



5TH EDITION OF THE INTERNATIONAL MEETING ON RETOUCHING OF CULTURAL HERITAGE

UNIVERSITÀ DEGLI STUDI DI URBINO "CARLO BO"
SCUOLA DI CONSERVAZIONE E RESTAURO DEI BENI CULTURALI

18TH - 19TH OCTOBER
2019

Filling and retouching of losses in a Portuguese Army model 1859 clothes backpack

André Filipe de Nunes Fernandes, Ana Maria dos Santos Bailão

Abstract: Two identical backpacks were treated on two occasions to be exhibited alongside at the Lisbon Military Museum. Although both backpacks are the model 1859, the treatment procedures related to the painted canvas were approached differently. The distortions and losses of canvas on the first treated backpack were easily addressed with an ultrasonic humidifier and the insertion of new canvas. Regarding the surface coating, it was consolidated with BEVA® 371, and the inserted canvas was filled with a pigmented wax paste described in a book from the late 19th century. The second backpack was in far worse condition, which, when compared with archive record, seemed likely that it was exhibited for a long period in a damp environment. There were also traces of an organic coating distinct from the original coating. These conditions resulted in a stiffer backpack, with more losses of canvas and surface coating. As a result, the distortions could not be removed, new fabric could not be properly inserted, and the consolidation of the surface coating had to be addressed in a different way. For these motives, the goal of treatment of the second treated backpack was cut short for a more realistic goal, but resulted in a good outcome, nonetheless.

Keywords: wax, canvas, leather, individual equipment, heritage, Lisbon Military Museum, restoration

Relleno y reintegración de lagunas en mochilas de ropa del Ejército Portugués modelo 1859

Resumen: Dos mochilas idénticas fueron tratadas en diferentes ocasiones para exhibirse juntas en el Museo Militar de Lisboa. Aunque ambas mochilas son del modelo 1859, los procedimientos de tratamiento relacionados con el lienzo pintado se abordaron de manera diferente. Las distorsiones y pérdidas de lienzo en la primera mochila tratada se abordaron fácilmente con un humidificador ultrasónico y la inserción de un nuevo lienzo. El revestimiento de la superficie se consolidó con BEVA® 371, y el lienzo insertado se rellenó con una pasta de cera pigmentada, descrita en un libro del final del siglo XIX. La segunda mochila estaba en condiciones mucho peores, lo que, en comparación con la evidencia de archivo, parecía probable que se exhibiera durante un largo período en un ambiente húmedo. También había rastros de un revestimiento orgánico distinto del revestimiento original. Estas dos condiciones dieron como resultado una mochila más rígida, con más pérdidas de lienzo y revestimiento superficial. Como resultado, las distorsiones no se pudieron eliminar, el nuevo lienzo no se pudo insertar correctamente y la consolidación del revestimiento de la superficie tuvo que abordarse de una manera diferente. Por estos motivos, el objetivo del tratamiento de la segunda mochila tratada se truncó para un objetivo más realista, sin embargo resultó en un buen término.

Palabras clave: cera, lienzo, cuero, equipo individual, patrimonio, Museo Militar de Lisboa, restauración

Preenchimento e reintegração de lacunas em mochila de roupa do Exército Português modelo 1859

Resumo: Duas mochilas idénticas foram tratadas em ocasiões diferentes para serem expostas em conjunto no Museu Militar de Lisboa. Embora ambas as mochilas sejam do modelo 1859, os procedimentos de tratamento relacionados com a tela pintada foram abordados de forma diferente. As distorções e as perdas de tela na primeira mochila tratada foram facilmente resolvidas com um humidificador ultrasónico e a inserção de nova tela. O revestimento da superfície foi consolidado com BEVA® 371, e a nova tela inserida foi preenchida com uma pasta de cera pigmentada, descrita num livro do final do século XIX. A segunda mochila estava em muito pior estado, o que, quando comparada com evidências de arquivo, parecia provável que tenha sido exibida por um longo período num ambiente húmido. Também havia vestígios de uma camada orgânica distinta do revestimento original. Essas duas condições resultaram numa mochila mais rígida, com mais perdas de tela e do revestimento da superfície. Como resultado, as distorções não puderam ser eliminadas, a nova tela não pôde ser devidamente inserida, e a consolidação do revestimento da superfície teve de ser abordada de outra forma. Por essas razões, o objetivo do tratamento da segunda mochila tratada foi reduzido para um objetivo mais realista, porém resultou num bom termo.

Palavras-chave: cera, tela, cabedal, equipamento individual, património, Museu Militar de Lisboa, restauro

Introduction

The 1890's were years of great turmoil regarding several European colonies in Africa. In the Portuguese context, Mozambique was of particular political interest, and the historical events that there took place, mainly a set of military operations, were of great importance, and shaped the future of both countries.

These events are well documented in the written history, with first-hand publications, reports, and newspaper publications (Ennes, 1897; 1898 a; 1898 b; Alberto, s.d.; de Ornellas, et al., 1897; Simões, 1896). Although, in one hand, these documents tell the story as it supposedly happened, they only describe these events. On the other hand, we can find some objects which were present in these events, and these are of great historical interest, since they are key witnesses, and are complementary to the written history.

Among several objects that were used on those events, six backpacks were incorporated in the Lisbon Military Museum (LMM) in the late 19th century/early 20th century and were present in the conflicts of Marracuene and Coolella, and in the actions of Manjacase and Chaimite (Brandão, 1912). From these six backpacks, three of them made it to these days (the location of the remaining is unknown). One of them was recently studied within the curricular unit "Conservation and Restoration Project" of the Conservation and Restoration Bachelor (Fernandes, 2020), and the remaining two during the Master's thesis, both at the Polytechnic Institute of Tomar. These studies allowed to identify them as being the model 1859 clothes

backpack, used by the Portuguese army. The model 1859 clothes backpack has a rectangular shape. It is made mostly from canvas and leather painted black on the exterior; the body hardware is made from an iron alloy, and the straps hardware is made from a copper alloy when the straps are white, and from an iron alloy when the straps are black. As with most military backpacks of the time, it was designed to carry spare clothing, necessities, the overcoat and the mess kit (Anon., 1879 a; Aragão, 1886; M., 1894; Brak Lamy, 1897; Fernandes, 2020).

One of the three model 1859 backpacks (inventory MML04844) was properly stored in the condition it was found, to provide a reference and non-contaminated (with conservation materials) study object for the future. The other two backpacks were treated on two occasions, in 2017 (inventory MML02048) [figure 1 A-B], and 2019 (inventory MML04845) [figure 2 A-B], in order to be included with the permanent exhibition of the LMM. The 2017 intervention, as said, was carried out during the Bachelor's curricular unit "Conservation and Restoration Project", while the 2019 intervention was carried out during the Master's thesis project in Conservation and Restoration, both at the Polytechnic Institute of Tomar.

Regarding this model of backpack and the remaining equipment, besides one recent article (Fernandes, 2020), there are no known studies, and the only information available dates to the time these objects were still in use, and can be found on some journals publications (Anon., 1849; Salgado, 1849; Anon., 1850 a; Anon., 1850 b; Anon., 1856; Pimentel, 1860; Viana, 1861; Salgado, 1861; Soares, 1868; Aragão, 1886; Simões, 1891; Oliveira, 1893; M., 1894;



Figure 1.- Model 1859 backpack (MML02048) after the 2017 treatment. A- View from the front. B- View from the back.



Figure 2.- Model 1859 backpack (MML04845) before the 2019 treatment. A- View from the front. B- View from the back.

G., 1909), official publications (Anon., 1879 a; Anon., 1882; Anon., 1888) and a published book (Brak Lamy, 1897).

As for the materials that these backpacks are made from, their deterioration, and their conservation, there is plenty of published literature which was key for achieving this work, such as: (Florian, 2006; Kite & Thomson, 2006; Lama, et al., 2014; Larsen, 2008; Logan, 2013; Meilunas, et al., 1990; Ohlídálová, et al., 2017; Stoner & Rushfield, 2012); and the remaining citations along this paper which concern conservation.

Methodology

The aim of the intervention for both backpacks was to place them in permanent exhibition. Although these backpacks are the same model, the MML02048 was used by light infantry with black vegetable tanned leather straps, and the MML04845 was used by artillery with white buff leather straps. Besides these differences, both backpacks were used in the same campaigns, entered the same museum at the same time, and for the same reasons. Therefore, considering the high

historical value converging mostly in the period when these backpacks were last used for their purpose, it was decided that the goal of treatment, as described by Fernandes (2020, p. 160), should correspond with that period, or at least within the time they entered the museum collection. Therefore, there was a need to trace a methodology to stabilize the backpacks (i.e. consolidate flaking paint, mend tears, among others.), and to restore them to the chosen state.

In regard to the techniques and materials used for treating the canvas and surface paint on both backpacks, there was a similar approach for both cases, which was derived from regular treatments used in the conservation of easel paintings. However, although the MML04845 backpack presented the same typological problems as the MML02048, it was in far worse condition, and therefore required some minor changes to the techniques and materials used for the treatment.

The canvas on both backpacks had a large longitudinal loss in the top portion of the front, longer than 120 mm on the MML02048 [figure 3 A], and across the entire length on the MML04845 [figure 3 B]. After some consideration and

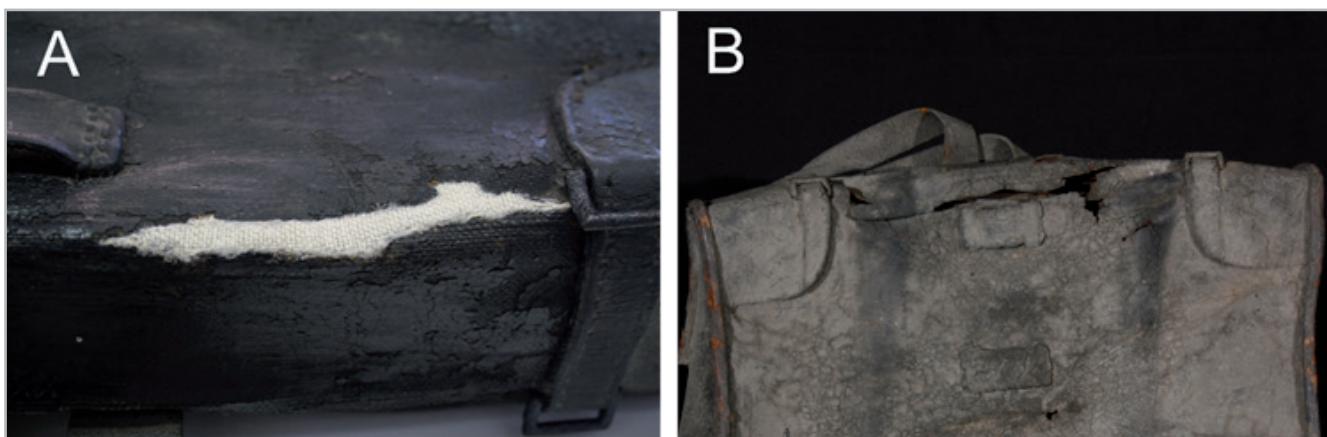


Figure 3.- Large, 120 mm long loss of canvas on the MML02048 backpack, with new fabric inserted (A). Loss of canvas covering the entire length of the canvas on the MML04845 backpack (B).

by comparing all the existing model 1859 backpacks, it was obvious that this loss did not originate during the period that the backpack was used, but rather during the time it was in storage. In fact, this exact damage is typical of the model 1859 backpack, and in five known backpacks, three of them present this damage. On the MML04845, besides the large loss on the top, there was also a small, round loss, at the center of the front [figure 4].



Figure 4. - Loss of canvas at the front of the MML04845 backpack, with new fabric inserted.

Regarding the surface paint (which covered both canvas and leather parts), it had losses, lack of adhesion and was flaking on both backpacks. On the MML04845 this paint was thicker than the paint on the MML02048 (measured with a USB microscope at approximately 500 μm thick for the MML04845, and for the MML02048 at approximately 130 μm on a buckle, but noticeably thicker at the front), it had more losses but also less flaking, and presented tenting and cupping. There was also evidence of a distinct, yellow looking, organic coating, fluorescent under UV light, applied on the surface of this backpack. This non original coating appears to have reacted with the original surface, and changed its appearance in color and texture, making the canvas stiffer

The overall treatment on the canvas of the backpacks consisted in reinforcing the tears from the reverse, and, where achievable, inserting new fabric on the losses, after which were reinforced. As for the treatment of the painted surface, there was a need for consolidation, filling, and retouching. The final step was the application of a protecting coating on the surface.

Results and discussion

Knowing that the longitudinal loss in the top portion of the front of the MML02048 could reach the proportion of the MML04845 if the problem was not addressed, after cleaning the canvas, relaxing the fibers, and consolidating the surface coating with the use of BEVA[®] 371 applied with a brush, the entire loss was treated as described in the methodology, inserting new fabric with the aid of textile polyamide and a

hot needle, and reinforcing from the reverse using Reemay[®] adhered with BEVA[®] film and a hot spatula. The outcome was satisfactory, and the same approach was tried on the MML02048 to provide the same results. However, the issues that the yellow coating caused, and the damp environment in which this backpack was placed, in combination with a construction in which the sides are structural (which are made from thick vegetable tanned sole leather), and a poor storage, resulted in severe deformations. The combination of these conditions made it impossible to relax the fibers and remove the distortions. This step would be necessary in order to allow access to the interior of the backpack, through which the insertion of new fabric and reinforcement of the losses would be made. Therefore, the treatment of this canvas loss, which was successfully achieved on the MML02048, was impossible to reproduce on the MML04845. As such, this treatment was only applied on the small round loss.

Where it was applied this treatment reinforced the canvas, but it brought an aesthetical problem, since the new canvas was light colored, but the remaining backpacks were black. Dyeing the new canvas could be a sufficient treatment; however, the canvas surface would not match the painted surface of the backpack, and an aesthetical problem could persist. Therefore, it was decided to infill and retouch the new canvas to mimic the original surfaces, but this option brought yet another problem: what materials should be used?

Due to the thickness of the paint, it was necessary to apply a material with enough body to fill the lacunae. On the first treated backpack, in 2017, the solution for this problem came from a book published in 1879. While studying the model 1859 backpack and consulting literature from that time, instructions for this backpack and the remaining equipment were found in the book "Ordinance About the Exercises and Evolutions of Infantry Corps", published in 1879 (Anon., 1879 a). Regarding the equipment, besides prints representing equipped soldiers, nomenclature of the equipment, and instructions for equipping, there are two pages which provide instructions for "cleaning and conserving the straps and equipment" (Anon., 1879 b, p. 112). These cleaning instructions provide two different recipes, the first one for cleaning white buff leather straps, and the other for cleaning "vegetable tanned leather straps, cartridge box, ammunition bag, water canteen, bayonet sheath and the leather parts of the backpack" (Anon., 1879 b, p. 112) and which dates from 1854 (Pereira, 1855). Considering that this last recipe could aid in the identification of the composition of the original surface coating, and determine appropriate materials to use in the intervention, the recipe was reproduced in order to be analyzed with Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy and the results compared with the original surface coating. This recipe contained two kinds of wax (yellow and white), turpentine, ivory black and rosin. Its composition did not match that of the original surface coating. However, after being reproduced, it was noted that the handling properties as well as the color were suitable for the requirements of the filling and retouching of losses. As such, this material was tested on new canvas and its appearance

compared to the original surface coating [figure 5]. After some considerations due to the stability of the material, it was used only on the new canvas for the filling and retouching of losses, and it was applied with spatulas. The results of the 2017 intervention could be seen on figure 1.



Figure 5.- Comparing the appearance of the wax paste made according to the 1854 recipe with the original surface of a model 1864 haversack treated at the same time as the MML02048 backpack. Both share the same black surface paint.

For the 2019 intervention, the challenges and materials chosen were slightly different. Regarding the surface paint, the larger number of losses and the presence of tenting and cupping posed another problem, not found on the previous backpack. Following testing, the flaking paint was consolidated with the use of an adhesive made with Regalrez® 1126 (5 g), Kraton™ G1165 (0,02 g) and two solvents, hexane (7,5 g) and white spirit (1 g). This adhesive was applied with a small brush, only where there was a need for consolidation. The Regalrez® resin provided a good bond between the canvas and the flaking coat, and the addition of Kraton™ ensured that the resin would not become too brittle. However, due to the tenting and cupping, there were situations where large gaps between the canvas and the original coating were occurring, and flattening was not possible. Due to the low molecular weight of this resin, which results in a low viscosity (Feller, et al., 1971; de la Rie, et al., 2000; Learner & Arslanoglu, 2001;

Del Grosso, et al., 2019), these gaps could not be properly filled, even when used at a relatively high concentration (~37%). Since the gaps could not be properly filled, the lack of physical support could result in more losses of the paint in the near future, and therefore this problem needed to be addressed. For that, a similar approach to the treatment of the MML02048 was made, providing two treatments in one (filling and retouching), but choosing materials which are more stable than the ones previously used, since this time the treatment was not only be applied on the new fabric insertion, but on the original surface as well.

The recipe found on the instructions was, again, a starting point for the filling and retouching treatment. The recipe was reviewed in order to see what could be used and what was to be discarded. It was considered that the rosin is the less stable material, and it has no function on the goal of this treatment. The solvent used (turpentine) could also be changed for other solvents to control the evaporation rate and make sure they do not affect the original coating, according to the solubility tests performed. Other types of waxes besides beeswax could also be used, with the advantage of being compatible with the Regalrez® resin used during consolidation (Piena, 2006). Regarding the pigment, bone black or smoke black could be an option.

For preparing the filling/retouching paste, paraffin wax (Sasolwax 5803) and microcrystalline wax (Cosmolloid® 80H) at a 60/40 ratio were blended. This blend was used instead of a single wax because it is stronger than either of the waxes by them self (Freund, et al., 1983). For making the paste the waxes were placed in a beaker along with hexane, covered, and slowly heated on a hot plate. After melting, the paste was transferred to a closed container, and for using, a required amount was placed in a watch glass along with smoke black pigment, and properly mixed with a spatula. If necessary, droplets of solvent were added, either of hexane or white spirit, or a mix of both. This was done in order to control the working time provided by the solvents. With the paste ready and thinned with solvents, it was applied with small brushes in several layers, until the desired thickness and texture were achieved [figures 6 A-B; figure 7].

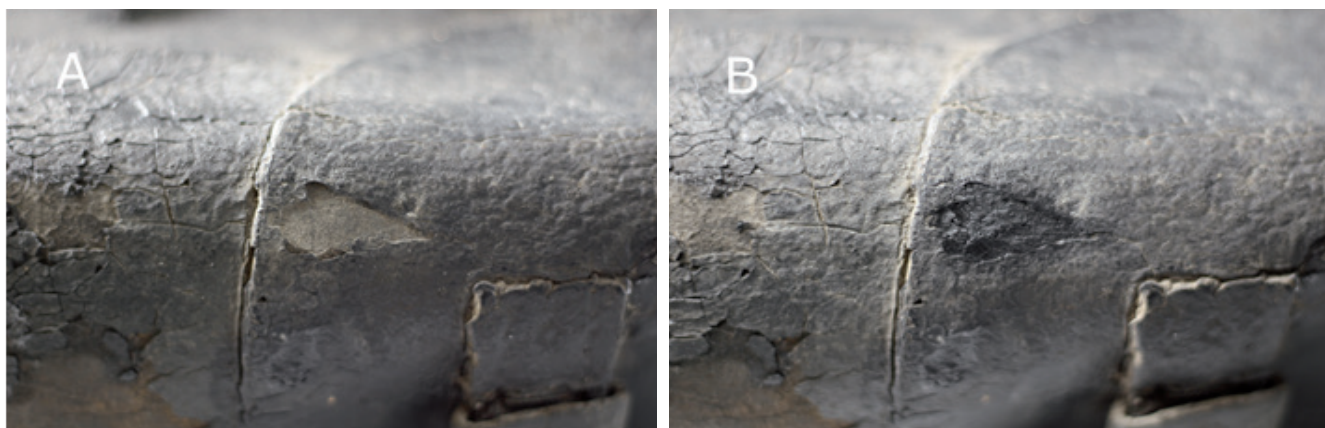


Figure 6.- Filling and retouching treatment on a loss of original paint on the MML04845 backpack. A- before. B- during.

The final treatment consisted on the application of a surface finish. This treatment was one of the most important steps in achieving the aesthetic values that were attributed to this object at the time it was used. An article written in 1855 dedicated to the introduction of a new recipe of black wax (Pereira, 1855) (the same wax mentioned in the instructions (Anon., 1879 b) reflects the importance attributed to the appearance of the equipment, and a polished shiny surface was mandatory. For this treatment, in the case of the MML02048, microcrystalline wax was dissolved in white spirit, and applied on the surface with a rag. In the case of the MML04845, the wax blend previously prepared was applied on the surface (without the pigment) using the tip of the fingers, since this method of application was more controllable than a rag. On both backpacks, after the solvent evaporated, the surface was buffed with a soft brush in order to provide a shiny surface [figure 8].



Figure 7.-During the filling and retouching treatment on the loss of canvas at the front of the MML04845 backpack.



Figure 8.-MML04845 backpack after the application and buffing of the wax blend

Conclusions

Conservators tend to state that each intervention is one of a kind, and these two case studies are a positive example of such. Here we have two backpacks of the same model, which were most likely produced in close years, used in the same campaigns and which entered in the same museum at the same time, but needed a different approach in regards

to some aspects of the conservation treatment, although the damage in both was rather similar.

The way the first treated backpack was exhibited in the past was key for an overall better condition, and allowed for an easier to achieve intervention, which also brought it closer to the goal of treatment. As for the second treated backpack, the opposite happened, and due to a worse overall condition the goal of treatment was not fully achieved. Nonetheless, in both cases the use of a period recipe and an adaptation of such a recipe, proved to be successful in filling and retouching the losses of canvas and original surface coating.

References

- ALBERTO, C. (s.d.). *A campanha d'África contada por um sargento*. Lourenço Marques: Minerva Central.
- ANON. (1849). "Chronica Interna", *Revista Militar*, 1(2): 115-118.
- ANON. (1850 a). "Chronica Interna", *Revista Militar*, 2(8): 393-402.
- ANON. (1850 b). "Chronica Interna", *Revista Militar*, 2(10): 501-505.
- ANON. (1856). "Noticiario militar", *Revista Militar*, 8(3): 133-142.
- ANON. (1860). "Interior", *Revista Militar*, 12(13): 454-455.
- ANON. (1879 a). *Ordenança sobre os exercícios e evoluções dos corpos de infantaria*. Lisboa: Imprensa Nacional.
- ANON. (1879 b). *Instruções para a limpeza e conservação do correame e equipamento*. En *Ordenança sobre os exercícios e evoluções dos corpos de infantaria*. Lisboa: Imprensa Nacional, 113-114.
- ANON. (1882). *Ordenança sobre os exercícios e evoluções dos corpos de infantaria (Aplicada ao uso dos corpos de artilheria)*. Lisboa: Imprensa Nacional.
- ANON. (1888). *Manual para a instrução theorico-practica da infantaria*. Lisboa: Typographia das Horas Romanticas.
- ARAGÃO, A. C. (1886). "Uniformes militares", *Revista Militar*, 38(18): 545-552.
- BRAK LAMY, A. C. F. (1897). *Manual para a instrução dos cabos e soldados de infantaria*. Lisboa: Typographia da Cooperativa Militar.
- BRANDÃO, Z. (1912). *Catalogo do Museu de Artilharia*. 6ª ed. Lisboa: A Editora.
- DE LA RIE, E. R. et al. (2000). "An investigation of the photochemical stability of urea-aldehyde resin retouching paints: removability tests and colour spectroscopy", *Studies in Conservation*, 45(sup1): 51-59. <https://doi.org/10.1179/sic.2000.45.Supplement-1.51>
- DE ORNELLAS, A., et al. (1897). *A campanha das tropas portuguesas em Lourenço Marques e Inhambane*. Lisboa: Imprensa Nacional.

- DEL GROSSO, C. A., POULIS, J. A. & DE LA RIE, E. R. (2019). "The photostability of acrylic tri-block copolymer blends for the consolidation of cultural heritage", *Polymer Degradation and Stability*, 159: 31-42. <https://doi.org/10.1016/j.polymdegradstab.2018.11.010>
- ENNES, A. (1897). *A campanha contra os Namarrais*. Lisboa: Imprensa Nacional.
- ENNES, A. (1898 a). *A guerra d'África em 1895*. Lisboa: Typographia do Dia.
- ENNES, A. (1898 b). *Campanha contra o Maguiguana nos territórios de Gaza em 1897*. Lisboa: Imprensa Nacional.
- FELLER, R. L., STOLOW, N. & JONES, E. H. (1971). *On Picture Varnishes and their Solvents*. Revised and Enlarged ed. Cleveland and London: The Press of Case Western Reserve University.
- FERNANDES, A. F. N. (2020). "Model 1859 Portuguese army clothes backpack. Historical note, conservation and restoration treatment", *Conservar Património*, 34: 155-165. <https://doi.org/10.14568/cp2018069>
- FLORIAN, M.-L. E. (2006). The mechanisms of deterioration in leather. En: *Conservation of leather and related materials*. s.l.:Routledge, 36-57.
- FREUND, M., et al. (1983). *Paraffin Products*. Oxford: Elsevier.
- G., C. (1909). "Infanteria n.º 27", *Revista de Infanteria*, 12(2): 40-42.
- KITE, M. & THOMSON, R. (2006). *Conservation of Leather and Related Materials*. Oxford: Butterworth-Heinemann.
- LAMA, A. et al., (2014). Acid-deterioration in historic leather and a new solution. https://www.researchgate.net/publication/50298506_Analysis_of_acid_deterioration_of_leather. [Consulta: 07/09/2020]
- LARSEN, R. (2008). "The Chemical Degradation of Leather", *Chimia*, 62: 899-902.
- LEARNER, T. & ARSLANOGLU, J. (2001). "The evaluation of Laropal A81: Paraloid B-72 polymer blend varnishes for painted and decorative surfaces – appearance and practical considerations", *The Conservator*, 25(1): 62-72. <https://doi.org/10.1080/01410096.2001.9995165>
- LOGAN, J. (2013). "Tannic Acid Coating for Rusted Iron Artifacts. Note 9/5", *Canadian Conservation Notes*. <https://www.canada.ca/en/conservation-institute/services/conservation-preservation-publications/canadian-conservation-institute-notes/tannic-acid-rusted-iron-artifacts.html>. [consulta 07/09/2020]
- M. (1894). "Estudos militares", *Revista Militar*, 46(12): 353-358.
- MEILUNAS, R. J., BENTSEN, J. G. & STEINBERG, A. (1990). "Analysis of Aged Paint Binders by FTIR Spectroscopy", *Studies in Conservation*, 35(1): 33-51. <https://doi.org/10.2307/1506280>
- OHLÍDALOVÁ, M. et al. (2017). "Influence of metal cations on leather degradation", *Journal of Cultural Heritage*, 24: 86-92. <https://doi.org/10.1016/j.culher.2016.10.013>
- OLIVEIRA, J. d. A. e. (1893). "Os exercícios de brigada", *Revista Militar*, 45(22): 673-682.
- PEREIRA, V. P. A. (1855). "Algumas considerações a respeito do novo systema de limpeza", *Revista Militar*, 7(3): 109-119.
- PIENA, H. (2006). "Regalrez in Furniture Conservation", *Journal of the American Institute for Conservation*, 40(1): 59-68. <https://doi.org/10.1179/019713601806113111>
- PIMENTEL, L. A. (1860). "Util e commoda transformação nos uniformes da infantaria", *Revista Militar*, 12(18): 589-593.
- SALGADO, A. J. d. C. (1849). "Uniformes-equipamento", *Revista Militar*, 1(4): 304-307.
- SALGADO, A. J. d. C. (1861). "O exercito", *Revista Militar*, 13(4): 101-108.
- SIMÕES, P. (1891). "Uniformes, armamento e equipamento da nossa infantaria", *Revista Militar*, 43(17): 524-530.
- SIMÕES, P. (1896). "Notícia histórica do regimento n.º 2 de caçadores da rainha", *Revista Militar*, 48(11): 230-236.
- SOARES, F. A. C. (1868). "Estudo sobre o actual armamento dos corpos de caçadores", *Revista Militar*, 20(18): 432-441.
- STONER, J. H. & RUSHFIELD, R. (2012). *Conservation of easel paintings*. Nova Iorque: Routledge.
- VIANA, C. (1861). "Vícios de organização, disposições contradictórias", *Revista Militar*, 13(17): 551-559.

Author/s



André Filipe de Nunes Fernandes
andre.fnf@gmail.com
Freelancer

Born in 1994 in Lisbon, he graduated in Art and Heritage sciences in 2016 at the Faculty of Fine Arts of the University of Lisbon. Currently is taking a master's degree in conservation and restoration at the Polytechnic Institute of Tomar. He has dedicated his studies to leather conservation and the investigation of 19th and 20th century Portuguese military equipment, collaborating with the Military Museum of Lisbon since 2016.



Ana Bailão

ana.bailao@gmail.com

Faculdade de Belas-Artes (CIEBA); Centro de Investigação em Ciência e Tecnologia das Artes (CITAR), Universidade Católica Portuguesa

Diploma in Conservation and Restoration by the Polytechnic Institute of Tomar (2005) and a master's degree in Painting Conservation by the Portuguese Catholic University (2010). The master research was about methodologies and techniques of retouching. PhD in Conservation of Paintings at the same university, in collaboration with the Centro de Investigação em Ciência e Tecnologia das Artes (CITAR) and the Instituto del Patrimonio Cultural de España (IPCE), Madrid. The doctoral research was about the criteria and methodologies which might help to enhance the quality of painting retouching. The projects are presented through publications, lectures, exhibitions and presentations. Teaching about conservation and restoration, especially chromatic retouching, since 2008. Since 2004 carrying out conservation and restoration works.



<https://doi.org/10.37558/gec.v18i1.853>