding found in 19th century books. The creation of a metadata schema contributes to systematizing the information collected regarding bookbinding guides and organizes the information collection and management process and facilitates search and retrieval. For each individual element of the binding process, the corresponding metadata are defined. The proposed metadata schema focuses on the representation of decorated papers used in books as covers, or parts of covers, and as endpapers. Mapping of metadata elements to Dublin Core elements is also provided, to facilitate standardization and interoperability.

#### Methodology

To achieve systematic documentation of the decorated papers and define a comprehensive and complete set of metadata, the first step was to categorize them and identify their properties. Initially, the techniques, materials, types of designs, colours, and characteristics of the papers were studied. To this end, information from similar categorizations was sourced from literature and the internet and utilized. Best practices followed by international standards for defining metadata and types of information encoding using controlled vocabularies and rules were identified and adopted.

#### Findings

This study presents a set of comprehensive and organized metadata elements for decorated papers, which can be used for the study and documentation of decorated papers.

#### Value

Today, in Greece, there have been only a few sporadic references to decorated papers, however no organized recording or systematic classification of these papers and their attributes is available. The present study constitutes the first step towards creating a metadata schema that will enable the recording, organization, management, and utilization of decorated paper information, as well as a

populated database, aiming to deepen the understanding of book collection, correlate it with the spatial-temporal context of its use, and promote and disseminate the material to user communities.

**Index Terms** — Decorated paper, marble paper, paste paper, coloured paper, embossed paper, printed paper, sprinkled paper, surface paper, metadata.

## I. INTRODUCTION

Joseph William Zaehnsdorf (1853-1930) in his book *The Art of Bookbinding: a Practical Treatise* [1] states that a bookbinding is completed in two basic stages. The first stage (forwarding) involves creating the book as a body and includes sewing the gatherings, gluing and rounding the spine, placing the endbands, attaching the boards, and covering the book with a material such as fabric, leather, parchment, paper, or a combination of these. The second stage (finishing) is the decoration of the cover. Decoration refers to the embellishment of the cover with various designs and techniques, such as printed (embossed, blind-embossed) decoration, gold or silver stamping, insertion of metallic elements, and impressions of lettering on the spine or both sides of the cover.

For the creation of an aesthetically pleasing result, whether for a handmade or industrially produced book, in addition to the final decoration, the following factors play a crucial role:

- The choice of cover material, its quality, colour, and texture.
- The choice or execution of headbands (handmade or industrial) which usually aesthetically match the cover's colour.
- Decoration of the edges using various techniques (marbling, gilding, colouring, embossing, etc.).
- The use of decorated papers with various techniques, used as endpapers or cover materials, either alone or in combination with other cover materials such as leather and fabric [2].

In researching 19th-century bookbinding in Greek libraries the striking decorated papers used attracted further study and it soon became evident that very few references to the topic existed. Occasionally, records of the papers were made by librarians, bookbinders, and especially book

conservators, who document binding elements as part of the conservation process. However, organized recording and classification of the papers had not been carried out.

Decorated papers are handmade or industrial papers that have undergone special treatment to be used in bookbinding as cover, or part of cover or endpapers. At times they also have decorated boxes for storing books and objects (such as children's toys) or small furniture [3]. Furthermore, they have been used as recycled material for lining the spines of books. In addition, they served as substrates for printing and penmanship as well as wrapping papers [4].<sup>1</sup>

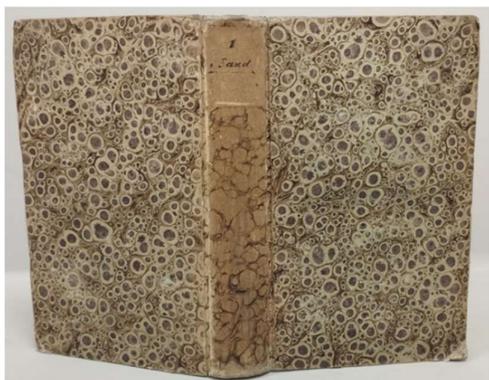


Fig. 1. Decorated paper as book cover

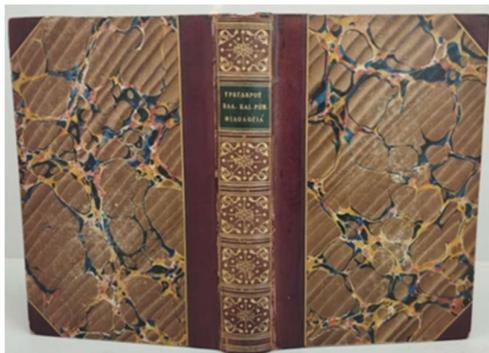


Fig. 2. Decorated paper as part of the book cover

Decorated papers are used in various types of bookbinding as cover (Fig. 1), for decorative reasons as well as for economy, since, for example, leather is much more expensive than decorated paper, which a bookbinder can easily create in his workshop. They may cover the entire cover or part of it (Fig. 2). Depending on the section that they occupy on the cover, bindings are classified as (Fig. 3):

- Full binding,
- Half binding,
- Quarter binding,
- Three-quarter binding.

Decorated papers are also used as endpapers (Fig. 4). Endpapers (endleaves) are two sheets of paper placed, one at the beginning and one at the end of the text block. In addition to decorated papers, plain white sheets are sometimes used for endpapers, often made from the same paper as the text block. Of these, the leaves that are glued to the front and back boards are called pastedowns, whereas

the remaining ones are called flyleaves. For the description of the term various names have been used such as “παράφυλλα”, “ακρόφυλλα” even “φύλακες” (guards) of the book as they protect the text block from damages [5]-[6].

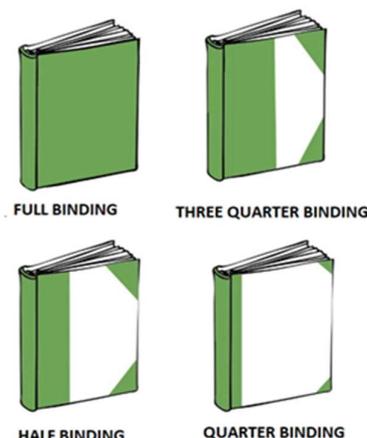


Fig. 3. Binding types

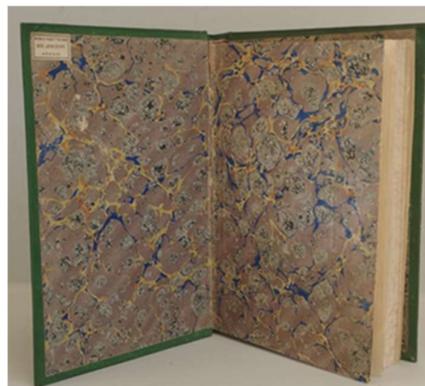


Fig. 4. Decorated papers as endleaves of the book.

## II. RESEARCH METHODOLOGY

Documenting the decorated papers is a challenge due to the uniqueness of each case and the lack of standardization of the terminology used to describe them. Since no organized classification of the papers into categories has been done so far, the need for one arose, to facilitate research, identification of the papers, and the definition of metadata. More specifically, this classification will allow metadata to be entered into a database designed for the documentation, organization, management, and display of books in general, and decorated papers specifically found within them.

The first step was to catalogue the varieties of decorated paper and to this end a review of exceptional bookbinding samples found in the libraries of the Greek Parliament, the Panteion University of Social and Political Sciences, and the Kaireios Library of Andros<sup>2</sup>, was carried out. The results were then crosschecked to existing samples and descriptions in relevant bibliography. The corpus of collected types of

<sup>1</sup> <https://www.ligatus.org.uk/lob/concept/1285>

<sup>2</sup> The aforementioned libraries were selected due to their exceptional collections in terms of bookbinding.

decorated papers leads to the search for methods of classification and management of the terminology for describing them.

After studying the bibliographic references, [2]-[4]-[7]-[8]-[9]-[10]-[11]-[12]-[13]-[14]-[27], it became clear that there is no common way to classify decorated papers, particularly marbled papers. Classification can be based on the technique used, but the names of the papers vary and are defined according to the creation technique or various cultural or historical influences.

It was decided that the criterion for classifying them would be the technique used in their creation, whereas the collection of data for formulating a rule for the recording of metadata would be based on the study of techniques, materials, types of patterns and designs, colours, and specific characteristics of the paper.

For the informational description of decorated papers, the internationally recognized Dublin Core™ Metadata Initiative standard<sup>3</sup> [15] was studied and used. This standard defines the minimal elements of information that can be used to describe web-based sources containing cultural information. The elements it proposes, and their specifications comprehensively describe the object being documented and its elements. Additionally, it is a simple standard that can be used even by non-experts in documentation. Furthermore, it supports interoperability and can be extended in the future by combining elements drawn from other standards without affecting it [16]- [17].

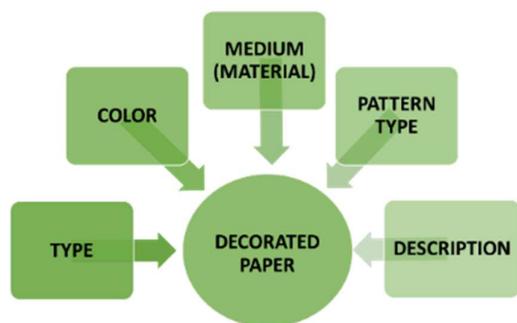


Fig. 5. Elements for the documentation of decorated papers

Another reason for choosing this standard is that it "supports the demands of broad usage and access over detailed analysis and exhaustive documentation"[17], which is the goal in this specific case.

The design of this documentation proposal aims to capture the minimum set of elements that describe each decorated paper. These elements include the type, pattern, colour, and paper quality, which help to more accurately define the visual, digital documentation (digital copy of the decorated papers) (Fig. 5).

The elements that are used fall into the three categories prescribed by Dublin Core, which are as follows:

1. Content: Elements that describe the object.
2. Intellectual Property: Elements that describe copyright

and creation.

3. Snapshot: Elements that describe the status and management of the object at a specific point in time (TABLE I).

Similarly to the approach followed by the Dublin Core standard, in the proposed metadata schema the elements are optional and repeatable [16] [17].

Based on the above, the recording of types of papers was designed.

	DCMI Element	Element Refinement(s)	Category
1	TITLE		Content
2	SUBJECT		
3	DESCRIPTION		
4	SOURCE		
5	LANGUAGE		
6	RELATION	Is Version Of Has Version Is Replaced By Replaces Is Required By Requires Is Part Of Has Part Is Referenced By References Is Format Of Has Format	Intellectual Property
7	COVERAGE	Spatial/ Temporal	
8	PUBLISHER		
9	CREATOR		Snapshot
10	CONTRIBUTOR		
11	RIGHTS		Snapshot
12	DATE	Created Valid Available Issued Modified	
13	TYPE		
14	FORMAT	Extent Medium	
15	IDENTIFIER		

### III. TYPES OF DECORATED PAPERS

The types of papers that decorate bookbinding vary and are classified into the following categories, based on references in literature and online sources, and according to the technique used to create them [2]- [19]- [12]<sup>4</sup>.

- A. Paste Paper
- B. Surface Paper
- C. Coloured Paper

<sup>3</sup> It is a set of 15 terms that were proposed following the collaboration of an international team with library managers, museums, government programs, and commercial publishers with the World Wide Web

Consortium (W3C). It was recognized as the IETF RFC 5013 standard, ANSI/NISO Standard Z39.85-2007, and ISO Standard 15836:2009[16].

<sup>4</sup> [Endpapers | Rare Books & Manuscripts \(adelaide.edu.au\)](http://endpapers.library.utoronto.ca/)

- D. Marbled Paper
- F. Printed Paper
- G. Sprinkled Paper
- H. Embossed Paper

Below, the fundamental techniques and subcategories associated with the variations in the final design of the paper are analysed.

#### A. Paste Paper (starch paste-coated paper)

Paste papers have been used since the late 16th century and continue to be used today as endpapers, book covers and part of book cover. They are created using various techniques, but the simplest involves coating the paper surface with a thick mixture of paste made from starch or flour paste, soap, and pigment.

Before the paste layer dries, various patterns are painted using a comb, fingers, a blunt tool, a brush, etc., to achieve striped, checkered, and other patterns that leave lighter areas of the paper exposed. (*Drawn/Combed paste*) (Fig. 6).



Fig. 6. Drawn /Combed paste papers

Another simple way to create a decorative pattern is by using a sponge, which, through gentle dabbing, leaves a random effect of different colour tones (*Daubed paste*) (Fig. 7).

Alternatively, two prepared sheets with paste and pigments can be placed with their coloured surfaces facing each other and then separated, creating a wavy pattern (*Pulled paste paper*) (Fig. 8).

Additionally, the paper can be decorated with a wooden block featuring embossed designs, which is pressed onto the paper surface. In the raised areas of the block, the paper appears lighter. Instead of a wooden block, bookbinding tools (fillets and rolls) can be used to imprint their designs on the coated paper (*Printed paste paper*) (Fig. 9).

Finally, the paper can be covered with diluted paste, creating random patterns, and then hung from one side so that the runny paste flows down, forming spontaneous gradations (*Spatter or brushed paste paper*) [20] (Fig. 10).

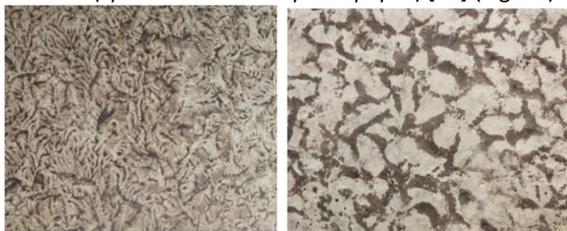


Fig. 7. Daubed paste papers



Fig. 8. Pulled paste papers.



Fig. 9. Printed paste papers

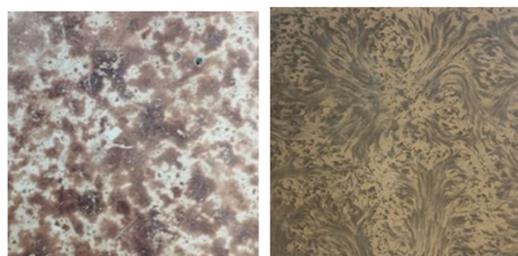


Fig. 10. Brushed or spatter paste papers

Once the design is created, the paper is left to dry at room temperature and is then polished with a hot iron. A paper may be created using a combination of two techniques [1]-[2]-[19].

Paste papers are unique and original, as there aren't patterns exactly alike. They were made using common, inexpensive materials and required minimal expertise from the maker, meaning that bookbinders and publishers could easily produce their own papers. This made them a cheap and easy choice for small print runs and for cases where more expensive decorated papers were unaffordable. As a result, very few recipes were recorded, and the papers were almost always unsigned [3].

#### B. Marbled Paper

Marbled papers are named for their surface patterns, which resemble the veins and designs found in marble. (Fig. 11) It is believed that the Persians were the first to use marbled paper for decorating manuscripts, as examples have been found in the margins of 16th-century manuscripts [3]-[8]-[19].

This technique was introduced to Western Europe from the East (via the Ottoman Turks) and began to be used in bookbinding from the late 16th or early 17th century [1]-[3].

This type of paper decoration is believed to have existed in Japan under the name *Suminagashi* since 1118. One theory (proposed by Lord Bacon) suggests that the marbling technique originated with the Turks. However, C.W.

Woolnough [7] believed that the art developed in the Netherlands around 1598. He suggested that small packages of Dutch toys arrived in England wrapped in marbled papers, likely to avoid English taxes. These papers were flattened and reused by bookbinders. The Dutch are also considered the first to use marbling techniques on the edges of books [1]-[3]-[19].

Another theory suggests that the Germans discovered the technique, as marbled paper has been found in *Alba Amicorum* (friendship album)<sup>5</sup> belonging to German travellers from 1575. In a later reference, Woolnough stated that he had found Turkish marbled paper in an album from 1616. It is possible that the Dutch, Germans, and Turks discovered the technique simultaneously but independently [19]-[20].

Marbled papers were created by spraying prepared colours onto a bath containing a solution of gum tragacanth and water. The colours were ground finely on a stone and mixed with water and a few drops of ox gall. If the pigments were organic based (lac colours), they were added directly. However, if they were mineral-based, a sticky substance was needed to prevent the heavy pigments from sinking. The best binding agents included diluted fish glue or parchment glue combined with gum tragacanth or even gum Arabic. Once the colours were prepared, droplets were sprinkled onto the solution's surface.

To create patterns, the artisan used various tools to manipulate the floating colours before placing the paper onto the bath. The colours adhered to the paper, creating the final design [25].

Once dried, the paper was polished with bee wax or soap to enhance its sheen and prevent it from sticking. For a higher gloss, the paper was burnished with flint or glass on a concave table. Later, hot rollers were used for this task.

Marbled papers were then coated with a mixture of animal glue, diluted in water, and a high-quality white soap. The mixture was left overnight over low heat before being applied to the paper. Polishing followed, using the methods described above [1].

The marbling process required precise measurements of ingredients (such as ox gall) and was sensitive to impurities in the water and changes in air temperature.

Each marbled paper is unique, as only one sheet can be produced at a time. Although the same colours can be reused for another sheet, the design and colour intensity will always be slightly different [3].



Fig. 11. Image of Greek marbles 'Roches de Milo- at "M. Guizot, Expedition scientifique de Moree 1831-1835: travaux de la section des sciences physiques. Atlas. Paris: Chez F. G. Levrault, 1835, PL: XI" [34].

Tanselle [2] suggesting categorizing marbled papers into two main groups based on whether the floating colours were manipulated or left untouched:

A. *Whisked*: If the colours remained as they fell into the bath, the designs were irregular, separated by "veins," and resembled natural marble.

B. *Combed*: If the colours were manipulated with styluses, combs, or other tools, they formed uniform patterns, swirls, and loops that did not resemble marble.

The following table classifies marbled papers into these two categories, along with historical details and their production techniques. Some papers may combine both techniques.

#### Detailed Classification of Marbled Papers

The marbled papers are categorized into two main types:

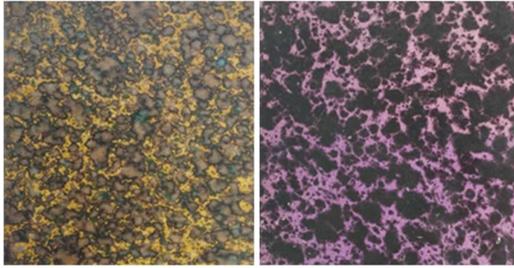
##### A. *Whisked Marbled Papers*

###### 1. *German - Papier Tourniquet*

This pattern consists of small spots likely created by dripping colour onto already coloured paper, forming scattered stains (Fig. 12).

<sup>5</sup> An *Alba Amicorum* is a friendship album (in Greek, *λεύκωμα*), containing handwritten texts from friends and acquaintances. These albums were first used in universities in Germany during the 16th century. Dutch

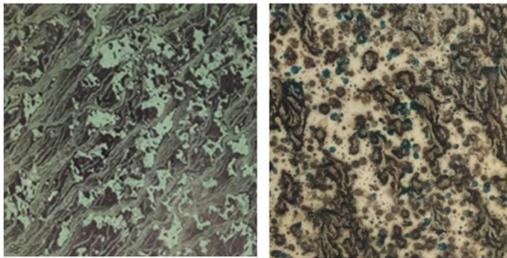
students later adopted this tradition of keeping friendship albums. <https://www.kb.nl/en/onderzoeken-vinden/bijzondere-collecties/alba-amicorum#toc-history-of-the-alba-amicorum> [21]



**Fig. 12.** German - Papier Tourniquet marbled papers

### 2. Twilled Paper - Papier Croisé

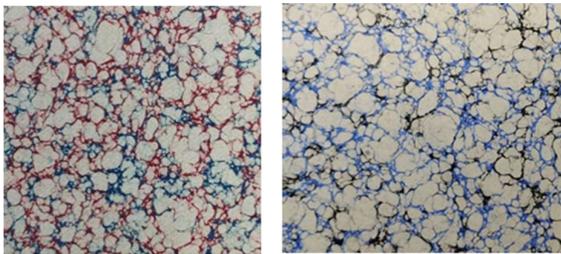
Attributed to F. M. Montgolfier in 1830, this pattern belongs to the category of papers called "pseudo-marbled" according to Wolf [26]. Historically, it is referred as Agathe or Achate. It is created by treating paper with potassium hydroxide or caustic potash and then laying it flat. Colours mixed with starch and alum are applied via spraying or sponging. The paper is lifted whereas still wet, allowing colours to flow and create unique patterns (Fig. 13).



**Fig. 13.** Twilled Paper – Papier Croisé marbled papers

### 3. Italian - Hair-Vein

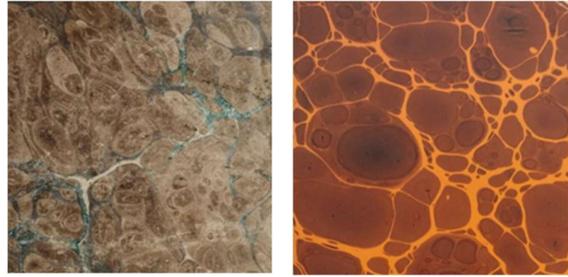
This pattern resembles a fine network of veins akin to capillaries. Developed in Italy in the late 18th century, the name either originates from its place of origin or its resemblance to Italian marble. The design is achieved by dispersing colours on a marbling bath surface, then introducing a mixture of soap, ox gall, and alcohol through a fine wire mesh to maintain the size of the dispersed droplets [7] (Fig. 14).



**Fig. 14.** Italian - Hair-Vein Twilled marbled papers

### 4. Stormont

This paper probably originates from Dublin or France. The use of turpentine as a dispersing agent causes the colours to form tiny dots across the surface, resulting in a lace-like effect [7] (Fig.15).



**Fig.15.** Stormont marbled papers

### 5. Gloster

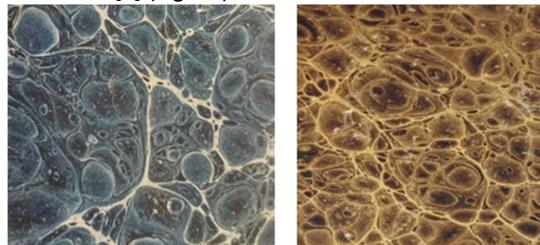
This pattern features very fine dots and thick, multi-coloured veins. The effect is produced using turpentine mixed with various colours, which are then applied to different areas of the bath. The base layer of colour is also manipulated with a comb or similar tool [7] (Fig. 16).



**Fig. 16.** Gloster marbled papers

### 6. Shell (French)

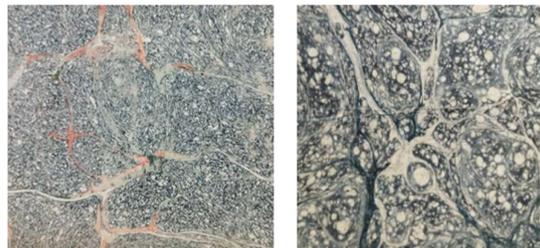
Emerging in late 18th-century France, this pattern is made by sprinkling colours onto the bath surface. The final colour, which dominates, is mixed with oil before being dropped into the bath. The oil causes a distinctive white outline to form around each droplet, with a darker centre reminiscent of a seashell [7] (Fig. 17).



**Fig. 17.** Shell (French) marbled papers

### 7. Smooth Body

This pattern consists of medium-thickness veins with a solid colour appearance, free of spots or rings [7] (Fig. 18).



**Fig. 18.** Smooth Body marbled papers

### 8. Spanish

Developed in the early 17th century, this pattern is known for its diagonal streaks that cross the base design, creating a 'moiré' effect. According to Loring [27], it was discovered accidentally when a marbling apprentice, suffering from a hangover and trembling hands, unintentionally created a linear, graduated pattern whereas placing the paper into the bath. The pattern is typically formed on a Turkish base, with the paper being repeatedly shaken back and forth whereas submerged (Fig. 19).

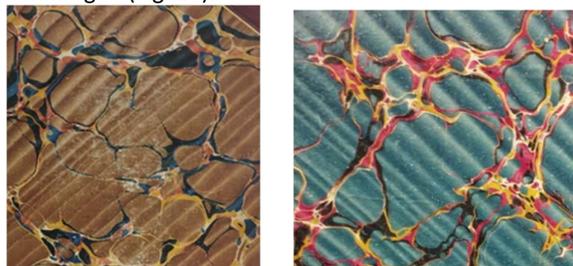


Fig. 19. Spanish marbled papers

### 9. Tiger Sunspot

First appearing around 1855, this pattern is achieved by dropping two or three colours into the bath, followed by a final black layer mixed with limewater and potash solution. The chemical reaction creates spots resembling eyes, with dark irises at the centre out of which tiny rays of the same colour spread all around [27] (Fig. 20).



Fig. 20. Tiger Sunspot marbled papers

### 10. Antique Spot Turkish

This is the oldest of the Western marbled patterns, dating back to the mid-15th century. Initial colours are dropped onto the bath surface, followed by lighter-coloured droplets. The first colours contract, forming vein-like structures around the newer, lighter drops [7] (Fig. 21).

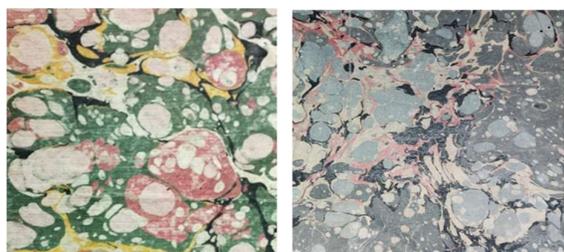


Fig. 21. Antique Spot / Turkish marbled papers

### 11. Morris

Dating to the late 19th century, this pattern was likely created by E. W. Morris, a London printer, or possibly by

another Morris working in Oxford. The paper is soaked in water, and colours are poured onto it, dissolving and spreading to create a watercolour effect. This pattern can be achieved using either water-based or oil-based marbling techniques [27] (Fig. 22).



Fig. 22. Morris marbled paper

### 12. Schrottell marbled paper

This pattern was created in Germany in the early 18th century, and its name comes from the German word Schrot which means "small pellet" or "small grain". The design is created by starting with a Turkish base. Then, a mixture of ox gall and oil is poured into the bath. The reaction of this mixture with the existing colours causes the appearance of dark spots with white halos. [27] (Fig. 23).

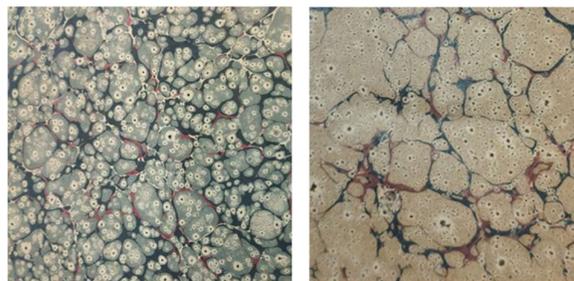


Fig. 23. Schrottell marbled papers

### B. Combed Marbled Papers

#### 1. Nonpareil

Named after the French word meaning "unparalleled" or "matchless," this pattern features horizontal parallel lines. It is created by sequentially dropping colours into the bath whereas using a tool to evenly distribute the material. A comb with evenly spaced teeth (15-30mm apart) is drawn across the bath in one direction, followed by another pass with a finer comb (apart 0,2cm to 0,3cm) in the opposite direction. This is one of the most widely used marbled paper patterns [7] (Fig. 24).



**Fig. 24.** Nonpareil marbled papers

2. Dutch

Similar to Nonpareil, but with precisely ordered colours that occasionally form curls [7] (Fig. 25).



**Fig. 25.** Dutch marbled paper

3. Curl (Snail)

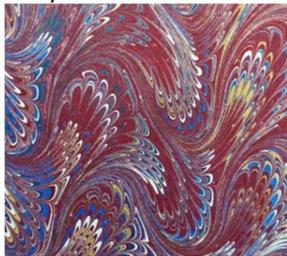
This pattern can be based on any marbled design. Using a special tool resembling a stylus or a comb with wide-spaced teeth, swirling motions are applied to create spiral patterns [7] (Fig. 26).



**Fig. 26.** Curl (Snail) marbled papers

4. Peacock

This pattern, along with the next one (Bouquet), requires a tool that creates fan-like or peacock feather-like shapes. After applying a base colour and combing it twice vertically and twice horizontally, a final comb with two rows of teeth is drawn through the bath in a wavy motion, producing feather-like shapes. Peacock closely resembles Bouquet but is always based on the Turkish pattern [27] (Fig. 27).



**Fig. 27.** Peacock marble paper

5. Bouquet

Created in the late 18th century, Bouquet is similar to Peacock but starts with a Nonpareil base. A comb with two rows of teeth is dragged through the bath in gentle, wavy motions, causing the Nonpareil columns to form small bouquet-like patterns [27] (Fig. 28).



**Fig. 28.** Bouquet marbled papers

6. Zebra

Popular in the late 19th century, this pattern is often mistaken for Antique Straight. It has a Turkish base with large, scattered colour drops. A comb with a single row of teeth is drawn through the bath vertically twice, followed by additional colour splattering on top [7] (Fig. 29).



**Fig. 29.** Zebra marbled papers

7. Antique Straight /Antique Zigzag

Like Zebra, it starts with a Turkish base and follows a similar process, but the final colour drops are smaller and more uniform, appearing as tiny dots [7] (Fig. 30 a, b).



**Fig. 30.** a. Antique Zig-zag, b. Antique Straight marbled paper

*Historical Overview*

After 1670, marbled paper patterns became widely used, with Old Dutch being the most common design. By the last quarter of the 18th century, Old Dutch was gradually replaced by French Shell, Stormont, and Antique Spot.

In the early 19th century, the Nonpareil and Spanish patterns gained popularity, reviving 17th-century designs.

During the latter half of the 19th century, mid-to-low-cost bookbinding often featured patterns like Gloster, Italian, Antique Spot, with Gold Vein emerging around 1880. German marbled papers with repetitive black spots on coloured backgrounds were also widely used but were not considered artistic.

Leather-bound books of this period often featured a modern version of the Dutch pattern, complementing decorative covers inspired by earlier historical styles. In the last quarter of the 19th century, the Arts and Crafts Movement, led by William Morris, revived traditional marbled paper designs from previous centuries [3]-[8].

### C. Surface or Brush Coated Paper

This type of paper has one side prepared with a layer of colour, which is applied evenly with a brush [1].

It was widely used after 1820 in various colours, both matte and glossy. A particularly common colour was yellow in different shades. It was mainly used in cloth (case-bound) bookbinding as well as in artistic bookbinding. However, it was not used as a covering material due to the sensitivity of the colour to mechanical wear [1]-[8] (Fig. 31).

The earliest paper of this type was found on the back of playing cards and in an Alba Amicorum album, which had been coated with red paint using a brush. Based on its watermark, it was dated between 1428-33 [20].



Fig. 31. Surface or Brush Coated Paper

### D. Coloured Paper

This type of paper acquires its desired colour during its manufacture, through the appropriate colouring of the pulp. In the literature, it is also referred to as Cobb paper, named after the British papermaker Thomas Cobb (17...-18...), who created the first coloured paper (Fig. 32).

In 1796, Thomas Cobb patented a pulp-dyeing method based on textile dyeing principles. Cobb's paper was a thin, high-quality, woven paper that was quite durable when wet and came in reddish-brown and olive shades. In the early 19th century, it was used to cover boards, especially in half-calf bindings with sprinkled or gilded top edges<sup>6</sup> [1]-[12]-[29]-[32].



Fig. 32. Coloured Papers

The dyes used for colouring were primarily pigments and plant-based dyes. Aniline dyes, well-known in the textile industry, were extensively used after 1856, although their application in the paper industry remained minimal until around 1890 [32].

<sup>6</sup> [Endpapers | Rare Books & Manuscripts \(adelaide.edu.au\)](http://Endpapers | Rare Books & Manuscripts (adelaide.edu.au))

<sup>7</sup> <https://cool.culturalheritage.org/don/dt/dt2684.html>

<sup>8</sup> In 1796-98, Alois Senefelder discovered the technique of lithography, in which the lithographer creates the design on a limestone plate using a greasy pencil or chemical ink. The design is then fixed with a solution of gum Arabic and nitric acid, which oxidizes. After about twelve hours, the plate is washed, leaving only the design drawn with the greasy pencil. The plate is then inked, and only the areas with the greasy pencil retain the ink. The

### E. Printed Paper

Printed papers date back to the late 16th century but were used in publisher bindings around 1880.

The term "printed papers" refers to those produced by transferring a hand-carved design from a wooden or metal plate onto paper using the desired colour. Each colour was printed separately, and after drying, the next colour was applied. The designs were created by repeating a small recurring pattern, whereas later, papers featuring floral, foliage, and bird motifs emerged.

Additionally, some papers were printed with gold and copper, although over time, copper oxidized, altering the paper's colour surface. Some of these designs were quite intricate. Printed papers were rarely used in leather bindings but were preferred in cloth bindings [2]-[8].

The production of printed paper required the right tools and skilful engravings by experienced woodcarvers. These papers varied from precise imitations of the texture and patterns of other materials to original, imaginative designs.

Many of these original papers were printed in the 18th century by the Dominotiers of France, who were manufacturers of decorated wallpaper, book covers, playing cards, box linings, and religious images. These early papers were printed on small sheets in a wide variety of patterns, ranging from simple, almost crude woodcuts—either monochrome or in two or more colours—to more complex designs [28]<sup>7</sup>.

According to Foot [20] the first printed paper dates to 1423. The design was created on a wooden surface, which was then inked with diluted water-based ink or watercolour paint and printed on paper.

In addition to papers printed using wooden blocks (matrices), lithographed papers<sup>8</sup> were also used (Fig. 33).



Fig. 33. Printed Papers

### F. Sprinkled Paper

Sprinkling has been used in bookbinding for decoration on both leather and book edges since the 16th century. Sprinkled paper is an inexpensive production method where small droplets of colour are spread on the paper's surface by lightly pressing one finger along a brush dipped in paint. This technique was used from the second half of the 16th century) [20].

design is printed onto paper through the application of pressure. If the printing was in colour, the technique required printing with different plates for each colour. After the introduction of steam presses in 1860, steel plates began to replace limestone plates. From 1900 to 1920, techniques involving colour separation cameras and photographic plates dominated commercial chromolithographic printing. Changes also took place in the materials used, including paper, inks, and varnishes [29.]

Sprinkled paper was particularly popular for book covers in Germany, where it is known as *Kiebitzpapier* (literally, "spotted paper"), as the speckled effect was considered like the pattern found on the eggs of certain birds (Fig. 34).



Fig. 34. Sprinkled Paper

### G. Embossed Paper

Embossed paper was popular in the 18th century and had a textured surface created by a metallic layer of colour (gold, silver, bronze) covering either the entire background of the paper or various decorative patterns. One of the most common patterns was leather simulation. [28]<sup>9</sup>.

Patterned papers, which feature embossed or printed designs, belong to the same category [28]<sup>10</sup>.

The process of creating embossed patterns on paper followed these methods:

1. Passing the paper between an engraved or embossed steel roller (or plate) and another roller (or plate) made of soft or easily compressible material, such as paper or cotton.
2. Pressing the paper between hard, coarse fabrics.
3. Passing the paper between two steel rollers with an engraved design, where one roller acts as the male and the other as the female counterpart of the design [25]<sup>11</sup>.

This category also includes *Dutch gilt papers*, which were produced in the early 18th century in Nuremberg, Augsburg, and Fürth. They became known by this name because the Dutch exported them to the rest of Europe.

Dutch gilt papers were printed from either wooden or metal plates, and the printed designs were usually quite embossed. They are classified into two types:

- Paper initially covered with colour, onto which a gilded design is printed.
- Paper where the design is printed with an inked plate (metal or wood) in various colours immediately after the paper has been gilded. The embossed printing creates an effect similar to that left by decorative tools on leather [3] (Fig. 35, 36).



Fig. 35. Embossed Papers



Fig. 36. Dutch gilt papers

### III. DOCUMENTATION OF DECORATED PAPERS

The term documentation refers to "an organized system consisting of techniques and technology that supports the organization and transmission of information" related to a record [17].

The information used for documentation is known as metadata, which is "data about other data; in other words, it is information that is not primary (such as a book, electronic text, or photograph) but rather information that describes a given entity [18],[17], in our case the decorated paper.

Metadata represents a vast body of accumulated, authoritative scientific knowledge that defines the origin and interpretation of each record [16].

Metadata "serve to describe and organize information, facilitate the identification and management of records, and provide access to them" [17].

When principles and guidelines, international standards, and a common language define metadata, they ensure the interoperability of a documentation system. These define the processes, the type of information, and the method of recording it so that broad and combined access is possible, as well as the exchange of information between cultural institutions [17]-[18]-[30]-[31].

#### A. Metadata for the Documentation of Decorated Papers

For the documentation of decorated paper VRA Core 4<sup>12</sup> standard was used as it focuses on the description of works of visual culture as well as the images that document them. In this respect VRA Core was ideal for such description. It soon became evident that there was a need to compliment the VRA elements with specifications regarding type, description and relation. In order to accommodate this DCMI [15] elements were examined. Specifically:

##### 1. TYPE

The type specifies the category and subcategory to which the decorated paper belongs. For example: Marbled paper Nonpareil. If the paper is a lithograph of an original marbling, the title is Lithographed paper Nonpareil.

##### 2. DESCRIPTION

The description includes free text in case additional details need to be recorded that are not included in the predefined elements. For example, an important signature or ex-libris frequently found on the pastedown or the bookbinder's stamp.

##### 3. RELATION

<sup>9</sup> <https://cool.culturalheritage.org/don/dt/dt1174.html>

<sup>10</sup> <https://cool.culturalheritage.org/don/dt/dt2518.html>

<sup>11</sup> <https://cool.culturalheritage.org/don/dt/dt1174.html>

<sup>12</sup> (<https://www.loc.gov/standards/vracore/>)

Associates the paper with the book in which it is found:  
*Is Part of*: This field specifies the book containing the decorated paper. This way, decorated papers are linked to the book's identification code (Book ID) and all related documentation as we see at Fig.37.

Figure 37 provides a full schema with both the elements of VRA CORE 4 standards [35], and DUBLIN CORE:

- **BOOK (WORK)**: Id, Title, Subject, Location, Date, Actor, Inscriptions, Measurements, Material, Condition Statement, Deterioration, Examination, Conservation, Exhibition History, Sources. Rights, BOOKBINDING (Type, Cover, Binder's Blank, Endbands, Sewing, Edges, Spine, Finishing, Endleaves).
- **COLLECTION** (an aggregate of books),
- **IMAGES** (a visual surrogate of books).

4. FORMAT

*Medium*. Specifies the paper quality, whether it is laid or woven, handmade or industrially produced.

*Medium DESCRIPTION colour*: Defines the paper's colour  
*Medium DESCRIPTION pattern*: Specifies the decorative pattern.

To define the values that the elements will take for interoperability and ease of search and retrieval, the following standards and controlled vocabularies were used: Art & Architecture Thesaurus (AAT) [33] and Ligatus The Language of bindings [4].

Table II lists the proposed metadata, the mapping with the Dublin Core standard, the vocabulary for each element, and the frequency of use (imperative, optional, repeatable).

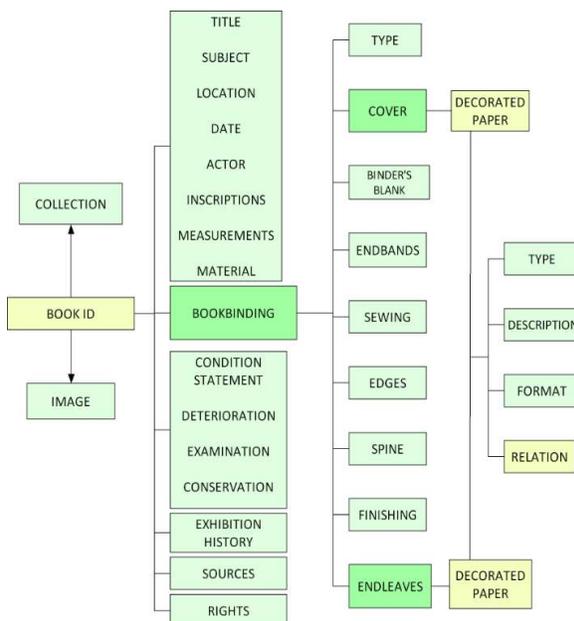


Fig. 37. Linking metadata for the documentation of decorated papers with metadata of book and bookbinding's documentation.

IV. CONCLUSION

In this study, a classification of decorated papers was conducted into categories based on bibliographic and field research, to define the metadata for their documentation.

With the aim of interoperability, usability, and future expansion of the documentation elements, the VRA Core standard (some of its core elements and their specifications) was selected complimented by DC, as well as controlled vocabularies and standards for thematic processing of the records and encoding of the element values.

This was the basis upon which a database documenting 19th-century bookbinding was built. Same structure and descriptions could be used for paper of other periods, techniques etc. The metadata can be integrated into other databases for more comprehensive documentation of bibliographic materials from other historical periods.

Table II. Mapping metadata to Dublin Core elements and encoding types

Metadata description	Terms	Imperative (I) Optional (O) Repeatable (R)
Type Paper Type	<u>Paste paper</u> Pulled paste paper Daubed paste paper Brushed/ spatter paste paper. Drawn/ Combed paste paper <u>Surface Paper</u> <u>Coloured Paper</u> <u>Marbled Paper</u> German Twilled paper Italian (Hair- Vein) Stormont Gloster Shell (French) Smooth Body Spanish Tiger Sunspot Antique Spot- Turkish Morris Schrottel Nonpareil Dutch Curl (Snail) Peacock Bouquet Zebra Antique straight Antique zigzag <u>Printed papers</u> Lithographed paper Block printed paper <u>Sprinkled Paper</u> <u>Embossed Paper</u> Dutch gilt paper	I
Description		O
Format Medium	Paper Wove Laid Handmade Mechanical	I/R
Medium Description: colour	monochrome multicolored pink (colour) red (colour) blue (colour)	I/R

	.....	
Medium Description: Pattern type	moiré diagonal floral patterns grain patterns geometric patterns	I/R
Relation Is part of	Book ID	I

In a library, the organization of a documentation system for decorated papers will contribute to a deeper understanding collection, including cataloguing and preservation.

The availability of the material to user groups will both facilitate access and enhance further study from the perspectives of art history, decoration history, and book history. Furthermore, it will enable the correlation of decorated papers with the bookbinding workshops that used them. Additionally, for more specialized purposes in study and research, the documentation of decorated papers could be expanded with elements relating to the analysis of construction materials (pigments and binding agents) using physicochemical methods, to identify them and, consequently, understand the historical "recipes" used in their production.

Another future attend could be the management of vocabulary, specifically the translation of terms into Greek. At present, the English terminology is adopted, as stated in the Art and Architecture Thesaurus by the GETTY.

#### V. REFERENCES

- [1] J. Zaehnsdorf, *The Art of Bookbinding: A Practical Treatise*. London, UK: George Bell and Sons, pp 36-111, 1890. [Online]. Available: <https://www.gutenberg.org/files/51213/51213-h/51213-h.htm>. [Accessed: Jul. 12, 2024].
- [2] T. Tanselle, "The Bibliographical Description of Patterns," *Studies in Bibliography*, vol. 23, pp 84-85, 1970. [Online]. Available: <http://www.jstor.org/stable/40371502>. [Accessed: Apr. 15, 2024].
- [3] W. Osmun, *Decorated Book Papers: Seventeenth to Twentieth Century*. New York, NY, USA: The Museum, 1954. [Online]. Available: <https://archive.org/details/decoratedbookpap00coop/page/n3/mode/2up>. [Accessed: May 14, 2024].
- [4] University of the Arts London, "The Language of Bindings Thesaurus," Jun. 21, 2015. [Online]. Available: <https://www.ligatus.org.uk/lob/concept/1285>. [Accessed: Jul. 4, 2024].
- [5] T. Theodorou, The terminology of the History of Bookbinding, In: in Vivlioamfiastis, B. Leggas, Ed. Athens: Hellenic Society of Bookbinding, pp 299-306, 1999.
- [6] K. Choulis, Byzantine Bookbinding: History, Art, and Technique, in Vivlioamfiastis, B. Leggas, Ed. Athens: Hellenic Society of Bookbinding, pp 46-49, 1999.
- [7] C. Woolnough, *The Whole Art of Marbling*. London, UK: George Bell and Sons, pp 26-42, 1881. [Online]. Available: <https://archive.org/details/wholeartofmarbli00wool/page/n7/mode/2up>. [Accessed: Jun. 9, 2024].
- [8] B. Middleton, *The Restoration of Leather Binding*. London, UK: OAK Knoll Press - British Library, pp 33-38, 162, 2004.
- [9] A. Ladrick, "The Art of Paper Marbling: An Exploration," Oct. 17, 2023. [Online]. Available: <https://storymaps.com/stories/3002b98bf9ce49398046df181888147f>. [Accessed: May 16, 2024].
- [10] Historians of Eighteenth-Century Art & Architecture, "Enfilade Exhibition | Decorated Paper," Dec. 25, 2014. [Online]. Available: <https://papelesdecoradosenmadrid.blogspot.com/2014/12/indice.html>. [Accessed: Mar. 2, 2024].
- [11] A. Celemin, "Traditional Techniques of Paper Decoration and Contemporary Artistic Creation," Dec. 6, 2014. [Online]. Available: <https://papelesdecoradosenmadrid.blogspot.com/2014/12/indice.html>. [Accessed: Apr. 17, 2024].
- [12] L. Hayes, "Rare Books & Manuscripts: Endpapers Cover to Cover: Exposing the Bookbinder's Ancient Craft," May 1, 2018. [Online]. Available: <https://www.adelaide.edu.au/library/special/exhibitions/cover-to-cover/endpapers/>. [Accessed: May 4, 2024].
- [13] Harvard Library, Houghton Library, "Rosamond B. Loring Collection of Decorated Papers," 2020. [Online]. Available: <https://hollisarchives.lib.harvard.edu/repositories/24/resources/3070> [Accessed: Mar. 11, 2023].
- [14] Wikipedia, "Rosamond B. Loring," Dec. 25, 2014. [Online]. Available: [https://en.wikipedia.org/wiki/Rosamond\\_B.\\_Loring](https://en.wikipedia.org/wiki/Rosamond_B._Loring). [Accessed: Apr. 4, 2024].
- [15] The Dublin Core™ Metadata Initiative, "Dublin Core," Jul. 25, 2024. [Online]. Available: <https://www.dublincore.org/specifications/dublin-core/dces/>. [Accessed: Jul. 29, 2024].
- [16] S. Kapidakis, F. Lazarinis, and K. Toraki, "Metadata," in *Topics in Library Science and Information Science [Undergraduate Textbook]*. Kallipos, Open Academic Editions, pp 92-127, 2015. [Online]. Available: <https://hdl.handle.net/11419/1682>. [Accessed: Feb. 3, 2025].
- [17] D. Kyriaki-Manessi and A. Koulouris, *Digital Content Management [Undergraduate Textbook]*. Kallipos, Open Academic Editions, pp 61-76, 2015. [Online]. Available: <https://hdl.handle.net/11419/2496>. [Accessed: Feb. 3, 2025].
- [18] M. Dendrinis and D. Kouis, (2016). *Basic Principles and Technologies in Information Science [Undergraduate Textbook]*. Kallipos, Open Academic Editions, pp 370-371, 2016. [Online]. Available: <https://dx.doi.org/10.57713/kallipos-688>. [Accessed: Feb. 3, 2024].

- [19] E. Diehl, *Bookbinding: Its Background and Technique*. New York, NY, USA: Dover Publications, pp 63-186, 1980.
- [20] M. M. Foot, "The Olga Hirsch Collection of Decorated Papers," *The British Library Journal*, vol. 7, no. 1, pp. 12–38, 1981. [Online]. Available: <https://www.jstor.org/stable/42554129>. [Accessed: Jul. 18, 2024].
- [21] National Library of Netherlands, "Alba Amicorum," n.d. [Online]. Available: <https://www.kb.nl/en/onderzoeken-vinden/bijzondere-collecties/alba-amicorum#toc-history-of-the-alba-amicorum>. [Accessed: Jun. 15, 2024].
- [22] En Academic, "Academic Dictionaries and Encyclopaedias," 2013. [Online]. Available: <https://greek.greek.en-academic.com/175189/>. [Accessed: Jun. 10, 2014].
- [23] Wikipedia, "Psyllium", Dec. 25, 2014. [Online]. Available: <https://en.wikipedia.org/wiki/Psyllium> [Accessed: Apr. 4, 2024].
- [24] Wikipedia. "Ox gall," Dec. 25, 2014 Available: [https://en.wikipedia.org/wiki/Ox\\_gall](https://en.wikipedia.org/wiki/Ox_gall) [Accessed: Apr. 4, 2024].
- [25] J. Halfer, *The progress of the marbling art*, NY: The American Bookbinder Co., 1894. [Online]. Available: <https://www.gutenberg.org/files/41241/41241-h/41241-h.htm> [Accessed: Jul. 12, 2024].
- [26] R. Wolfe, *Marbled Paper: Its History, Techniques, and Patterns, With Special Reference to the Relationship of Marbling to Bookbinding in Europe and the Western World*. Philadelphia, PA, USA: University of Pennsylvania Press, pp 113, 1990.
- [27] University Libraries, University of Washington, "Decorated and Decorative Paper Collection," n.d. [Online]. Available: <https://content.lib.washington.edu/dpweb/index.html> [Accessed: Apr. 17, 2024].
- [28] Conservation OnLine, "Bookbinding and the Conservation of Books: A Dictionary of Descriptive Terminology," n.d. [Online]. Available: <https://cool.culturalheritage.org/don/dt/dt1174.html>. [Accessed: Jan. 15, 2024].
- [29] Mosier, E., Van der Reyden, D., Baker M. (1992). *The Technology and Treatment of an Embossed, Chromolithographic "Mechanical" Victorian Valentine Card* the Book and Paper Group Annual, The American Institute for Conservation. [Online]. Available: <https://cool.culturalheritage.org/coolaic/sg/bpg/annua/v11/bp11-30.html> [Accessed: Jul.18, 2024].
- [30] P. Konstantopoulos, *Guidelines for the Development of Cultural Documentation Systems and the Connection of Digital Cultural Heritage Resources*. Cultural Informatics Center, Institute of Informatics, Foundation for Research and Technology – Hellas (FORTH), 2004.
- [31] Bekiaris, Ch., (2005), *Cultural Metadata (CIDOC CRM & Dublin Core)*, Presentation at the "Digital Technology Seminar: Libraries, Archives, Museums", Panteion University, June 4-5, 2005, Athens.
- [32] J. Irving, "Construction Paper: A Brief History of Impermanence," *The Book and Paper Group Annual*, vol. 16, The American Institute for Conservation, 1997. [Online]. Available: <https://cool.culturalheritage.org/coolaic/sg/bpg/annua/v16/bp16-07.html>. [Accessed: Jul. 15, 2024].
- [33] The J. Paul Getty Trust. (2021, 25 lav.). *Art & Architecture Thesaurus®* [Online] Available: <https://www.getty.edu/research/tools/vocabularies/at/> [Accessed: 15 lav. 2023].
- [34] M. Guizot, *Expedition scientifique de Moree 1831-1835: travaux de la section des sciences physiques*. Atlas. Paris: Chez F. G. Levrault, 1835, PL: XI  
Library of Congress. May. 4, 2007. *VRA Core 4.0 Element Description* [Online] Available: [http://www.loc.gov/standards/vracore/VRA\\_Core4\\_Element\\_Description.pdf](http://www.loc.gov/standards/vracore/VRA_Core4_Element_Description.pdf) [Accessed: Jul. 15, 2024].

## VI. AUTHORS



### **Eftalia Ntalouka**

Eftalia Ntalouka studied Conservation of Antiquities and Works of Art at the Technological Educational Institute of Athens, Communication, Media and Culture at Panteion University, and Pedagogical Studies at ASPETE. She holds a master's degree in Museum Studies from the National and Kapodistrian University of Athens and is currently a PhD candidate at the Department of Conservation of Antiquities and Works of Art, University of West Attica. She has participated in several national projects developing vocational education curricula. She is co-author of two books on the conservation of works of art. Currently, she works at the Laboratory for the Preservation of Printed Material and Works of Art at the Library of the Hellenic Parliament. Her professional experience focuses on the conservation of works of art on paper and books, and includes collaborations with cultural institutions throughout Greece. Her research interests center on bookbinding, with particular emphasis on its history, documentation, and conservation.



### **Daphne Kyriaki-Manessi**

Daphne Kyriaki-Manessi is a Professor at the University of West Attica at the Department of Archives, Library Science and Information Systems and she is the Director of the Graduate Program "Information Management in Libraries, Archives and Museums". She has a PhD from the Faculty of Information Science of the University of Toronto, Canada. She also holds an MLIS (Master of Library and Information Science) from Dalhousie University, Halifax, Canada. She has served as the Special Secretary of the Greek Ministry of Education for four years (2000-2004) responsible for the country's Libraries, Archives, Educational Television and Educational Media. She has participated in many research projects or has been the leader of research teams (or whole projects) focusing on repositories, information organization and subject access to information. Academic interests include structures of data and their description standards as well as their applications in repository environment along with the structures supporting open access policies. Subject approach to information is also a main point of interest. Part of her educational academic activities focus on curriculum development for information professionals and alumni follow up. She has published more than 120 papers; a list of publications and activities is available at the webpage

<http://users.uniwa.gr/dkmanessi/>



### **Costas Vassilakis**

Costas Vassilakis is a Professor in the Department of Informatics and Telecommunications of the University of the Peloponnese, in the area of Information Systems, and Director of the M.Sc. in Computer Science. He holds a degree from the Department of Informatics from the University of Athens and a Ph.D. from the same department. He has published over 270 scientific

papers in international scientific journals and conferences and has participated in more than 35 European and national research and development projects. He has served as a PC member and a referee in several international journals and conferences. His research interests include information systems, system architectures, computer security, precision agriculture, virtual and mixed reality systems, semantic web technologies and applications, and cultural informatics.



### **Konstantinos Choulis**

Konstantinos Choulis studied painting at the Athens School of Fine Arts (1977-1982) and then, with a scholarship from the State Scholarship Foundation, paper conservation and book restoration at the Istituto Centrale per la patologia del libro in Rome (1983-1985). He attended the postgraduate course in Greek Palaeography at the Scuola di Paleografia, Diplomatica e Archivistica of the Vatican and the International Course on the Restoration of Library Materials organised by UNESCO in Venice (1990). He completed his PhD thesis at the University of London, School of Advance Study on the 'History of the Binding and Conservation of the Greek Manuscripts of the Fondo Antico in the Vatican Library (15th - 20th centuries)'. He worked with the Vatican Apostolic Library as Head of the Conservation Laboratory to initiate and complete preventive and conservation programmes in the manuscript and printed collections (2000-2004). Since 1995 he has been a member of the teaching staff of the Department of Conservation of Antiquities and Works of Art of the University of West Attica - Greece.

He is the author of many articles and monographs on the history and the structure of the Byzantine bookbindings and has participated as a speaker in many international and national conferences and seminars.