

THE PAPAL BULLS ON PAPYRUS: AN APPROACH TO THEIR CONSERVATION

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ABSTRACT

There are few Papal bulls on Papyrus, it is a support difficult to find and to preserve, and that's why we have to consider them like an exceptional historic and cultural heritage, especially in Catalonia where some important collections are preserved. Our work over the years has been studying, documenting and preserving these extraordinary documents and setting some precedents which will serve as a good model for their documentation and for any action on conservation or restoration in the future. From our professional point of view, an important amount of information can be found through different museums and Cathedral archives which is fundamental to understand the route of the document and its own history through the centuries¹.

KEY WORDS

Papal Bulls, Papyrus, Conservation, Restoration, Historic Heritage.

CAPITALIA VERBA

Bullae Pontificiae, Papyrus, Diuturnitas, Restitutio, Patrum memoria.

1. Used abbreviations: ABEV, Arxiu i Biblioteca Episcopal de Vic; ACG, Arxiu Capítular de Girona.



Our interest in papal bulls, written on papyrus, comes from a report which we wrote in 2010, about the state of conservation and the proposal of the exhibition in museums of the Papal bulls preserved and exhibited in the Cathedral's museum of Girona and the later restoration we did in 2012 of the Papal Bull of Sylvester II of Urgell.

Once we entered into the study and restoration of these bulls, it became clear to us that these bulls are interesting not only for their historic importance but also in terms of their conservation. Thus, it is clear that the Bulls had already been restored and framed previously, a fact was noted in plentiful documentation, in relation to the relocation of the bulls in the laboratories of the Vatican, which prompted us to follow through and try to recover as much information as possible, from a professional point of view. In front of this evidence, we sought additional information from the archivist of the Girona's Cathedral, if it was possible, who facilitated us a copy of the Chapter Acts, where the steps to send the bulls to the restoration laboratory of the Vatican were extremely well detailed, until they were returned.

Following this study, we asked the archivist of Vic if he could provide us with copies of the Chapter Acts of Vic, in order to compare the two procedures and dates of both Chapters, and indeed it confirmed the coincidence in all fundamental aspects and even they are mutually complementary.

This is an example of the extreme importance of the documentation generated during a direct intervention for the preservation of historic and cultural heritage, and the need for a proper preservation.

1. The Papal bulls on papyrus support

The Papyrus is a rarity as a writing support in Catalan museums and archives, although the world's most important collections are preserved in Catalonia. It's a support quite difficult to find and problematic to preserve and restore, and there is little information that we have regarding its specific vegetal origin that complicates their preservation. On the other hand, there are many documents that have been preserved around the world in spite of being a meticulous and complicated elaboration support for writing, in which a very thin layer of lime (almost imperceptible) must be used to facilitate writing and a cedar oil impregnation is required to protect the Papyrus against insect attacks. The inks used for writing usually came from coal or from sepia (depending on the period), and the colour pigments came from minerals, the gum Arabic or egg white were used as binders. These components are relatively stable, which has also contributed to the survival of papyrus.

Within the papyrus collections of Catalonia we have focused on the study of Papal bulls, not just for their documentary value, but also for their interest as a support of writing and their extraordinary size, which makes them exceptional, from a conservation point of view.

Ten of the twelve Catalan bulls, written on Papyrus support, have survived until the present day within the Catalan territory, from different times and promulgated



by different Popes. The date of these Catalan bulls range from the oldest 892 with the Papal Bull of Pope Formosus (located in Girona) to most recent in 1017 with the Bull of Pope Benedictus VIII (located in the monastery of Sant Pere de Camprodon). Nowadays, these bulls are preserved in different archives: at the Arxiu Capitular de Girona we can find two, one from Pope Formosus in 892 and the other one from Pope Romanus in 897; at the Arxiu Episcopal de Vic we can find five, three from Pope Ioannes XIII in 971, one from Pope Benedictus VII in 978 and one from Pope Gregorius V in 998; at the Arxiu Capitular de la Seu d'Urgell we can find one from Pope Sylvester II in 1001 AD; at the Archivo de la Corona de Aragón we can find two, one from Pope Silvester II in 1002 and the other one from Pope Ioannes XVIII in 1007.

Outside Catalan territory we can find two more bulls: one in Perpignan from Pope Sergius IV in the year 1011 AD, and another one in Paris at the Bibliothèque Nationale from Pope Benedictus VIII in 1016 which belongs to the monastery of Sant Pere de Camprodon.

In general, the contents of these bulls are basically the same: the donation or confirmation of belongings and possessions of the Church.

The majority of these collections have often been loaned to be exhibited, especially those of Vic, and the others are exhibited permanently in museums, such as the one in Urgell or the two in Girona. They have also been studied by Agustin Millares Carlo in his doctoral thesis: *Documentos pontificios en papiro de Archivos Catalanes* (Madrid, 1918) and by Dr. Kehr in: *Das Papsttum und der Katalanische Prinzipat bis zur Vereinigung mit Aragon* (Berlin, 1926), as well as by some researchers of our country but only partially such as Ramón Roca Puig, Miquel S. Gros i Pujol, M. Anscari Mundó, Miquel Barceló, Benigne Marques, among others.



ILLUSTRATION 1. ALTERATIONS DETAIL WITH LOSS INKS.



Table 1. Papal Bulls on Papyrus preserved in Catalonia.

	PLACE - LOCATION	YEAR	PONTIFF	SEAL	DIMENSIONS <i>approx.</i>
1	ARXIU BISBAT SEU D'URGELL	1001	Silvester II	No	268 x 72 cm.
2	ARXIU CAPITULAR GIRONA	892	Formosus	No	155 x 31 cm.
3	ARXIU CAPITULAR GIRONA	897	Romanus	No	160 x 43 cm.
4	ARXIU EPISCOPAL VIC	971	Ioannes XIII <i>Dilectioni et fraternitati</i>	Yes	208 x 64 cm.
5	ARXIU EPISCOPAL VIC	971	Ioannes XIII <i>Si pastores ovium</i>	Yes	232 x 64 cm.
6	ARXIU EPISCOPAL VIC	971	Ioannes XIII <i>Agnouimus qualite</i>	Yes	163 x 63 cm.
7	ARXIU EPISCOPAL VIC	978	Benedictus VII <i>Cum summae apostolicae</i>	No	164 x 65 cm.
8	ARXIU EPISCOPAL VIC	998	Gregorius V <i>Divina nobis.</i>	Yes	254 x 74 cm.
9	ARCHIVO CORONA DE ARAGÓN	1002	Silvester II	Yes	94 x 74 cm.
10	ARCHIVO CORONA DE ARAGÓN	1007	Ioannes XVIII	No	143 x 71 cm.



2. Precedents for the preservation of Papal bulls

2.1. Restoration laboratory of the Vatican

Although we have yet to obtain the details of the restoration made in the restoration laboratories of the Vatican, by doing an organoleptic study we may clearly deduce the procedures used, as we shall see below in the descriptions.

The bulls were ordered for restoration by Pope Pius XI, according to Dr. Anscari M. Mundó, this proposal by Pope Pius XI *el más erudito de los papas del siglo XX*² corresponds to his interest in the study of *Documentos pontificios en papiro de Archivos Catalanes* by Agustín Millares for the prefect Mons Achille Ratti of the Vatican Apostolic Library.

In order to confirm this, the Chapter Acts of Gerona and Vic have been directly consulted and we have confirmed with the archivist of Seu d'Urgell and the archivist of Aragon, that the process used for sending the bulls for restoration by the Vatican were the same for all and also the dates are the same. All the information that can be obtained from the Chapter Acts is very accurate (with the Vic Papal Bulls, it even explains how they were packed) and these are extremely useful to retrace the route followed by the bulls and to identify the people who were involved.



ILLUSTRATION 2. REGISTER OF THE RESTORATION PROCESS IN THE VATICAN IN 1927.

2. "the most learned Pope in the twentieth century". Mundó, Anscari M. "Millares Carlo y las dataciones de códices visigóticos". *Boletín Millares Carlo*, 13 (1994): 39.



2.2. Summary of the Chapter Acts of Girona mentioning the Papal Bulls

As it is mentioned in the Actes Capitulars de Girona between 1926 and 1928, vol. 106 and 107, the two Papal Bulls exhibited in the Cathedral Museum of Girona were sent to Rome for restoration:

In the session of the Chapter of the 1st March 1927³ is reflected the Nuncio of Pope Pius XI to the Government of Spain in order to transport the papyrus Bulls of Girona to Rome for the purpose of their study, restoration and preservation. In the session it was decided to consult Dr. Kehr, General Director of the Prussian Archives, in order to seek his advice regarding the transport to Rome, since the Papal Bulls are very valuable and in a delicate condition.

In the session of 23th March 1927⁴, it is explained the answer given by Dr. Kehr and it can be read the Royal order authorizing the relocation.

In the session of 1st July 1927⁵, an explanation is given regarding exactly how the papyrus were packed and how Dr. Jordi Rubió accepted them and deposited them in the Chapter of the Barcelona Cathedral until the Government Commissioner took charge of their transfer.

In the session of 1st August 1927⁶, a copy of the receipt in relation to the papyrus appears, signed by the prefect of the Vatican Archives Monsignor Mercati at the Spanish Embassy in Rome.

The session of 12th July 1928⁷ predicts that the papyrus will shortly arrive at Rome with their restoration complete, and that it shall be publicized when they have arrived and have been installed to be exhibited for those who wish to visit; it was also proposed to send a message of gratitude to the Pope's Nuncio thanking them for the restoration of the Papal Bulls.

The session of 1st September 1928⁸ explains that the restored Bulls were received on 19th July 1928 in the Vatican Archive by Dr. Hugo Ibscher from Berlin and were returned by Don Joaquín González, Director of the National Historic Archive. They were exhibited in the Chapterhouse room and the public was allowed to visit them between 23th and 25th of July.

In the session of 12th April 1930⁹ several photographic reproductions of the two Bulls, sent by Mons. Giovanni Mercati, were presented as a gift. They all agreed with thanking this gift and preserving them properly.

3. ACG. Capítol. Actes, vol. 106, p. 61-62.

4. ACG. Capítol. Actes, vol. 106, p. 62.

5. ACG. Capítol. Actes, vol. 106, p. 65-66.

6. ACG. Capítol. Actes, vol. 106, p. 66.

7. ACG. Capítol. Actes, vol. 106, p. 93.

8. ACG. Capítol. Actes, vol. 106, p. 96-97.

9. ACG. Capítol. Actes, vol. 107, p. 8.



2.3. Summary of the *Actes Capitulars de Vic* mentioning the Papal Bulls

The five Papal Bulls were sent to Rome for restoration and study as is mentioned in the *Actes Capitulars de Vic*:

In the session of the 19th April 1927¹⁰, mention is made of the interest of the Nuncio of Papa Pius XI, as expressed to the Government of Spain, to bring to Rome the papyrus Bulls of The Cathedral of Vic in order to study, restore and preserve them. It was decided to write to Dr. Rubió in order to seek his agreement to be responsible for the packaging and transport to Barcelona until such time as the person responsible for the transfer to Rome was designated. On 4th of May 1927¹¹ we can read the telegram posted by Dr. Rubió accepting the commission and saying that the next day he will arrive in order to pack the papyrus.

In the session of the 5th May 1927, an exhaustive description of the characteristic, size, etc. of each Bull and how they have to be packed *en dos paquetes cilíndricos, bien protegidos, precintados con cordón de seda encarnada y sellados con el sello de este Cabildo y lacre*¹² is explained. In the same Act, It is noted that Mr. Don Joaquín González, director of Archivo Nacional de Madrid, is in charge of the relocation to Rome.

In the session on 16th of May 1927¹³, one can read a communication from Dr. Rubió saying that the Papal Bulls are placed in the Cathedral Chapterhouse of Barcelona until the Commissioner of the Government takes charge of them for their relocation.

In the session on 7th of July 1928, it is explained how the papyrus, already restored, were delivered by Don Joaquin Gonzalez. Also, on 22nd of July 1928, the archivist was directed to send a letter of gratitude to the Pope's Nuncio for the restoration.

In the session on 4th of August 1928, 250 pesetas were assigned for the construction of a display case where the restored papyrus will be kept in the Chapterhouse Archives.

In summary of these Chapter Acts, the 10 Papal Bulls on Papyrus, preserved in Catalonia, were transferred to the Vatican to be studied, copied and then restored and framed in order to preserve its integrity. Besides the archives, where the Papal Bulls were preserved, others such as Dr. Rubió, Director of the Biblioteca de Catalunya, Don Joaquín González, Director of Archivo Histórico Nacional and Mons Mercati, the Prefect of the Vatican Archives, were involved in this process, facilitating the procedures required for the relocation. The Papal Bulls remained in the Vatican for approximately one year and afterwards they were returned to their original Archives.

10. ABEV. Arxiu Capitular de Vic. Actes, vol. 32, p. 280-281.

11. ABEV. Arxiu Capitular de Vic. Actes, vol. 32, p. 279.

12. "in two closed cylindrical packages with incarnated silk cord and sealed with the Cathedral Chapterhouse stamp using wax". ABEV. Arxiu Capitular de Vic. Actes, Vol. 32, p. 282.

13. ABEV. Arxiu Capitular de Vic. Actes, vol. 32, p. 283.





ILLUSTRATION 3. FRAGMENT OF THE ARXIU
CAPITULAR DE VIC (VOL. 32, 1927).

2.4. Royal Ministerial Order

On the 24th of March 1927, the General Direction of Fine Arts (Spain) reports to the head of Archivo de la Corona de Aragón that the King accepts the offering of His Holiness, through his representative apostolic Nuncio in Spain, in order to transport the Papal Bulls to be restored in Rome. He also dictates to keep all of the Papal Bulls in the Archivo de la Corona de Aragón. Furthermore, they also specify that the packaging must be in charge of Dr. Jordi Rubió and the transport to Rome must be supervised by Dr. Joaquín González who also shall pick them up and 3.200 pesetas were given to him for transport and daily expenses.

2.5. The restoration process in the Vatican

We don't know the itinerary that the bulls made once in Rome and there is not a conservation report. However, according to our experience and after doing an exhaustive organoleptic exam of the Bulls set, one can clearly see which conservation and restoration process was done in the Vatican laboratory. This process consisted to roll out the papyrus, because they were kept rolled in their respective archives due to their large size. They were indirectly wet and flat under a weight, in order to correct distortions suffered while rolled. After doing a mechanic cleanse with flat brushes to remove the superficial dirt, they were totally pasted on an ochre cardboard, probably with wheat paste, the adhesive most widely used in this period, and they were left to dry with weights in order to achieve maximum adhesion and to keep them flat.

Afterwards, they were framed in a special system in order to preserve them.

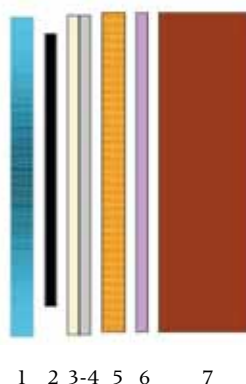
The frame system used in the laboratory of the Vatican Library consisted of an overlapping of sheets to get a compact, durable and isolating covering which could protect the papyrus of possible external aggressions (insects, wetness, etc.). It seems as if they are inside of a sarcophagus due to the chubbiness of the framing.

The different sheets from front to back:

1. Transparent sheet glass on direct contact with the Papal Bull.
2. Papal Bull adhered on beige cardboard.
3. Cardboard between the back of the beige cardboard and the metal sheet that closes the set.
4. Metal sheet (after doing an analysis by x-ray fluorescence, it was certified that the metal sheet was zinc) under the cardboard surface, which protects and insulates the papal bull, closing the set.
5. A wooden structure in the form of a rectangular frame, reinforced by crossbars to hold the structure. The smaller Bulls have 4 crossbars and the biggest ones have seven crossbars and one vertical crossbar to reinforce and to hold the weight of the whole set, as in the cases of the papyrus of Pope Formosus of Vic, papyrus of Pope Silvester II of Seu d'Urgell and papyrus of Pope Gregorius V of Vic. The frames of the papyrus that conserve a leaden papal bull as the one in Vic, have a hole at the back which allows one to see behind the Papal Bull.

Perimeter protection and closing system of the whole set:

6. Perimeter levelling and protection of the glass with a paperboard of about 3 mm. thick because the glass is a few millimetres smaller than the wooden structure and the metal sheet being it less fragile to hits. This shape of paperboard has been adhered on the cardboard support with glue (unknown type).
7. The closing and perimeter protection of the set were made with a grey paper and above it, there is a cardboard with the same thickness as the support. The grey paper and the cardboard hold the whole set and its perimeter. The cardboard is fixed with the tips of flat head, which were nailed to the wood frame.
8. The final perimeter was locked and sealed with pieces of leather of about 20 cm long. The leather, of a deep red colour, is superimposed on the paper and cardboard closing and is aligned both with the front and with the reverse, draping approximately 2 cm from each side.



1. Glass
2. Papyrus Bull
3. Cardboard
4. Grey cardboard
5. Yellow cardboard
6. Metal sheet
7. Wood frame

ILLUSTRATION 4. THE LATERAL VIEW OF THE PAPAL BULL.



3. Present state of Papal Bulls conservation

The Bulls of Girona are permanently exhibited in the Cathedral's Museum, the Bull of Seu d'Urgell is exhibited in the Diocesan Museum of Urgell and the Bulls of the Royal Aragon Archive and the ones of Vic are kept in the archives dependencies.

The actual state of the Papal Bulls, in general, is deficient but not worrying, although each one has its peculiarities. In order not to be too extensive in this article, we will make a general description. The five Papal Bulls of Vic are the best conserved, all of them are practically in one piece and with the lead Papal Bull, excellently preserved because they were not exhibited at the Museum nor exposed to direct light. Furthermore, they are preserved by the primogenital system, designed in the Vatican laboratory: Nailed with a hinge mechanism on one wall that allows movement and the viewing from behind. They are in a cupboard, which locks up and protects them.

The papyrus Bulls are probably glued with wheat paste (the adhesive most widely used in this period), on a thin piece of card, to give them consistency and rigidity. This has not permitted the papyrus to be able to adapt to changes in the environment (change of temperature or of humidity), which has caused flaking inks, and some wrinkled areas.

Their aspect is dehydrated. They have many broken and frayed fibres and most of them have holes and galleries caused by xylophagous attack. In some of the Papal Bulls there are some bits missing where the signature and the date used to be. There are also some bits missing at the beginning of the papal bull due to the action of rolling out the document.

The sustained is a brown ink of a plant origin, which has modified the original colour due to aging, incidence of light and environment changes. In certain Papal Bulls the loss of intensity is very acute.

The framework has preserved the papal bulls for many years since it is compact and resistant system to external elements. However it is, now falling and is a problem for the conservation of the papal bulls. The papyrus is glued on a cardboard which did not let the document to adapt to the environment and climatic changes over time. Consequently there are strong tensions. Furthermore, the cardboard where the papyrus is stuck is clearly suffering the effects of foxing, which inevitably will end up contaminating the papyrus and will end up degrading it irreversibly. Foxing is a microorganism that develops in certain environmental conditions on papers or cardboards with a ferrous component in its composition. It grows very slowly, but there is no way to stop it permanently if the support is not changed.

The glass touches the papyrus and this represents a serious risk. If condensation occurs due to a great temperature difference in relation to the relative environmental humidity the papyrus could get stuck on the glass and most probably microorganisms will grow. In any case, this danger, should be amended.

The glass of the frame has no UVA filter. Consequently, the Papal Bulls that are exposed in the Museum have accumulated many lux hours and the ink has lost intensity. The metal sheet (zinc) which has maintained this structure very well and has preserved it from exterior elements now it is a danger because the metals in combination with atmosphere and humidity suffer several physiochemical changes



that can contaminate everything that is in contact with it, as it is the case of the Papal Bulls. It is necessary to replace them.

This framework is very heavy, because the sum of the glass weight, oak frame, metal sheet and hinges is so considerable that is extremely difficult to manipulate and dangerous for the Bull integrity.

4. The later restorations

The Papal Bull of Gregorius V of Vic was exhibited in 1993 in Hildesheim (Germany). It was then opened, cleaned and a piece of papyrus was added on top. This piece felt and remained on the archive when it was restored in the Vatican.

It has been made a partial restoration and a new framing (twice) to the Papal Bull of Seu d'Urgell when was revised. The first took place in 1976 in the Centro de Restauración de Libros y Documentos de Madrid with the register number 3442, entry number 23/12/76 and exit number 7/6/77. The treatment consisted of:

- *Se procedió a efectuar una limpieza general con pincel y brocha suave*
- *Consolidación de grietas y fragmentos con tisú impregnado en polietileno, aplicado por termofusión.*
- *Sustitución del segundo soporte por una lámina de cartón neutro.*
- *Montaje de su primitiva instalación, previa eliminación y sustitución de una tira de cuero que circundaba el marco.*
- *No se hizo gran cosa dado que no había lugar a reintegrar las zonas perdidas y el criterio seguido fue mantener su instalación original¹⁴.*

The second intervention was done on May 2012 and carried out by the authors of this article. After evaluating the conservation status of the Papal Bull and due to its size and the difficulty of manipulating it, we suggested to perform the work in the facilities of Centre de Restauració de Béns Mobles de Catalunya since they have an anoxia chamber for disinfection and a bigger room for working. The timing for the work was a month for the disinfection by anoxia and three weeks for the direct intervention of restoration.

14. - We proceed to make a general cleaning with soft brush.

- Fragments and cracks consolidation with tissue impregnated in polyethylene applied by thermofusion.
 - Replacement of second support by other new paperboard.
 - Assembly of the original structure, after the removal and replacement of a leather strip, which surrounded the frame.
 - Little has been done because there was no place for reintegration of the lost areas and our criteria was maintaining the original installation.
- (As reflected in a letter sent in 1987 from the Centro de Restauración to the restorer of the Archivo de la Corona de Aragon who was interested).





ILLUSTRATION 5. PAPA BULLS OF JOANNES XIII. ARXIU AND BIBLIOTECA EPISCOPAL DE VIC.



ILLUSTRATION 6. DETAIL OF THE PAPAL BULL OF JOANNES XIII. ARXIU AND BIBLIOTECA EPISCOPAL DE VIC.



ILLUSTRATION 7. PAPAL BULL OF BENEDICTUS AND PAPAL BULL OF GREGORIUS V. ARXIU AND BIBLIOTECA EPISCOPAL DE VIC.



ILLUSTRATION 8. THE TWO PAPAL BULLS EXHIBITED IN THE CATHEDRAL'S MUSEUM OF GIRONA. MUSEU DE LA CATEDRAL DE GIRONA.



ILLUSTRATION 9. REVERS OF THE PAPAL BULLS FRAME SYSTEM. MUSEU DE LA CATEDRAL DE GIRONA.



ILLUSTRATION 10 AND 11. DETAILS OF THE REVERS OF THE PAPAL BULLS FRAME SYSTEM. MUSEU DE LA CATEDRAL DE GIRONA.



ILLUSTRATION 12. REVERS OF THE PAPAL BULLS FRAME SYSTEM. MUSEU DE LA CATEDRAL DE GIRONA.



ILLUSTRATION 13, 14, 15. THE STORAGE FACILITIES OF THE PAPAL BULLS. SILVESTER II (1002) AND JOHANNES XVII (1007). ARCHIVO DE LA CORONA DE ARAGÓN, BARCELONA.

4.1. Restoration of the papyrus bull of Pope Silvester II of Seu d'Urgell (Catalonia, Spain)

The papyrus document (2,68m. x 0,72m.) is the largest Papal Bull conserved in Catalonia. It records one of Pope Silvestre II's pronouncements/rulings and was presented to Bishop Sal·la of Urgell. Dated 1001 it is written in Latin in curial old script with sepia ink. The document granted privileges to bishop Sal·la, (son of viscounts of Conflent and uncle of Saint Ermengol) confirming his stewardship of all the possessions of the Church of Urgell. Bishop Sal·la was a proponent in the spiritual renewal of the diocese and he also pioneered feudal practices such as the granting of fiefs, under his leadership the diocese exchanged territories with Count Borrell II. This Papal Bull is considered to be the founding symbol of the unification of several Catalan counties within the Principality of Andorra.

4.1.1. Damage to the document (pre-current restoration)

Due to the Papal Bull being mounted on cardboard for reinforcement it has been prevented from reacting naturally to changes in temperature and humidity. This has led to flaking and peeling of ink in places and caused some folds and creases in the papyrus. The document also suffered from holes, broken fibres and fraying at the edges due to wood eating (xylophagous) insects. There are also woodworm holes in the supporting frame. There is damage to the bottom of the Bull and part of the signature and date are missing. The seal itself has disappeared. The ink has faded to brown over time due to light and environmental changes.

The papyrus frame for the papyrus Bull has some glue stains which occurred during previous restoration work either on the frame, cardboard backing or from the gum on paper strips used to stick papyrus fragments together.

When opening the case, the presence of carcasses of dead insects was found confirming the origin of the biological damage to the papyrus. While it appeared that this activity had ceased some time ago, a visual inspection alone would not allow one to determine the total absence of the presence of biological pests, which are not visible to the naked eye.

The cardboard to which the papyrus is attached has a pH of 5 while the outer cardboard next to the wooden frame has a pH of 4. This is a relative problem because of the papyrus is a support of acid nature and the acid nature of the cardboard doesn't affect it.

The wood framework which has preserved the bull for many years, although it's a compact and durable system to external elements, now is failing to do its function, becoming a problem for the conservation of the bull.

As the current wood framework (added in Madrid, in 1976) is not airtight and it has allowed for dirt and insects to enter. Furthermore, the direct contact



of methacrylate with the Papal Bull has allowed for the production of static electricity, which can possibly cause small parts of the papyrus to stick to the methacrylate.

Dimensions of the wood framework

Rectangular frame (stretcher):

- 282 cm height x 74 cm width.
- 7 horizontal crossbars of 8 cm width.
- 1 vertical crossbar.

Outer frame:

- 288 cm height x 84 cm width (3.5 cm thick).

4.1.2. Framing

The frame of the Papal Bull is composed of two parts: One is a solid sturdy structure completed during the restoration in Rome and the second is a more modern wooden frame added later in 1977 to facilitate its mounting and display in the museum.

When we opened the wood framing we found that there were some differences between the reality and the description by *Centro Nacional de Restauración de Libros y Documentos de Madrid*. Since the letter that the restorer of the Archivo de la Corona de Aragon received mentions that they had the same type of wood framing and the perimeter was locked and sealed with pieces of leather maintaining the original method. But when it was opened we noticed some differences as the methacrylate under the sheet glass or the substitution of the pieces of leather for a yellow adhesive paper (masking tape). So, the structure of the front-to-back framing is:

1. Transparent sheet glass.
2. Methacrylate sheet in direct contact with the Papal Bull.
3. The Papal Bull (with paste or Arabic gum (awaiting analysis) on an ivory cardboard overlaid and pasted on a grey cardboard.
4. Orange-brown cardboard between the back of the grey cardboard and the metal sheet, which closes the set.
5. A zinc metal sheet, below the cardboard surface, which gives protection and isolation to the Papal Bull, closing the set.
6. A wooden structure in the form of a rectangular frame, reinforced by seven crossbars to hold the structure. The frame of the Papal Bull is bigger, and part of the seven horizontal crossbars is also reinforced by a vertical crossbar to support the heavy weight of the set.

Outer protection and closing system set:

7. Perimeter levelling and protection of the glass with a beige cardboard of approximately 3mm. thickness and 3.5 cm width. Above this there is another grey cardboard of the same size because the methacrylate is a few



- millimetres smaller than the wooden and metal structure and thereby is more protected from impacts. These profiles have been tacked to the wood.
8. Closure and perimeter protection of the set by a yellow paper with adhesive (masking tape), which holds the whole thickness and perimeter.

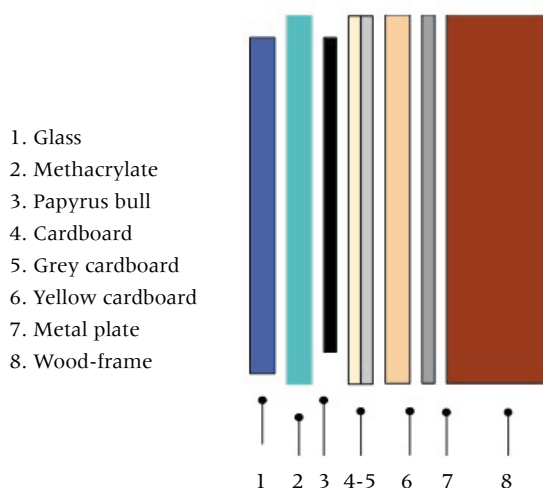


ILLUSTRATION 16. PRE-CURRENT SYSTEM. STRATIGRAPHIC SYSTEM.

4.2. Restoration process of the Papal Bull

When the Papal Bull was brought to Centre de Restauració de Béns Mobles de Catalunya (CRBMC) the first thing we did was to document the Papal Bull. We then proceeded to open the wood framing and remove the glass, the methacrylate, the metal plate, the main frame and the outer frame. We also photographed and documented each of the operational stages of the restoration from start to finish. We then proceeded to complete an anoxic disinfestation as a preventive measure to destroy any possible insect larvae that may have been within the fibres of the papyrus. The papyrus was kept in the disinfestation chamber for one month.

Upon removing it from the disinfection chamber we proceeded to take samples of the metal plate, papyrus fibres, as well as of the adhesive strips used to keep the papyrus for analysis for any possible contaminants. This is being completed by the CRBMC and we await the results of their analysis. We also measured the pH of the backing cardboard, which had a pH value of 5.5.

As regards the document the initial task undertaken was to clean the Papal Bull and remove any superficial dirt as well as the remains of any dead insects using blowers, flat brushes and a micro-vacuum cleaner.

A de-acidification of the grey cardboard (layer 5), which is glued to the cardboard (layer 4), which holds the Papal Bull, was undertaken as a



precautionary measure. Magnesium oxide was used and applied by spraying the back of the cardboard.

In order to reduce the visual impact of spots on the papyrus, a treatment with a controlled fixed humidity and a heated spatula was completed.

After this treatment, again with a fixed humidity controlled weight was applied to certain creases.

Later the mounting areas of the Papal Bull were checked one by one and reinforced, where necessary, with strips of 12 gr. Japanese paper treated with Arabic-gum.

In certain areas of the Papal Bull it was necessary to reinforce the cardboard clamping support with Japanese paper hinges and polyvinyl acetate Hewitt M-218. In these cases they were dried under weights. Certain points of the cardboard support of the Bull had to be reinforced with Japanese paper hinges 20g with polyvinyl acetate Hewitt M-218. In both cases the elements were left to dry under weights.

4.2.1. The restoration process of the wooden frame

The oak frame restoration was completed after the restoration of the Papal Bull. When the metallic hinges and fastening nails were removed we proceeded with cleaning using a flat brush in order to remove all the accumulated dust. Dust that was stuck to the frame surface was removed using a cloth slightly moistened with water and alcohol. Cracks in the wood were treated by filling them with conservation polyvinyl acetate glue and then adding pressure with clamps while the glue was drying in order to fill and close all the cracks.

Woodworm holes were covered with a specialised oak and chestnut coloured wood wax. The holes in the hinges were covered with specialised oak coloured wood water-based acrylic putty. To finish and in order to the entire frame we applied beeswax with a cotton cloth to the entire surface.

4.2.2. Wood framing

The new framing was composed of the existing wooden frame and the glass-acrylic plate was replaced by a single pane of 4mm conservation glass with a 99%UV filter. This was decided upon so as to remove hazardous items and replace them with conservation materials that would remove weight from the mounting.

From front to back:

1. Glass sheet of 2+2 mm with UV filter.
2. Document (Papal Bull) with the original backing of beige cardboard on a grey one.



3. Corrugated 3mm conservation cardboard between the back of the grey cardboard and the protection sheet, which seals the mounting.
4. Edged closing and sealing of the whole set with frame sealing tape, conservation self-adhesive (acrylic adhesive) and a © *Lineco brand* tin-layered sealing tape.
5. *DIBOND* protective sheet (consisting of two 3mm aluminium sheets with a polyethylene central core) under the corrugated conservation cardboard for the protection and insulation of the Papal Bull, sealing the set. The DIBOND was attached to the frame using small screws to prevent movement.
6. Wooden structure in a rectangular frame, reinforced by seven crossbars to hold the frame rigid. On top of this frame is placed the whole set that supports and protects the Papal Bull. Two adjustable fastening systems were added to assist the installation in their place of origin.
7. New beech-wood frame protected inside by © *Lineco brand frame-sealing* tape and attached to the wood frame sides with screws.

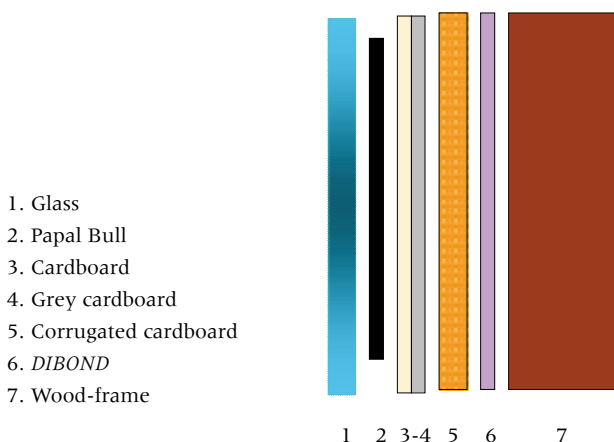


ILLUSTRATION 17. RESTORATION PROCESS. STRATIGRAFIC SYSTEM.



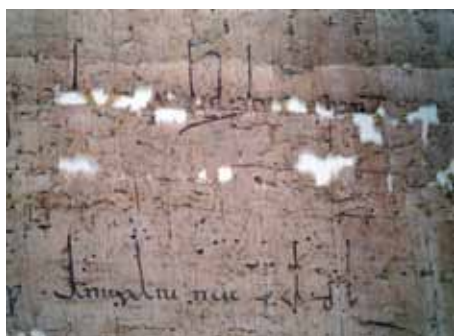


ILLUSTRATION 18-23. DETAILS AND GENERAL VIEW OF THE PAPAL BULL BEFORE OF SILVESTER II, THE RESTORATION PROCESS.



ILLUSTRATION 24-28. RESTORATION PROCESS OF THE PAPAL BULL OF SILVESTER II.





ILLUSTRATION 29-32. RESTORATION PROCESS OF THE PAPAL BULL OF SILVESTER II.

5. Conclusions

It is quite clear that this research work about papal bulls is completely open and in progress, for the reason that there are some aspects which still must be confirmed with chemical analysis, x-ray fluorescence, reflectography and mass spectrometry. It is advised to perform these tests in order to give a more scientific aspect to the topic as well as to involve several scientific specialists in the analysis.

To conclude, we would like to point out that the conservation status of these papal bulls is deficient but not worrying. They are not available to be consulted and thus their degradation process is very slow. This does not mean they are in the ideal conditions, because it has been 86 years since the intervention was made in the Vatican Library. The materials used for the restoration are ageing. The Papal Bulls that are exhibited in museums are aging faster.

Nowadays, with technological advances and the new conservation materials for this type of documents, would be possible to make an extremely respectful intervention, in order to remove or neutralize those elements which have degraded over time, such as the subsection cardboard with foxing or the metal sheet closing the framing, which is probably polluting the papyrus support. From our point of view, this intervention to improve the Papal Bulls' state of conservation and to ensure their survival over time should be made in the 10 Papal Bulls. They should be treated and framed using the same criteria and then stored or exposed according to the criteria of the different archives and museums, following the guaranties for its conservation. In fact, it's a type of intervention, which should be made following the conservation policy of the institutions, which are guarding them. It is necessary to keep in mind that, there are only 25 papal bulls on papyrus in the world preserved and 10 of them are in Catalonia. We believe that is necessary to consider their exceptional nature, to consider them as a cultural good, to consider them as a writing support already extinct and to ensure their permanent preservation for future generations.

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