ICOM-CC
ICOM international council of museums – committee for conservation

12th Interim Meeting of the *ICOM-CC Leather and Related Materials Working Group*

Cultural Heritage Agency of the Netherlands

12 & 13 October 2022

Book of Abstracts

Cultural Heritage Agency
Ministry of Education, Culture and Science

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Cultural Heritage Agency of the Netherlands

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ACKNOWLEDGMENTS

For enabling this online event we would like to acknowledge both Arjan de Zeeuw and Jan van‘t Hof of the Cultural Heritage Agency of the Netherlands.

Cover image : detail of gilt leather cushion from the Opificio delle Pietre Dure in Florence

FOREWORD

The ICOM-CC and the Cultural Heritage Agency of the Netherlands are pleased welcome you to the online 12th Interim Meeting of the ICOM-CC Leather and Related Materials Working Group on 12 & 13 October 2022.

The Leather and Related Materials Working Group is one of the 21 Working Groups of the Committee for Conservation of ICOM (ICOM-CC). Gathering over 150 members, objective of our Working Group is to promote the diffusion and sharing of knowledge for the conservation of skin-based objects. For 36 years this group has been organising regular conferences, entitled Interim Meeting. These meetings are meant to allow members, and more widely all interested professionals, to meet, share and discuss their work regarding the conservation of skin-based materials.

This year, the Interim Meeting of the ICOM-CC Leather and Related Materials Working Group takes place for the first time online, and it is a free-of-charge event. At this meeting conservators, curators, scientists, (art-) historians and students will gather who are committed to better knowledge and conservation of skin-based collections in its different forms: parchment, leather, tawed or untanned animal skins, fur and natural history specimens.

During two afternoons on Wednesday 12th and Thursday 13th October, there will be a series of 20 online lectures and short video-presentations by speakers from all over the world. Knowledge and experiences will be shared on current projects, new or innovative research initiatives, as well as various conservation experiences with leather and related materials.

Aside from an emphasis on gilt leather, there will be lectures on dating and measuring techniques, adhesives, infill materials and other aspects of leather conservation, plus some art historical subjects. The conference will be recorded, so the presentation will be accessible to be watched at a later stage. Finally, the conference proceedings will be published online on the ICOM-CC website and on the Lulu publishing platform.

It is a great pleasure that the Cultural Heritage Agency of the Netherlands is willing to host this 12th Interim Meeting of our Working Group. It was in 1986, June 9-11 that the Central Research Laboratory for Objects of Art and Science in Amsterdam, one of the predecessors of the Cultural Heritage Agency of the Netherlands, hosted its first Interim Meeting. This 3-day event hosted 10 lectures for 42 attendees. We are extremely pleased that this 12th Interim Meeting that we have organized for all of you, is attracting a much larger audience: not less than circa 480 stakeholders from 38 countries from all continents of the world have registered for this online event.

We sincerely hope that all of you, wherever you work and live, will enjoy these two days to learn more about leather and skin, but also to stimulate your desire to join the Working Group and get active in its activities. Our next event will be the participation in the 20th ICOM-CC Triennial Conference in Valencia, September 2022. We sincerely hope to meet some of you in person there!

Laurianne Robinet and Eloy Koldeweij,
For the organisation committee

CONFERENCE PROGRAM

Wednesday 12th October

13.30 – 13.45 **Opening and welcome by the Working Group**

13.45 – 13.50 Interactive Intermezzo

13.50 – 14.20 **L1** - An extensive treatment of a complex object: Preparing a gilt leather wall hanging for the National Museum's new permanent display - Marie Kleivane*, Vilde Marie Dalåsen & Kathrin Guthmann (Norway)

14.20 - 14:30 **P1** - Restoring the Antwerp "Brouwershuis" gilt leather wall hanging. Historic interventions and their contemporary challenges - Saar Van Hove* & Martijn Remmen (Belgium)

14.30 – 15.00 **L2** - Salvage and restoration of a gilt leather wall hanging from Löwenburg castle in Kassel Jana Bösenberg* & Anna Siegel* (Germany)

15.00 – 15.20 **Break**

15.20 – 15.25 Interactive Intermezzo

15.25 – 15.55 **L3** - Non-invasive characterization of varnish thickness on gilt leathers by OCT Giulia Galante*, Maëlle Vilbert, Marie-Claire Schanne-Klein, Laurianne Robinet & Gaël Latour (France)

15.55 – 16.05 **P2** - The gilt leathers of the "Chapel" of the Museo Nacional de Artes Decorativas in Madrid Félix de la Fuente Andrés* & Cristina Villar Fernández (Spain)

16.05 – 16.35 **L4** - Carbon-14 dating of gilt leather – Céline Bonnot Diconne* & Lucile Beck (France)

16.35 – 16.45 **P3** - Conservation and restoration of a leather bag excavated from the Chehrabad salt mine in Zanjan - Narguess Afzalipour*, Shahrzad Aminshirazi & Abolfazl Aali (Iran)

16.45 – 17.05 **Break**

17.05 – 17.10 Interactive Intermezzo

17.10 – 17.40 **L5** - Masses in hides: analytical and art-historical steps into the identification of a large group of gilt leather chasubles- Eloy Koldeweij* & Ingrid Kramer* (the Netherlands / France)

17.40 – 17.50 **P4** - More facts and thoughts on a polychrome and punched gilt leather panel in the collection of the Metropolitan Museum of Art, New York- Guia Rossignoli (Italy)

17.50 – 18.20 **L6** - An authentic material? Gilt leather imitations in late nineteenth-century Britain - Clare Taylor (England)

18.20 Closing Words

L = Lecture **P = Pitch**

* Presenting author(s)

Thursday 13th October

13.30 Opening and welcome by the Working Group

13.35 – 13.40 Interactive Intermezzo

13.40 – 14.10 **L7** - The challenge of conserving two leather cushions: options for the conservation of decorative leather made in different ways - Patrizia Labianca* & Guia Rossignoli* (Italy)

14.10 – 14.20 **P5** - Study on the changes in structure and composition of collagen-based cultural relics by ATR-FTIR - Mingrui Zhang*, Yadi Hu, Chaoya Ren, Jie Liu, Yong Lei & Keyong Tang (China)

14.20 – 14.50 **L8** - The production of a replica of a 16th century gilt leather hanging for Palazzo Te, Mantua - Adam Lowe (Spain)

14.50 – 15.10 Break

15.10 – 15.15 Interactive Intermezzo

15.15 – 15.45 **L9** - The art of damask leather. Contributions from an archival research - Mara Nimmo* & Mariabianca Paris* (Italy)

15.45 – 15.55 **P6** - Investigation of the deterioration of vegetable-tanned leather by UV irradiation using ATR-FTIR and TG-FTIR-MS – Yadi Hu*, Jie Liu, Mingrui Zhang, Chaoya Ren, Yong Lei & Keyong Tang (China)

15.55 – 16.25 **L10** - Bonding historical leather bookbindings. Comparison of a set of adhesives in order to study alternatives to wheat starch paste - Ana Oñate Muñoz*, Laurianne Robinet, Estelle Van Geyts, Noé Thys, Francisco Mederos-Henry, Stéphane Hocquet & Tim Schouw (Belgium)

16.25 – 16.35 **P7** - Investigation of the deterioration of vegetable-tanned leather by the synergistic effect of temperature and humidity with Thermogravimetric Analysis – Chaoya Ren*, Jie Liu, Yadi Hu, Mingrui Zhang, Yong Lei & Keyong Tang (China)

16.35 – 16.55 Break

16.55 – 17.00 Interactive Intermezzo

17.00 – 17.30 **L11** - Development of a sustainable and stable leather surrogate for leather infill and mending Ségolène Girard (France)

17.30 – 17.40 **P8** - Leather Use in Treatment: Summarizing a structured discussion concerning the evolution of treatment practices- Katharine Wagner*, Kristi Wright*, Holly Herro* & William Minter* (USA)

17.40 – 18.10 **L12** - Klucel® - variations to consolidate degraded leather - Andrea Pataki-Hundt*, Klaus Pesch & Marlen Börngen (Germany)

18.10 Closing statement

ORAL LECTURES

An extensive treatment of a complex object: Preparing a gilt leather wall hanging for the National Museum's new permanent display

Marie Kleivane, Vilde Marie Dalåsen, Kathrin Guthman

The National Museum – Oslo, Norway

This paper will present the largest conservation project ever undertaken at the National Museum in Oslo: The conservation of a gilt leather wall hanging. With this paper will present the wall hanging and the conservation project, that included some analysis on the material and colours, as well as the conservation treatment that was undertaken.

In 2016 an extensive conservation treatment of a Dutch 17th century gilt leather wall hanging began in preparation of the permanent display of the new National Museum in Oslo. The motif shows different kinds of vegetation, putties, insects, birds, and a grotesque in relief, with painted details in red and green, and has a grey-white background colour. The wall hanging originates from a manor house in Denmark and was bought in 1933 by the Friend's Association of the Museum of Decorative Arts in Oslo. There it was mounted and exhibited in the permanent display from 1947 until 2016.

The Museum of Decorative Arts was not climatized, thus the exhibits underwent great variations in temperature and humidity during the year. When the wall hanging was dismounted in October 2016, the approximately 38 m^2 of gilt leather was in a compromised state. For instance, the wall hanging had been mounted directly to the walls with nails, and these nail holes had expanded when the leather moved due to the shifts in indoor climate. Large parts were also somewhat fragmentary as it had been cut into pieces to cover as much as possible of the walls surrounding the furniture. Also, the entire surface had at some point been covered with a varnish, which had given the wall hanging an overall yellow-brown hue.

The wall hanging was thoroughly examined and documented, as well as analysis of the leather, silver, paints, and glazes were analysed by external laboratories. After a period of eight weeks with testing of different materials and methods a treatment proposal was made. It was decided that about 27 m^2 of wall hanging, divided into 11 full panels, was to be conserved, mounted, and exhibited in the new National Museum's permanent display.

The treatment consisted of partly varnish removal and surface cleaning; this part was very time-consuming as only the background colour was susceptible to the treatment without damaging the colours and subsequently the underlying silver. The cleaning had to be done in separate turns with different gels of cellulose ethers. Depending on the width of the panel, this process could take up to two months.

The structural reinforcements consisted of replacing poor seams with linen thread, removing old patches, mending tears, and nail holes, as well as adding new intarsia infills. The mending strips, intarsia infills, and subsequent strip lining was done with dyed leather of goat and parchment glue. The wall hanging was then mounted to aluminium stretchers with spring mechanisms.

The conservation of this wall hanging was very time consuming, lasting almost three years (2017-2019), with up to six conservators working on the wall hanging simultaneously at the height of the project. The team consisted of book and paper conservators, painting conservators and an object conservator.

The gilt leather wall hanging was originally planned mounted in the new permanent display in 2019, but due to construction delays of the new museum building and the Covid-19 pandemic, the mounting had to be postponed. It was finally mounted in its new exhibit in January 2022.

On the 11th of June 2022, the new National Museum will open, and we are looking forward to presenting our gilt leather wall hanging that is now more vivid in color, and probably resembles the splendor it once had.

Picture of the varnish removal, one of the steps in the surface cleaning. © Nasjonalmuseet

Salvage and restoration of gilt leather wall hanging from Löwenburg castle, Kassel, Germany

Jana Bösenberg[1] & Anna Siegel [2]

1. Self-employed, Radeberg, Germany
2. Self-employed, Dresden, Germany

Embossed gilt leather wall hangings, vase motif, Daniel Marot, Netherlands ca.1725, sewn, rectangular panels measuring 613mm x 755mm. The gilt leather wall hangings were first restored by Hermann Vrani, Vienna in 1971. During this process, older backings and patches were removed, the panels re-arranged, new leather patches were applied to the backs of holes, seams and tears using PVAc glue, and the resulting new wall sections were mounted onto plywood boards. The blue background of the embossed pattern was painted over, and the entire surface was treated with wax.

In 2013, the twelve panels were salvaged from Löwenburg castle, and in 2014 they were split into 64 separate pieces. The PVAc glue patches applied in 1971 were removed from the backs of the panels. Mould, which had affected some of the panels, was also removed.

Between 2020 and 2022 the original substance of the panels was restored. In order to restore the four required wall sections to their original room in Löweburg castle, the 64 panels were assessed, and where necessary, glue seams from the 1971 restoration were removed to reunite previously separated panels. Pieces of gilt leather wall hangings, which were trimmed off the original wall sections in 1971, were found in storage and, if possible, reattached. Overall 48 rectangular panels were restored for the new “old” wall sections.

The layers of overpaint and wax were removed under a microscope, and the newly revealed original paint layer was stabilised using photographic gelatin. The fronts of the panels were found to have areas of tarnishing to the silver layers caused by the use of PVAc during the restoration of 1971. When the leather patches were applied to the backs of the leather, acetic acid from the glue had permeated the material around the patch edges and lead to discolouration of the original silver leaf.

During the conservation of the leather, tears and holes were closed using calf leather and parchment glue. On panels which had been joined in 1971, non-matching glue seams were opened and refitted to match the embossed pattern. Thin areas of leather were backed with washi paper. The 48 panels chosen for restoration had new calf leather seam edges added with parchment glue. Deformed and partially shrunken panels were able to be stretched in a frame with the help of indirect humidification. Using a pricking frame developed by Andreas Schulze, all stitching holes were pre-pricked.

For the reconstruction and retouching of the outer layers of the gilt leather, a “silver” primer was developed. A mixture of Methocel, acrylic binders and IRIODIN Silver Pearl pigment was applied in several layers onto the new leather, which was itself primed with parchment glue. Following this, the retouching/reconstruction was done using acrylic paint. The original paint layer was restored using watercolour and gouache paints. The large areas of tarnishing of the silver layer could largely be covered using the “silver” primer and acrylic ink.

The original covering of the edges of the wall segments was achieved using strips of gilt leather and decorative nails, similar to techniques used in upholstery. The original leather strips, which were found in storage, were in very bad condition. After their conservation, a wooden support batten was developed, onto which the strips were fastened using new decorative nails. Missing strips could be replaced with a copy. The decorative strips were attached to the edges of the wall sections using magnets.

Non-invasive characterization of varnish thickness on gilt leathers by OCT

Giulia Galante[1], Maëlle Vilbert[1], Marie-Claire Schanne-Klein[1], Laurianne Robinet[2] & Gaël Latour[1]

1. Laboratoire d'Optique et Biosciences, École Polytechnique, CNRS, INSERM, IP Paris, Palaiseau, France
2. Centre de Recherche sur la Conservation, CNRS, MNHN, Ministère de la Culture, Paris, France

Gilt leathers were luxurious decorations largely used between the 16th and 18th century in Europe. These decorative objects are made by attaching to a leather support silver leaves which are subsequently burnished and covered with a yellow varnish. Occasionally, the silver leaves were also covered with a protective layer prior to the application of the varnish. Finally, on most decors, polychromy was applied on top. These objects are rarely signed, therefore their attribution is often difficult. Recently, researches have been developed to identify the different constitutive materials using a combination of analytical techniques to try reveal physical or chemical markers specific of a period, a country or a workshop or to orientate conservation treatments. The analysis of the yellow varnish may provide information on ancient practice such as specific composition or the presence of a protective layer, as well as on past conservation treatment such as the application of a modern varnish. Reflectance infrared spectroscopy is a non-invasive analytical technique which can provide information on these different aspects, however the data quality greatly rely on the varnish thickness [1]. The aim of this study was to non-invasively characterize the stratigraphy of the varnish to orientate subsequent chemical analyses or to help further restoration processes.

Optical Coherence Tomography (OCT) is today a well-established technique based on white-light interferometry. This technique provides information on the various layers (interfaces between two adjacent layers) and on the presence of particles (scattering particles). The collected signals are based on the reflection or scattering of light, i.e. spatial variation of the refractive index. OCT is a standard non-destructive and non-invasive three-dimensional (3D) imaging technique which can be brought on site for the study of cultural heritage artefacts [2-4]. However, commercially-available devices usually provide a lateral resolution of 5-10 µm that impedes accurate measurements of micrometric structures. Line-field Confocal Optical Coherence Tomography (LC-OCT) is a new 3D imaging technique that combines OCT with confocal microscopy, in order to provide improved spatial resolution and imaging speed, while still providing a similar penetration depth as in usual OCT setups [5]. This LC-OCT technique has been initially developed for biomedical applications, mainly in skin, and has proven to provide highly contrasted 3D images with isotropic micrometer resolution. Beyond OCT imaging, one of the challenges is to automatically determine and map the varnish thickness on the studied area. In this study, we present applications of LC-OCT and automatic data processing to gilt leathers and the benefit in orientating subsequent reflectance infrared spectroscopy analyses.

LC-OCT images of gilt leathers showed two interfaces, a first one between air and varnish and a second one between the varnish and the silver leaf. An interface detection from a 3D mapping program was adapted to automatically determine the varnish thickness from our LC-OCT images (see Figure 1). This imaging technique and the automated data processing may be useful for other types of stratified artefacts, such as varnish on paintings or varnished wooden musical instruments.

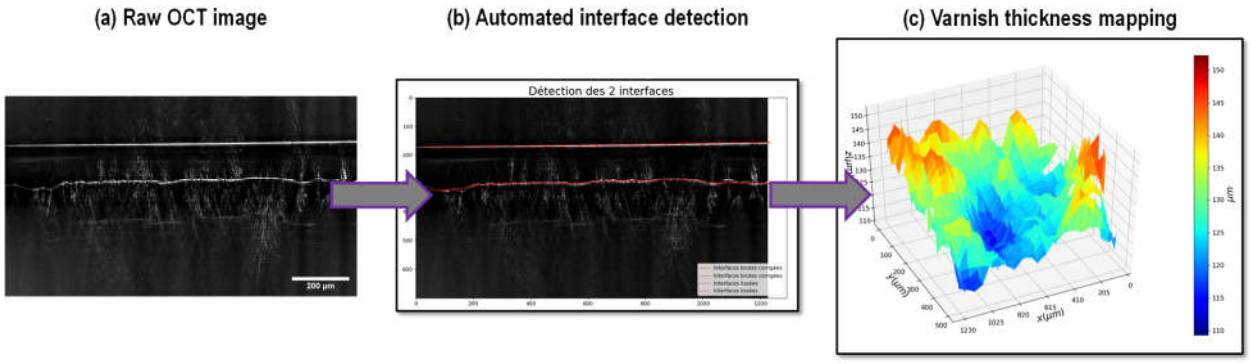

Figure 1: Automated processing to map the varnish thickness. (a) Raw OCT image that correspond to a virtual stratigraphic section of the gilt leather with the upper air/varnish interface and, below, the second varnish/silver leaf interface. (b) The data processing allows the determination of the interfaces within the image. (c) By computing the distance between the interfaces, the thickness is calculated in the whole volume.

[1] L. Robinet L., et al., *Vibrational Spectroscopy*, 110, 103133 (2020).
[2] P. Targowski et al. Laser Chemistry, Article ID 35373 (2006).
[3] C. S. Cheung et al., Opt. Express, 23, 10145–10157 (2015).
[4] G. Latour et al. Appl. Opt., 48, 6485–6491 (2009).
[5] A. Dubois et al, Opt. Express 26, 33534-33542 (2018).

Carbon-14 dating of gilt leather

Céline Bonnot-Diconne [1], Lucile Beck [2]

1. 2CRC, Moirans, France
2. LMC14, CEA-Saclay, France

In the field of decorative arts, the use of gilt leather, most often painted, seems to appear in the Iberian kingdoms at the end of the first millennium AD, shortly after the Arab conquest. These gilt leathers had their heyday in the Spanish peninsula in the 16th century. Used mainly to decorate the interiors of large residences, they were used as wall hangings, but also doors, floor mats, curtains, shields, screens, or cushions. In the religious field, altar frontals, devotional panels, and even liturgical vestments could be made of gilt leather.

Although gilt leathers almost completely declined in Spain in the 17th century, they did not disappear for all because workshops had been set up from the 16th century in most other European countries, notably in Italy, Flanders, England, and France, where they experienced their greatest development in the 17th and early 18th centuries. Compared to their large production, few of these decorations have come down to us and the oldest seem to have disappeared. The conservation and study of the extant examples are therefore essential.

These decorations, made by specialized craftsmen and sometimes renowned artists, are never signed and, in most cases, they are not dated. If the historical documentation and the stylistic analysis provide elements of information on their geographical origin and their period of production, these data remain most often insufficient and very imprecise.

Carbon-14 dating of gilt leather works had never been attempted until now. A study in this direction was therefore undertaken in collaboration with a conservator and the LMC14 laboratory in Saclay (France). Started in 2017, this research showed that it was possible to obtain a dating for gilt leather and that this made it possible to refine traditional dating hypotheses, most often deduced from stylistic observations.

The analysis of samples from large decorations, but also from more modest fragments, has shown that there is an interest in simultaneously dating the leather and the sewing thread used for the assembly of the various pieces. The dating of an exceptional series of devotional panels, representing the Holy Face of Christ, has made it possible to show that some of these works had been produced in the 15th century, whereas until then they were considered to be later, from the 16th century or 17th century, confirming the often approximate and uncertain character of the stylistic datings so far established in the collections.

The article proposes to report on this research to inform art historians and alert conservators to the existing absolute dating possibilities and the essential conditions to be put in place to be able to carry them out now or in the future.

Masses in hides: analytical and art-historical steps into the identification of a large group of gilt leather chasubles

Eloy Koldeweij [1] & Ingrid Kramer [2]

1. Cultural Heritage Agency of the Netherlands, Amersfoort, the Netherlands
2. PhD student, at University Paul Sabatier – INSA, Toulouse, France

The history of gilt leather is by now well documented, with the great input of many enthusiasts from various countries and disciplinary backgrounds. Over the last decade, a considerable upsurge in publications related to the technical history of gilt leather has reflected the increasing interest in the narration of its manufacture and the concerns for its conservation. The publication of the "White paper on Material Characterization and Improved Conservation", within the framework of the Netherlands Institute for Conservation+Art+Science (NICAS), collected most of the latest technical knowledge and expressed a collective determination for further research in the field. Noticeably, striking has been the important focus on gilt leather wall hangings in the literature, which can probably be explained by their outnumbering production compared to other artefacts made with this material. While little is known about the history of less occurring objects, there is an awareness that more investigation is needed, as pointed out by the authors of the White Paper. One curious group of objects, which has raised the attention of various scholars, are gilt leather chasubles.

At this moment 197 gilt leather chasubles have been traced, distributed over various European Countries. There is little information at hand witnessing their history, and therefore attributions rely on stylistic hypotheses. Diverging attributions have been ascribed to each of them respectively, which contradicts the uniformity of style this group displays. Various countries of manufacturing have been suggested: Spain, Italy, Germany, and Hungary. Their supposed dates vary even more: from the 16th century, up to the 17th century, and others suggest an 18th century manufacturing.
It has been advanced that these chasubles, at least most of them, come from the same area, conceivably even from a single workshop, dating from the 18th century and most likely from Italy or Germany. Besides, the animal species are notoriously known to provide indication about the geographical provenance of gilt leather. To bring more light into this darkness, it was hoped that analytical analyses on one of these chasubles, more information could be obtained.
An important aspect originates from the observed specific properties which distinguish this large group of chasubles from most other gilt leathers, especially the ones which have been used for wall hangings. Accordingly, this research aims to characterize, for the first time, the materials and techniques of one gilt leather chasuble, supported by scientific analysis. This project is in line with the NICAS White paper, whose authors put forward the necessity for the investigation of more gilt leather artefacts, for an improved knowledge of their associated making techniques. This project has been facilitated by the acquisition of one of these liturgical vestments by a private collector, who generously lent his chasuble for the purpose of technical analysis.

This research project aimed at a better understanding of the material and the techniques of gilt leather production around the 18th century, the most likely age of this group of chasubles. As the technical aspects of gilt leather and the various ways of production have been the subject of many publications and papers the analytical examination of the case-study will be presented, which provides data about the constitutive elements. Several analytical methods are outlined, including XRF, SEM, UHPLC, Py-GCMS and nL-HRMS. The results of these analyses will be described with the interesting discovery that the leather is made with calfskin and not, as often suggested, with goat- or sheepskin. The story of this chasuble begins to come to light, and this provides new information about the narrative of the gilt leather chasuble group.


Left: Front of a black mourning chasuble from a private collection, the Netherlands; Right: Chasuble from St. Bonifatius-church, Dokkum, on loan to Museum Catharijne Convent, Utrecht, the Netherlands.

An authentic material? Gilt leather imitations in late nineteenth-century Britain

Clare Taylor

Open University, United Kingdom

This paper focuses on the revival of interest in gilt leather in nineteenth century Britain. It will outline how embossed, painted and lacquered imitations of gilt leather were used to promote costly new finishes and styles in wall decoration.

Firstly, it will investigate the producers of these hangings, including Sanderson and their 'Japanese Leather Paper', drawing on evidence from both samples of the designs and price books. These will be compared with evidence for Jeffrey & Co's marketing of tripartite wall decorations composed of a frieze, filling and dado. The paper will also draw on the photographic archive of Scott Morton & Co to show how this firm introduced Tynecastle Tapestry https://collections.vam.ac.uk/item/O385306/wallpaper-morton-william-scott/

Secondly, it will discuss examples of selected houses in Scotland and England to show how these imitations were hung, including Jeffrey & Co's 'The Golden Age' at Wythenshawe Hall, Manchester, and Tynecastle Tapestry at Redlands, Glasgow. Institutional examples considered will include the theatre of London's Royal Institution decorated by Rottmann's and the Cordelova frieze hung in the Ivanhoe Hotel, London.

Thirdly and finally, the paper argues that such schemes also reflected much earlier taste for gilt leather, demonstrating the continued associations of the material with luxury. Sites considered will include Dunster Castle, Somerset, and the 'Cleves' Room at Preston Manor, Brighton, which combined Cordelova and Tynecastle canvas respectively with earlier gilt leather hangings in the same house, and, in the case of Preston Manor, the same room, challenging easy distinctions between authenticity and reproduction.

The challenge of conserving two leather cushions: options for the conservation of decorative leather made in different ways

Patrizia Labianca[1], Guia Rossignoli [2]

1. Self-employed conservator, Florence, Italy
2. Opificio delle Pietre Dure, Ministry of Cultural Heritage, Florence, Italy

The Textile Department of the Opificio delle Pietre Dure in Florence had the chance to deal with leather artefacts with the thesis project of two decorated cushions belonging to the Stibbert Museum in Florence. The leather collection of the museum has a very rich variety of artefacts, like wall hangings, table and chairs covers, altar frontals, banners, door curtains/portiere and fragments.

This research was the opportunity to study deeply the original techniques' methods of painted punched and scorched leather, usually used as wall hangings purpose. In this specific case, the most important features to be considered were: the nature of the constitutive materials (leather, silver foil and decorative layers), the structure of the cushions, the conservation of the artefacts and the microclimatic conditions of the environment in which the cushions would be exhibited. Historical and archival researches helped to identify the possible original location of the cushions within the house-museum.

First of all, the cushions were settled to anoxia treatment, modifying the atmosphere for 47 days. The analytical techniques were applied to identify the decorative layers of gilt leather by multispectral photography, x-ray fluorescence (XRF), Scanning electron microscopy (SEM), Fourier transform-infrared spectroscopy (FT-IR), cross sections with visible light and U.V. fluorescence microscopy. The tanning method was identified by micro chemical test with ferric chloride and vanillin; it was also done micro-fiber samples and then it was submitted at shrinkage temperature (TS) to establish the rate of deterioration. After many tests, several conservation approaches were developed on each face of the pillow, distinguishing the different techniques of execution and the individual conservation and structural problems.

The first pillow was made with two portions of punched gilt leather; the second one was embossed gilt leather on one face, and on the other side damask leather. Three different cleaning methods were applied to remove surface dirt, respecting the paint film and the previous interventions: an emulsion W/O, a buffer solution with Velvesil®Plus and a water solution with Klucel®H. A monitoring of the climatic conditions of the environment has carried out; furthermore, it was extremely important to conduct tests on the stability of different synthetic and natural adhesives, so that to discover which of them was the most suitable to maintain the adhesive strength unaltered on a certain level of RH%. Regarding the integration of the lost parts, many new and unexpected solutions with unusual materials were tested. Those proposals, even if they were not chosen for the treatment, offered possibilities that could be reviewed and/or corrected in the future, and applied in the practice.


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The production of a replica of a 16th century gilt leather hanging for Palazzo Te, Mantua

Adam Lowe

Factum Foundation for Digital Technology in Preservation, Madrid, Spain

The Factum Foundation for Digital Technology in Preservation is a not-for-profit organisation, founded in 2009 in Madrid. It works alongside its sister company, Factum Arte: a multi-disciplinary workshop in Madrid dedicated to digital mediation in contemporary art and the production of facsimiles for the preservation, study and dissemination of cultural heritage.

Adam Lowe, Director of Factum Arte and Founder of Factum Foundation, will present the work that Factum Arte and Factum Foundation have carried out in collaboration with Fondazione Palazzo Te. The aim was to recreate the atmosphere that once welcomed the guests of the Gonzaga family for the visitors of the exhibition Le pareti delle meraviglie (26 March - 26 June, 2022), curated by Augusto Morari within the frescoed rooms of Palazzo Te.

The palace, built as a place of leisure for the Gonzaga family in the mid-16th century, was designed and frescoed by Giulio Pippi, better known as Giulio Romano. Not much is left of the sumptuous leather wall hangings (also called corami, from the Latin corium, 'leather') that once covered some of the un-frescoed walls of Palazzo Te. Leather wall hangings were considered an alternative to tapestries in the warmer months of the year.

The craft required great leatherworking skills and expensive materials. During the 16th century, the main centres of production of leather wall hanging were Córdoba, where the craft was imported from the city of Gadamis in Libya during the Moorish rule (giving it the name guadamecil); and Venice, wherein leathercrafters acquired guild status (inside the Scuola dei Pittori) in 1569. Bologna was also a notable centre for leatherworking.

In January 2022, a 17th-century Leather wall hanging with flower vases was recorded in high resolution inside the collection of the Musée des Arts Décoratifs in Paris. The large object was recorded using both the Lucida 3D Scanner (a high-resolution and non-contact laser scanner conceived and developed by Manuel Franquelo and Factum Arte) and photogrammetry, accurately capturing the subtly carved surface; colour was acquired using composite photography.

The reflective nature of leather and its silver and gold embossing made the recording a complex task. The different sets of data were then processed and merged in Factum's headquarters, but it was the modular nature of the corame that allowed Factum to make a recreation fitted to the spaces of the Camera dei Venti.

The 2D department played with both relief and colour, expanding and adapting the original data so that the new object could offer a variety of natural ondulations and tone variations on its surface. As per Fondazione Palazzo Te's request, the object needed to be free-standing inside the room without touching the wall. A base panel simulating the leather ondulations was therefore CNC-milled on polyurethane, and later mounted on an aluminium structure.

The embossed surface was recreated in 'tiles' using elevated printing (Canon Production Printing), moulded in silicone and cast in a series of thin, gelatin-based skins, painted gold to simulate gilding. The colour was printed

over the skins using Factum Arte's custom inkjet flatbed printer, gradually building layer after layer of tone over the textured surface in perfect registration with the creases, punchmarks and surface details.

The printed 'tiles' were then applied to the CNC-milled panels and the joints were hand-painted before a final layer of wax was applied to the whole piece, in order to emulate the gloss of cured leather.

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The art of damask leather. Contributions from an archival research

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The examination of the documents discovered during a research in the Rome's State Archives provided significant data related to artefacts commissioned to the Palace coramari (gilt-leather workers) by the Pontifical Court, artefacts that used a decoration technique of the leather furnishings capable of imitating the typical characteristics of the damask, i.e. a fabric textured with stylised patterns yielding a shiny-matte effect. The technique of the damasked leather, less refined and expensive than that of the gilt-leather had a similarly widespread dissemination and it is documented not only in the papal palaces and in the aristocratic residences, but also in the more modest middle-class homes. Its execution falls within the competence of the coramari who, as shown by the documents that were examined, carried it on without interruption from the 16th well into the 18th century.

Compared to the gilt and painted leather, that already from the early 19th century draws the attention of the historians, scholars and collectors, the interest for the damasked leather turns out to be relatively recent. It is initially based only on a brief contribution by J.Waterer, in the appendix of the 1971 monography on the gilt-leathers, where the scholar dubs it as 'scorched' leather, followed by the hypothesis submitted by C. Calnan in 1998 in the face of the treatise by Månsson, as well as sporadic mentions within the diagnostics of the materials and the cataloguing of artefacts.

The research was carried out on the accounts and the inventories of the Camera Apostolica (the Roman Catholic Church financial and administrative body) for the period between 1544 and 1730. It is a considerable nucleus of documents that relates to 21 Palace coramari and several papal residences. These documents provide a wealth of information about the materials, structure and usage of this typology of furnishings, thus contributing by and large to the reconstruction of both the relevance and the evolution of the room's decor.

The damasked leather was used to fabricate coverings for furnitures and for valuable objects such as musical instruments, as well as cushions, carpets, wall-hangings and portieres' linings, all intended both for the Roman residences and the country villas: apartments of the Pontiff, of the Court's officials, of the high rank guests, executive rooms, service spaces, etc. The coramari bills encompass hundreds of artefacts with the description of the colour and typology of the skins, the manufacturing techniques, the decorative motifs as well as the potential coupling with silvered or gilt-leathers, even decorated according to refined combinations inspired by the textile art and in harmony with the decor of the environments.

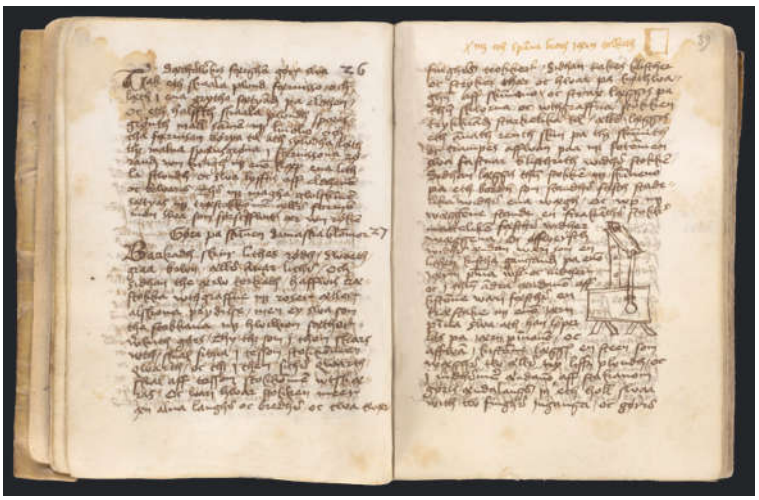
The overall analysis of the documentary data permits to observe interesting variations in the frequency of usage of some typologies of artefacts, such as the wall-hangings and to underline the variations of the gusto regarding the choice of the colours, of the decorative motifs and of the modalities with which skins were aggregated.

The procedure used to produce these furnishings is passed down to us uniquely by the treatise on "The processing of the leather and the art of stamping" drawn up by the Swedish prelate and scholar Peder Månsson during his stay in Rome between 1508 and 1523. This document, illustrated with drawings relative to the tools to be used, devotes a full chapter to "How to make damasked flowers on leather" for the production of

furnishings. This is the first known mention of the term damask referred to leather artefacts, enriched by the meticulous description of an unconventional method aimed at replicating its features.

In the light of this Source, of the many analysed documents and the few available artefacts the specific operations, connected with the processing of the damasked leather, have been subjected to reconsideration and annotations, also resorting to the numerous historic technical terms that surfaced. Terms that relate to quality, integrity and dimensions of the skins, to the finishing methods of both white and dyed leathers, to their denominations that often refer to the systems and tools used for their production, to the materials employed to obtain composite artefacts, etc.

It is thus desirable that the numerous data surfaced from this research can further stimulate additional research work aimed at tracking down new documents and Sources, and promote the exploration of still existing artefacts to investigate their structure and constitutive materials.



X 501, Peder Månssons Liber A (Roma,1514-1522), pp.38-39 [ff. 19v-20r] © Kungliga biblioteket

Bonding historical leather bookbindings. Comparison of a set of adhesives in order to study alternatives to wheat starch paste

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As a result of the natural ageing of vegetal-tanned leather, this material becomes more sensitive to moisture. In contact with water, leather can become darker and more rigid. This condition involves a challenge during the treatment of ancient bookbindings, especially regarding the choice of adhesive. Wheat starch paste, one of the most used traditional adhesives, is water based. There are several alternatives, as cellulose ethers –especially Hydroxypropylcellulose Klucel®- that can be dissolved in solvents in order to avoid the use of moisture, but their adhesive strength is lower. Other adhesives employed, as synthetic dispersions, are also water based, but they offer the advantage of being re-activated by solvents. Their properties after natural ageing and their interaction with leather, however, are less known.

In the research carried out during this master's thesis some of these adhesives were evaluated in order to study alternatives to wheat starch paste. The experimental study was performed in two phases: an initial phase, where the adhesives were evaluated in an empirical way, allowed us to reduce the list of products studied during the second phase. The samples used in this study were elaborated from new vegetal-tanned leather, and from two different historical vegetal-tanned leathers.

The first phase included some adhesives from several groups: proteinaceous adhesives (gelatine and Isinglass), vegetables adhesives (wheat starch, and wheat starch with sodium alginate), cellulose derivatives (Hydroxypropylcellulose Klucel® G in ethanol and in isopropanol), poly vinyl acetate adhesives (Beva® 371), and acrylic resin dispersions (Lascaux® 498HV, Lascaux® 303HV, and a mix of them in a ratio 3:1 498HV:303HV). The evaluations during this phase were mainly empirical. Characteristics as application of the products, visual aspects, effects of the adhesive films on the leather samples, and adhesive resistance were evaluated.

The second part comprised a quantitative evaluation of the strength of adhesives and their visual effects on leather (by T-peel strength test and colorimetry respectively), the resistance to repeated folding, and the pH measurement of the samples. Some samples were exposed to artificial ageing and the results of T-peel strength test and colorimetric measurements were compared. In this phase, the adhesives evaluated were wheat starch paste, wheat starch paste with sodium alginate, Klucel® G, a mix of Lascaux® 498HV and Lascaux® 303HV in a ratio 3:1 employed directly and reactivated, and Beva® 371.

The results of the T-peel strength test confirmed the initial hypothesis of the resistance of the adhesives: Klucel® G presented the lower strength, while synthetics adhesives showed the highest rates. However, results after artificial aging showed interesting changes in their resistance: in most of the cases this property increased, except

for Beva® 371, which presented a severe decrease. The results also varied between the new leather samples and the historical leather samples, showing higher strength rates for the wheat starch paste.

A more accurate test to evaluate the resistance of the adhesives applied on a bookbinding, although non-standard, was the repeated folding test. The results of this test were consistent with the T-peel strength test, which allowed us to have a more complete understanding of the performance of the adhesives studied for bookbinding conservation.

The pH measurement results were very similar among the different adhesive-historical leather samples, although it is necessary to conduct new pH measurements in the future in order to examine the stability of the adhesives on leather, especially in the case of synthetic products.

The conclusions of this study were applied on an academic practical case. This case was a 16th printed book with a vegetable-tanned leather cover presenting a general red-rot degradation (photograph). The main goals of the treatment were to re-establish the connection between the board covers and the book block, and to attach the leather on the spine.

The solution for attaching the leather on the spine consisted in the use of a solvent reactivated film of Lascaux® mix (3:1 Lascaux® 498HV : Lascaux® 303HV), in order to avoid the moisture of the resin dispersion during application. The process to obtain an adhesive film that could be handled was difficult, and it was finally decided to elaborate a double face adhesive tissue with a 5g/m^2 kozo paper. This Lascaux® paper-supported adhesive film was then employed to glue the leather on a kozo paper cast attached to the boards.

Dictionarium, printed in Cologne (1563), Mons University's Library collection

Development of a sustainable and stable leather surrogate for leather infill and mending

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In 2016, we started investigating a leather surrogate to find a common ground between the main two practices used for leather infills in book conservation. Nowadays, most book conservators are torn between methods that both present pros and cons without being fully satisfying in terms of conservation standards.

To sum them up, infilling leather tears with leather is the traditional method inherited from bookbinders. It consists in lifting torn leather on both sides, removing sometimes large amounts of original leather, to slide beneath it a new piece of wet pared leather. While being very aesthetical, it questions the root of conservation as it is interventionist. Concerns are also raised as leather production and dyeing is poorly traced, thus resulting in repairs that get acidic and brittle in time.

The other main method consists in layering Japanese paper mainly on top of the tear. It is generally pre-tinted with acrylic inks or sometimes retouched with heavy-body acrylics or pigments suspended in hydroxypropylcellulose. Japanese paper is sometimes lined with canvas to offer more resistance and avoid the layering which is one of the main issue with this method as it builds a hard shell over an already stressed tear, it can lead to breakage if the mend is located at the hinge. Acrylic paint as proven to reduce the strength of Japanese paper fibers. This parameter which favored it as a candidate in the first place as an alternative to leather infills, disqualifies it if the choice of binder for the retouch is inadequate. Japanese paper repairs are often frowned upon by book conservators with traditional backgrounds or by collectors as it can look fibery, therefore less aesthetically pleasant.

With these requirements in mind, BEVA 371 caught our interest as a base material. We found that BEVA 371 had been used with some success in collections from the CCI as well as the AMNH.

BEVA® 371 originated in Pr Gustav Berger's research to find an alternative to wax-resin consolidants in the conservation of painting. The product combines polymers of low and high molecular weights, each with different properties bringing resistance, strength, a low melting point, etc. The main concern while using it with leather were the methods of application. With a softening point of 65°C, it was generally melted directly into cracks or on another part of the object to mimic its surface pattern. New leather starts deteriorating at a temperature of around 40°C, so the required high temperature ended up damaging the original leather. However, any part in contact with set BEVA 371 would behave successfully in the long-term.

These past years, we have been researching ways to divert BEVA 371's original purpose as an adhesive to use it as a surrogate itself. We had success imprinting and coloring BEVA 371 which results we shared on several occasions under the name "SINTEVA". The main issue remained the way to adhere SINTEVA onto leather without reactivating it with heat but rather keep using starch adhesives as book conservators do. Our research was delayed to this year since the lining material we had in mind was launched at the same time as our research and was only commercialized last year.

Piñatex is a textile made of pineapple fibers and PLA. It has been experimented with in the fashion industry thanks to its promising properties to wear and tear which allows for extensive purposes like shoe-making. We started experimenting this year with Piñatex to study its compatibility with SINTEVA and understand how both materials

can interact and age together for conservation purposes. This paper focuses on our first hands-on results as well as the behavior of aged and unaged samples (high relative humidity and temperature) to tensile strength testing. As this year unrolls, we hope to be able to push further our experiments as our first results seem promising.

A sample of Piñatex Anam Anam with one side showing the structure of pineapple fibers and PLA, coated with a faux-leather material that we are in the process of identifying and that we wish to replace with SINTEVA

Klucel® - variations to consolidate degraded leather

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TH Köln, University of Applied Sciences Cologne, Cologne, Germany

Vegetable tanned leather undergoes ageing processes primarily if the hide derives from sheep. Bound materials mainly from the 18th to 19th century show powdered and abraded surfaces. The reasons for the decay of the leather are manifold. The degradation results mainly in two types of phenomena: red rot and powdered surfaces. The difference between red rot, and heavy degraded leather is not easy to detect. It remains questionable to what extent it influences the treatment method by knowing the reason for the decay. This question is discussed only in the periphery of this paper, although it is an essential key information. Because the degraded leather tends to immediately «burn» with aqueous contact, which means that it turns irreversible dark black, precaution and the best choice for the consolidant needs to be guaranteed. The consolidant needs to have good adhesive strength, should not darken the leather, and should also protect the leather surface for subsequent conservation measures. The evaluation of adhesives for the consolidation of powdered and degraded red leather is the focus of this research. Different types of Hydroxypropyl cellulose- Klucel- combined with different solvents were investigated and compared.

Butanol as solvent shows for example much better results on behalf of colour change than Ethanol, and Iso-Propanol. Also 1-Pentanol and ethyl-lactat as green solvent were investigated. Further, Klucel M givers better results than Klucel G. Both factors, the choice of solvent as well as the molecular weight of the half-synthetic polymer, were discussed and evaluated visually and instrumentally.

These requirements were evaluated on historical leather samples as well as on modern leather- artificially aged and non-aged. The artificial ageing was performed by exposing the samples with hydrogen sulfide with a subsequent exposure to elevated heat and humidity. Another mock-up uses fibrillated leather in form of cups to observe the visual changes and the structural success due to the consolidation. By failure of the treatment, the leather-fibre-cup occasionally collapses. The visual examination was undertaken with classical photography and reflection information imaging (RTI). The latter device helps to evaluate the surface characteristics before and after consolidation. Instrumentally, UV-Vis spectroscopy, scanning electron microscope (SEM), and differential scanning calorimetry (DSC) were implemented. Colour measurements were undertaken with UV-Vis spectroscopy to detect the DE-values before and after the treatment. SEM images give a visual impression of the success of the stabilization treatment. The DSC measurements provide information about the Tg of the leather samples during the test run. In the near future, mechanical test series with a Zwick/Roell device is planned to implement also the mechanical resistance after artificial ageing and on behalf of the stabilization treatments.

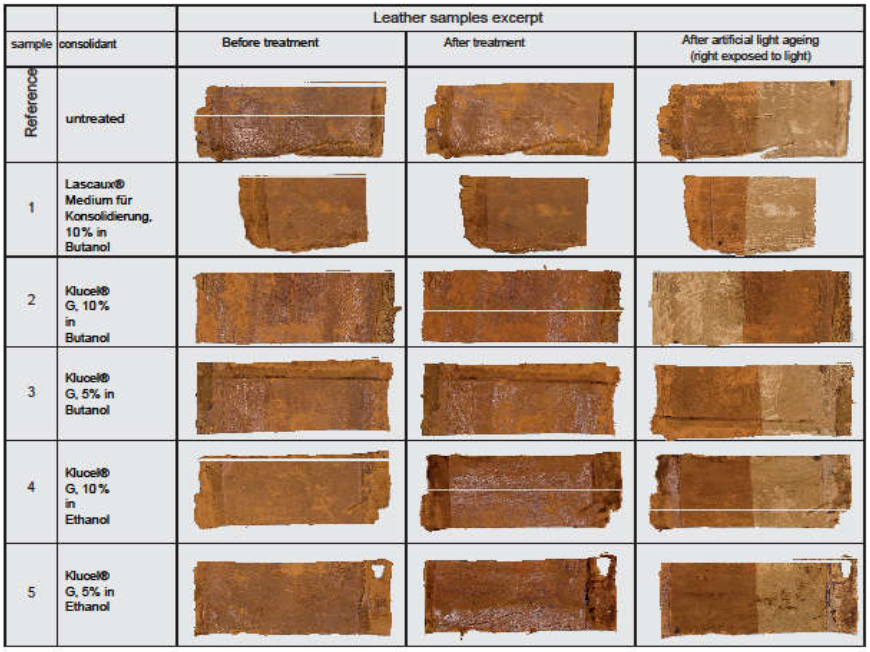

Figure 1 : excerpt of a range of test samples treated with a range of Klucel G in different solvents. The solvent Butanol seems to be a promising solvent.

PITCHES

Restoring the Antwerp “Brouwershuis” gilt leather wall hanging. Historic interventions and their contemporary challenges

Saar Van Hove, Martijn Remmen

Remmen BV, Vorselaar, Belgium

The conservation of the Antwerp “Brouwershuis” has been set to take place in the coming years, and with it, its 17th century gilt leather wall hanging. The wall hanging has a long history of conservation treatments, some of which have caused serious deterioration of the material. The leather panels have been lined with a resin wax mixture in a 1950’s intervention, which has caused the leather to harden and become brittle, resulting in damage, losses, and a diminished re-treatability.

One of the biggest challenges in the conservation of the wall hanging, is extracting the wax from the leather. A trial restoration was carried out 25 years ago and used heat and a xylene compress for this purpose. Our concern is the possible effect the solvent will have on the natural lipids in the leather, the silver gilding and its finishing layers. Furthermore, there are recent indications that parts of the building interior were treated with OCP’s like lindane or PCP, posing possible health risks during treatment.

The evaluation of the results of the trial restoration offers a unique chance to check the durability of the used methods and possibly finetune the described process. This pitch is prior to intervention and intended to trade ideas with other conservation specialists in order to optimise the treatment concept. We are actively looking for a group of professionals who are interested in joining our advising expert committee during the conservation treatment.

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The gilt leathers of the “Chapel” of the Museo Nacional de Artes Decorativas in Madrid

Félix de la Fuente Andrés, Cristina Villar Fernández

Museo Nacional de Artes Decorativas, Madrid, Spain

The National Museum of Decorative Arts preserves a varied collection of artistic leathers, among which two series of guadamecíes stand out, installed in the room known as “La Capilla” (the Chapel): On the one hand, an altarpiece with figurative representation, and on the other, a set of wall hangings.

"The Chapel" is a space created on the occasion of the extension of the museum building between 1942 and 1945. It is a room set in the period of maximum splendor of the Hispanic monarchy, between the end of the 15th century and the end of the 16th, where they installed a series of cultural goods linked to the equipment of palatial and religious interiors, such as the aforementioned leather coverings, as well as wooden ceilings and diverse furniture. These materials, although essentially original, are out of context and there was a need to adapt them to the new space with a historicist approach, typical of the museography of those years.

The leathers in the Chapel can be considered unique works of their kind. The altarpiece is the best of the very few copies that have come down to us; stylistically it falls within the full Renaissance, and stands out for its dimensions, elaborate composition, pictorial quality and iconographic richness. As for the wall hangings, they date from the last quarter of the 16th century, and their exceptionality lies in the fact that they have a large surface area (about 100 m2), and preserve the original structure and composition, allowing the understanding of their original function. This fact endows them with an enormous pedagogical and evocative potential for a possible museographic presentation.

As a whole, they also document the technical variants of production, the evolution of the industry, its subsidiary nature of interior decoration, its adaptation to the market, as well as its interrelation with the dominant aesthetic languages, from late Gothic to Mannerism.

In terms of conservation, it is necessary to take into account the history of the hides, the dismantling of their original location and their dispersion, the characteristics of the assembly in “the Chapel” in the 1940s, and the environmental conditions of the building. On the other hand, the museum is immersed in a comprehensive renovation process, which will affect both the structure of the building, as well as the museum facilities and the exhibition discourse.

In these circumstances, the National Museum of Decorative Arts, together with the IPCE (Institute of Cultural Heritage of Spain) has agreed to draw up a plan for the conservation of the leathers in the Chapel. Given the complexity of the whole, it is necessary to previously address a program of needs to define the specific problems and the methodology to address them:

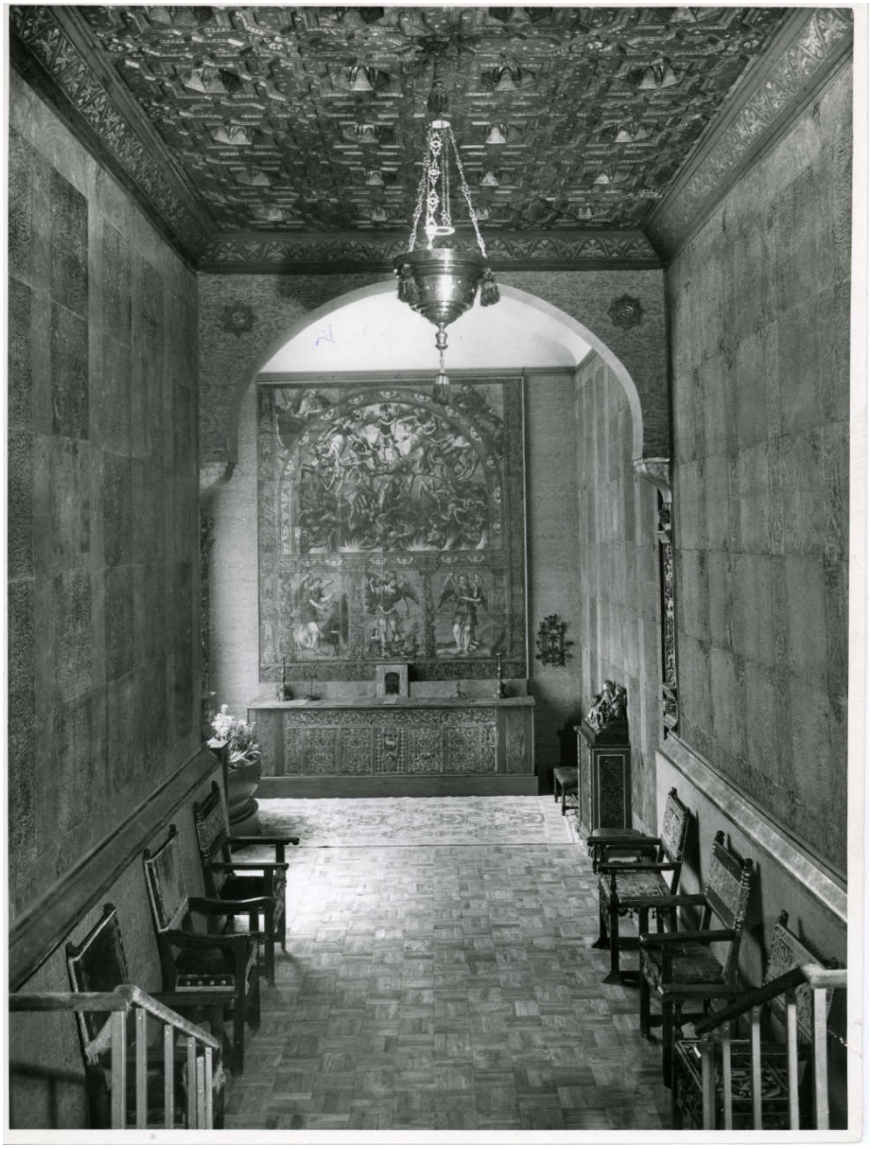
a. Update of the historical knowledge of both groups.
b. Analysis of the state of conservation of the support, of the applications, and of the assembly. Definition of pathologies..
c. Dismantling problems and protection needs. Possibilities and alternatives.
d. Intervention needs and medium-term storage and conservation. Technical and spatial needs.
F. New presentation in the museum. Objectives, limits, needs and alternatives.
g. Formation of a human team.
h. Scientific and technological needs.

The Institute of Cultural Heritage of Spain, IPCE, plans to intervene soon in the complex, given its artistic exceptionality and its poor state of conservation.

The intervention, which is proposed as an interdisciplinary work, represents a great technical challenge due to the composition and combination of its constituent materials, as well as the alterations that have been observed in a first phase of diagnosis that is already quite advanced.

It is also a challenge to establish the methodology and the schedule of action due to the special circumstances that occur in its current assembly, in a room with very limited circulation and accessibility, and with some data about the installation system that is impossible to know a priori, even with the support of different analytical and imaging techniques.

Finally, the project has two fundamental objectives: to guarantee the conservation of the goods in their materiality and to design a system that allows their exhibition or storage in the best conditions both for their preservation and for their reading and enjoyment.



Conservation and restoration of a leather bag excavated from the Chehrabad salt mine in Zanjan, Iran

Narguess Afzalipour, Shahrzad Aminshirazi, Abolfazl Aali

Research Center for Conservation of Cultural Relics, Tehran, Iran

The Chehrabad salt mine is one of the few ancient salt mines in the world and the only one located in Iran, in which excavations revealed a mining history dated back to 500 B.C. The saline environment inside the galleries of the mine, favored the preservation of a valuable collection of findings. This presentation looks into the conservation of the only leather bag in the collection.

This 2600 years old leather bag excavated in 2004 is light brown, and made of different goat leather fragments stitched together by wool and leather bands. Many patches and old mending also show how it was extensively used for a long time to carry the salt stones and tools.

The bag completely covered by soil and salt arrived in our conservation laboratory in poor conditions, damaged and completely distorted. Therefore, the main objectives of the treatment set on recovering the original form, restoring tears, putting back the detached pieces and improving the overall strength. The conservation process aimed to fully present the identity of the object and its outstanding values as a museum object and an important part of the collection.

The conservation plan consisted of comprehensive documentation followed by softening of the leather. Then separated parts were relocated and adhered to their original place. This step merely helped the bag to gain its original shape. Two supportive layers of monofilament gauze and cotton are then made in the exact form of the bag. These supportive layers went inside the leather bag and were filled with PP fibers to show original shape of the bag.

The result of the conservation project transferred the once extensively damaged leather bag to one of the centerpieces of the archaeological collection of Chehrabad Salt mine and gave it a new life as a very fascinating museum object.

The bag before treatment

More facts and thoughts on a polychrome and punched gilt leather panel in the collection of the Metropolitan Museum of Art, New York

Guia Rossignoli

Opificio delle Pietre Dure, Florence, Italy

One of the most interesting leather pieces in the Metropolitan Museum of Art is a huge punched and polychromed fragment, because of its structure and high-quality production, and because it reveals several connections with other similar artefacts throughout Europe.

The item must have been rather popular if it's possible to discover the same decorative pattern in the painting Der junge Gelehrte und seine of Gonzales Coques, 1640 (Gemaldegalerie Alte Meister, Kassel), where the walls are covered by the combination of the two decorative leather patterns as in the analyzed piece.

This item (inventory n. 1973.180.2), like others of the collection at the Metropolitan Museum of Art, belonged to Allan Marquand, son of Henry Marquand, collector and president of the Museum between 1889 and 1902, who had business transactions with famous Italian art dealer Stefano Bardini. The collection was donated to the museum in the 1973.

The item, glued on cloth, is composed of four different decorative patterns. Dr. E. Koldeweij identified the MMA piece as part of an important hanging belonged to the Spaniard Pedro Salazar, nominated cardinal in the 1686. Other parts of the hanging are at the Rijkmuseum in Amsterdam and at the Cinquentenaire Musée in Brussels. The upper and the bottom parts of the item have the same design with acanthus leaves facing each other. The main difference between them is the position: the one in the upper part is vertically orientated, and the one in the bottom part is horizontally arranged. On the surface there are some little red lines composing squares which indicate where the metal foils overlap. It's not so common to see the metal leaf on the leather's background. Does it happen because they were usually repainted?

Some samples are taken to do scientific research and try to understand the nature of these lines and of the gilding. The most interesting results by viewing the cross-sections at the microscope are the overlapping of the two silver foils and the quality of the silver, that is pure and not combined with copper or tin, as usually happened, as it's possible see from the bottom. The first sample has not revealed the presence of varnish or coating layers. The results show the overlapping of leather, a thick adhesive layer, the silver foil, and 1-2 µm of a coating. This description fit the traditional description of leather wall-hanging execution. It would be interesting to deepen the research on the thick adhesive in order to define its exact nature.

A blue color sample, taken in the border, has shown the same elements overlapping with the addition of a varnish and another paint layer. That part of the item was probably repainted. Each part was analyzed according to the measurement of its punches.

The design of the pattern was probably quite common. It's really difficult to understand in which country an item was produced, when there are not many documents on its developing, or paintings that prove its geographical diffusion and dating. For example, the styles used in Italy and in Spain had really the same aesthetic characteristics. About the production of similar decorative pattern in the Southern Europe, there are pieces like the MMA inv. n. 1973.180.2 coming from the Gallery of Mozzi Bardini Palace in Florence. The Florentine items have different colors in comparison to the Metropolitan Museum's piece. It's extremely interesting to note that in the 19th century the artisans working for the Italian art dealer Stefano Bardini had the knowledge and the talent to glue leather patch where there were holes, and lay out the silver foil.

The same pattern seen in the Florentine collection is in two panels at the Museum de la Pell in Vic, close to Barcelona. First, in the border of the altar frontal, which is the embellishment adorning the altar in the Catholic Church, and second in the border of a large panel. We still don't know if the panels were created in this shape because all leather items get easily damaged due to their constitutive nature that suffers so much from the fluctuations of the climate changing. It's probable that the leather panels are all coming from wall-hangings; in the 19th and 20th centuries the intact parts of the wall covering were reused for other purposes, like the creation of panels as paintings, that were saleable.

Study on the changes in structure and composition of collagen-based cultural relics by ATR-FTIR

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Zhengzhou University, Palace Museum, Zhengzhou of Henan province; Beijing, China

The collagen-based cultural relics could be classified into two kinds. One was tanned with vegetable tanning agents, and the other had not been tanned, such as Chinese shadow puppets, an intangible cultural heritage. Historians around the world have always attached great importance to the protection and inheritance of intangible culture heritage. However, the inheritance of shadow play and the preservation of shadow puppets are facing an unprecedented crisis, which have set off the alert on the dangers it suffers. Since the shadow play is an artistic performance with the help of light and shadow, it motivated our research to try to understand the aging mechanism of shadow puppet by light.

Shadow puppets were prepared from the hides/skins of animals such as cowhide, sheepskin or donkey skins through a series of process including soaking, liming, scraping, polishing, carving, coloring, and subsequent assembly with other materials (paper, bamboo). The main components of shadow puppets are collagen, which could be routinely extracted and analyzed in scientific archaeology, and vegetable dyes with rich phenolic hydroxyl groups. Spectroscopic techniques could provide an effective, non-destructive method to investigate the molecular structure. In this study, ATR-FTIR spectroscopy is employed to correlate the structural changes mainly from Amide III band analysis, by three spectral analysis techniques, namely 2D-correlation analysis, second derivative analysis, and peak-fitting to disclose the conformational information contained in the secondary structure of collagen.

The results showed that the hydrogen bonds that hold the collagen triple helix together were broken after UV light deterioration. The α-helix structure was gradually transformed into random coil structure and β-sheet structure. In addition, UV light aging could lead to the oxidation of phenolic hydroxyl groups into quinones, resulting in color changes of shadow puppets, and the degradation of phenol structure to form hydroxylated benzoic acid monomers or oligomers with carboxylic groups. ATR-FTIR was proved to be an ideal technique to characterize collagen-based cultural relics. The shadow play originated in China is not only a folk art with a long history and a wide spread, but also a cultural representative with extensive international influence, making a unique contribution to the development of world culture. So the study is proposed to provide basic theories for the protection of collagen-based cultural relics.

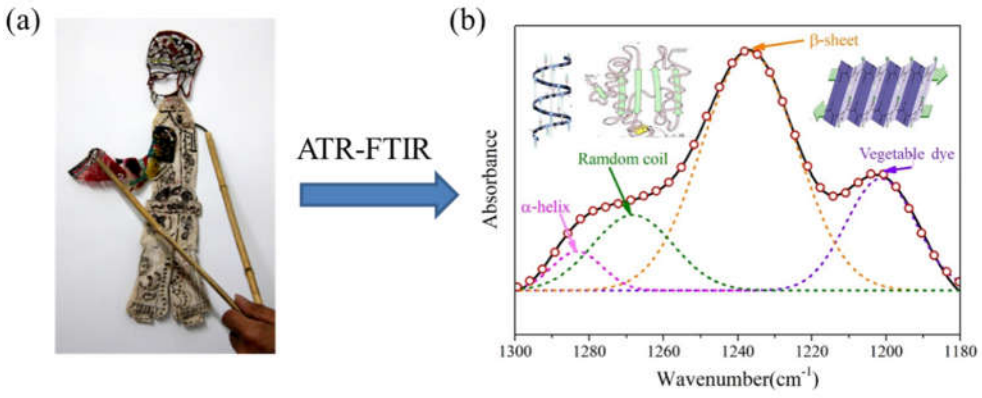

Figure 1: Shadow puppet (a), ATR_FTIR spectroscopy of the secondary structure of shadow puppet (b)

Investigation of the deterioration of vegetable-tanned leather by UV irradiation using ATR-FTIR and TG-FTIR-MS

Yadi Hu[1], Jie Liu[1], Mingrui Zhang[1], Chaoya Ren[1], Yong Lei[2], Keyong Tang[1]

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2. Palace Museum, Beijing, China

Leather is a complex natural collagen-based biological material obtained from animal hides/skins. The history of processing and using leather can be traced back to ancient times, and many precious leather artifacts were handed down and still exist now, which should be carefully protected, including armor, boots, saddlery, and bookbinding. However, because of the rich nutritional content of collagen, leather artifacts may easily deteriorate over time due to the effects of environmental conditions. Wherein, UV light is a key factor causing the deterioration and physical-chemical damages of leather artifacts. During the long-term of history, the leather artifacts are inevitably affected by the UV light, which leads to their deterioration. Therefore, it is crucial to study the deterioration of the leather by UV irradiation, which possibly provides scientific theoretical guidance for protecting leather artifacts from UV light during display.

In this work, the damage effects of UV irradiation on leathers tanned with mimosa extract (ME) and tannic acid (TA) were investigated by exposing the samples to UV light (365−400 nm) for 0−96 h. The changes in color, structure, tensile property, and thermal behaviors of the samples were characterized by colorimetric measurements, attenuated total reflectance-Fourier transform infrared (ATR-FTIR) spectroscopy, texture analyzer, and thermal gravimetric-Fourier transform infrared spectroscopy-Mass Spectrometer (TG-FTIR-MS).

After UV irradiation, the lightness L* of samples was decreased with the chromatic coordinate b* increased. The TG-FTIR-MS results revealed that the main evolved products of sample during thermal degradation are CO_2, CH_4, H_2O, NH_3, HNCO, pyrrole, SO_2, 1, 2-benzenediol and toluene. The yield of CO_2 and 1,2-benzenediol during thermal degradation was increased by UV irradiation. Besides, the position and intensity of FTIR band corresponding to the C=O vibration were changed by UV irradiation. The vegetable tanning agent might be damaged during the UV irradiation, with less damage of the collagen in the ME- and TA-tanned samples. The damage of tanning agent further caused the de-tanning of sample. Consequently, the tensile strength of samples was decreased by UV irradiation. In summary, the color of vegetable-tanned leather is affected obviously by UV irradiation because ME and TA are easily oxidized to quinones by UV light. Especially, the ester groups of TA are susceptible to the UV irradiation. Thus, how to avoid the photooxidation and photodegradation of vegetable tannins should be considered for long-term conservation of vegetable-tanned leather artifacts.

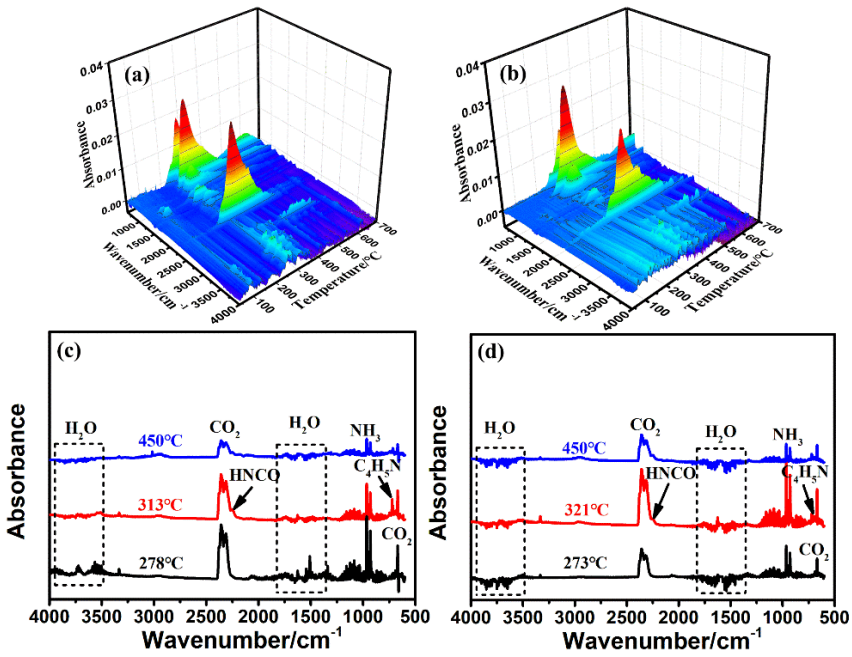

Figure 3D TG–FTIR spectra of evolved gases during thermal degradation of sample after UV irradiation for (a) (c) 0 h, (b) (d) 96 h and 2D FTIR spectra at 278, 313, and 450°C.

Investigation of the deterioration of vegetable-tanned leather by the synergistic effect of temperature and humidity with Thermogravimetric Analysis

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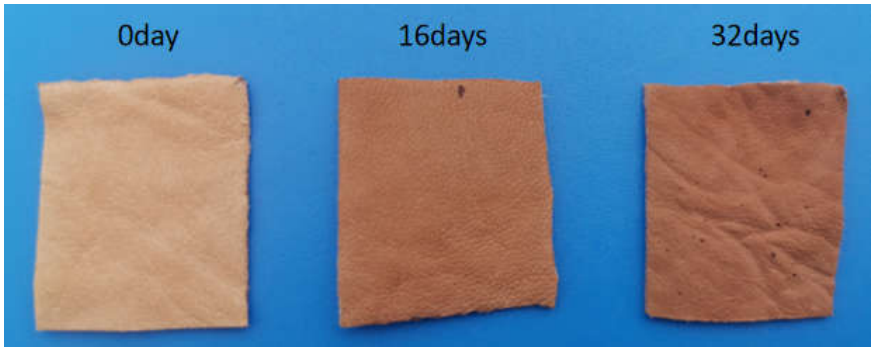
As collagen-based materials, leather cultural relics are susceptible to such environmental factors as temperature, relative humidity (RH), microorganisms, light, air pollution, and so on. The effect of temperature and RH exists in the whole process of deterioration of leather artifacts. No matter in natural conditions or in preservation conditions, the humidity variations caused by temperature volatility have a cyclical effect on leather artifacts, which inevitably results in deterioration.

Therefore, the mechanism of leather deterioration under the synergistic effect of temperature and humidity artifacts should be studied, in order to provide theoretical guidance for the optimization of storage environment of leather artifacts. In this work, the pickled sheep skins were tanned with quebracho extract to yield vegetable-tanned leather, which was used as the models of the vegetable-tanned leather artifacts. The samples were exposed to 80°C at 40% and 80% RH in alternating days for different duration. The changes in color and thermal behaviors of the samples were characterized by Colorimetric measurements and Thermogravimetry (TG). After the deterioration, both the lightness L* and chromatic coordinate b* of samples were decreased. The TG results showed that de-tanning takes place in the samples during the deterioration process, and the maximum water loss rate decreases with the prolongation of the deterioration time. The maximum decomposition rate and T-max shift towards high temperature. The damage of vegetable-tanned leather was suggested during aging with temperature and humidity volatility. This work might provide a theoretical basis and evidence for better preservation of leather cultural relics.



The digital photographs of quebracho-tanned samples after aging for 0, 16, 32 days.

Leather Use in Treatment: Summarizing a structured discussion concerning the evolution of treatment practices

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2. National Institutes of Health, National Library of Medicine - Bethesda, Maryland, USA
3. The Pennsylvania State University - State College, Pennsylvania, USA

The Leather Discussion Group, formed in 2016, continues to encourage discussion among leather users and conservators. How do conservators across disciplines use leather in conservation? Do these use practices affect leather's longevity? Recent panel discussions among leather users, leather producers, and leather researchers shed further light on techniques currently and historically used with leather added to the object during treatment, with additional perspectives on the conservation of deteriorated leather.

Leather has been a stable, reliable material in common use for many generations. However, leather production, including tanning practices, animal husbandry, and available tannins, dyes, and fatliquors have all changed since the Industrial Revolution. The available materials to treat leather and underlying philosophy behind leather use has also changed. Conservation techniques are regularly reevaluated and leather use is no exception. Some historic and modern leather treatments differ significantly, and naturally aged samples indicate some treatments may affect leather's longevity more than others. Do these changes affect leather use across disciplines?

Tanners and research scientists are willing to work with conservators to achieve ideal leather qualities. Even when starting with a quality leather, end users' choices may also have an impact on a skin's longevity. How are conservators affecting the leather when choosing water, adhesives, dyes, dressings, and finishing techniques? Are these choices regional or generational? In some conservation practices, the lines between tradition and science are blurred.

Approaches to leather use in conservation vary widely, with more regular leather use in Europe than in the U.S. How does leather use fit into the future of conservation? What practices are commonly used now? Which ones are no longer in common use? This presentation will summarize multiple discussions, interviews, surveys, and anecdotal accounts of leather selection, use, and treatment among leatherworkers from multiple trades and disciplines.

The Leather Discussion Group will continue investigating these activities globally and welcomes further input to the conversation. Would you like to contribute to the discussion? The group invites you to complete a survey which is available on the American Institute for Conservation wiki's Leather Research page.

ORGANISERS

Cultural Heritage Agency of the Netherlands, Amersfoort

Cultural Heritage Agency of the Netherlands

The 12th Interim Meeting of the ICOM-CC Leather and Related Materials Working Group is hosted by the Cultural Heritage Agency of the Netherlands (RCE). The RCE is the Netherlands' centre of expertise for heritage. It is an executive body of the Ministry of Education, Culture and Science. We are based in Amersfoort, in the centre of the country.

Heritage care is a public interest, for which the Dutch government also takes responsibility. Our tasks go beyond merely preserving and protecting historical buildings, sites and works of art. Today, society devotes increasing attention to how cultural historical values can be given a place within spatial development plans and all kind of projects. Doing so ensures that we can give the future a – recognisable – past.

The varied work of the Cultural Heritage Agency includes generating and disseminating knowledge, implementing policy and legislation, administering guarantees and subsidies, searching for innovations in heritage care and providing practical advice.

INTERNATIONAL COOPERATION

For the Cultural Heritage Agency of the Netherlands sharing knowledge is essential, both in- and outside our country. International cooperation is of paramount importance for our organization on all kind of topics, from archeology and maritime heritage, shared cultural heritage up to conservation and restoration of objects and buildings. Doing so we are working together with many countries and in various international organisations. Only together we can build on our sustainable future.

HERITAGE LAB & NICAS

One of our resources to generate knowledge is our Heritage Lab. To understand, appreciate, conserve and develop heritage, we need knowledge. With this knowledge we can answer questions about the construction of objects and insights into the decay of materials and in the meaning of objects. The methods, techniques and strategies that we develop to take care of heritage, are the results of research conducted in our laboratories. In these, we are working closely together with both the University of Amsterdam and the Rijksmuseum. Together we are active partners in NICAS: the Netherlands Institute for Conservation+Art+Science+. This interdisciplinary research institute brings together researchers from the disciplines of conservation, art history, physical science and computer science. Together we are working on a more complete understanding, an enriched presentation and optimal preservation of our cultural heritage.

Learn more about the RCE via: www.cultureelerfgoed.nl, or in English: English.cultureelerfgoed.nl

For more information about NICAS, see: www.nicas-research.nl

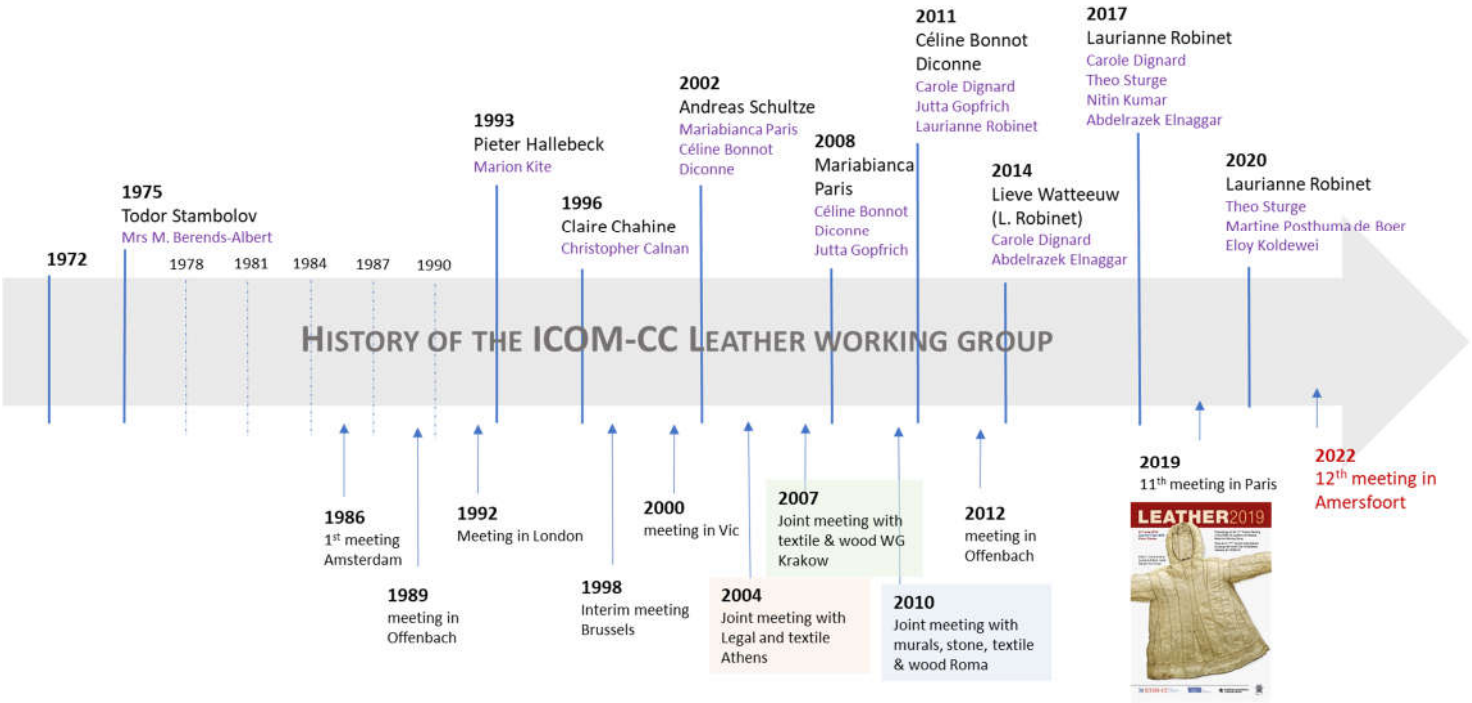
ICOM-CC Leather and Related Materials Working Group

The Leather and Related Materials Working Group is one of the 21 Working Groups of the Committee for Conservation of ICOM (ICOM-CC https://www.icom-cc.org/). Created 50 years ago, it today gathers over 150 members from 27 countries, in Europe mostly, and beyond. The Working Group is animated by Laurianne Robinet (coordinator), conservation scientist from the research centre for preservation in France, and three assistant coordinators: Theo Sturge, freelance conservator in UK, Martine Posthuma de Boer, freelance conservator in The Netherlands and Eloy Koldeweij, art historian at the RCE in The Netherlands.

The objective of our Working Group is to promote the diffusion and sharing of knowledge for the conservation of a wide variety of artefacts made of tanned or untanned animal skins, through different activities which members are encourage to participate: sharing of information by e-mail, yearly newsletter publication, Working Group interim meeting and ICOM-CC triennial conference organization with associated publications accessible freely on the ICOM-CC website (https://www.icom-cc-publications-online.org/).

If you are interested in getting active in the Working Group activities or just wish to be received the news associated with these activities, please become a member of ICOM-CC and join the Leather and Related Materials Working Group ! The process as to how to become an ICOM-CC member and join the Working Group is detailed in the following page.

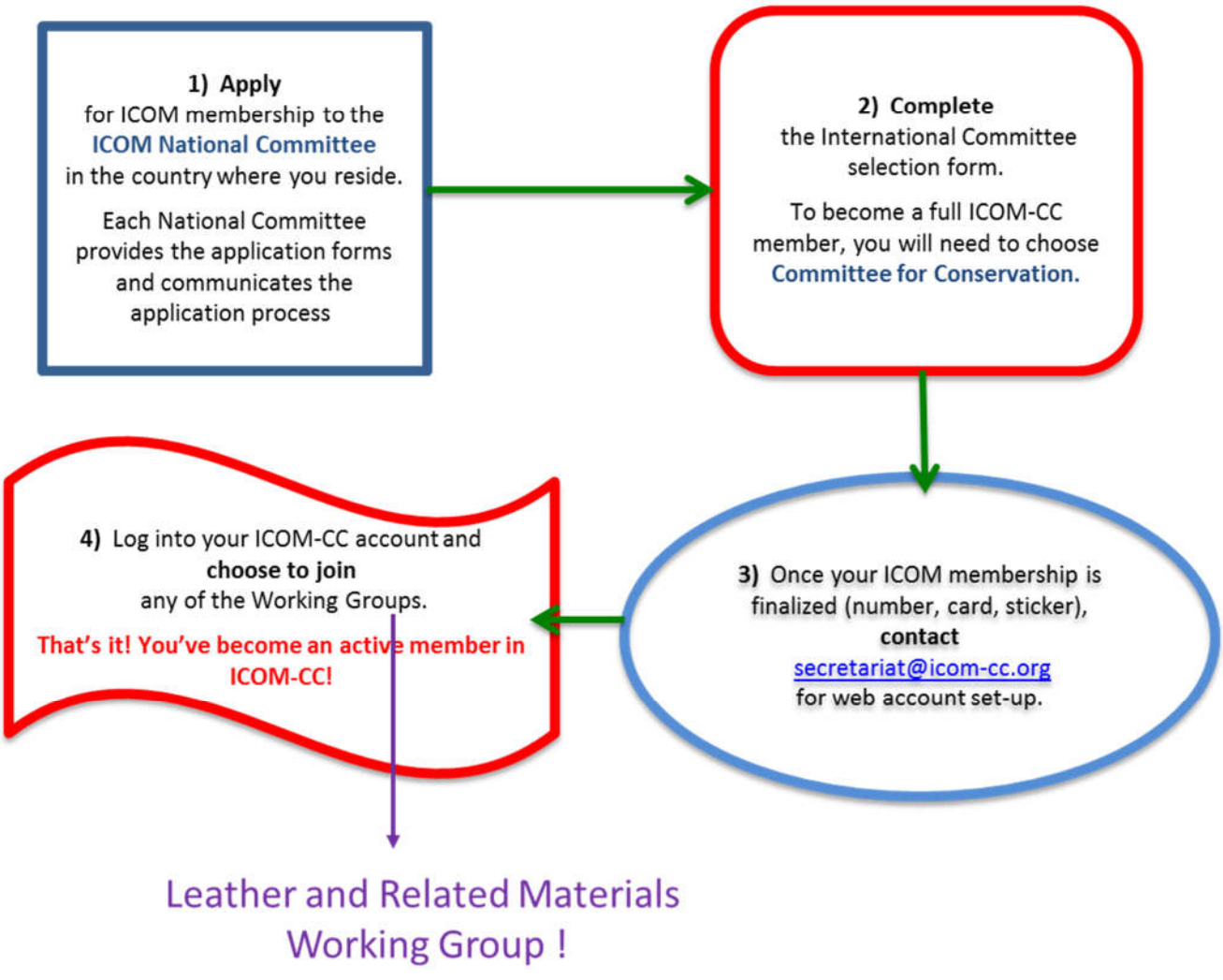
For more Information about the Leather and Related Materials Working Group: https://www.icom-cc.org/en/working-groups/leather-and-related-materials



ICOM-CC

ICOM international council of museums – committee for conservation

How to become an ICOM-CC Member



Leather and Related Materials Working Group !