

UNIVERSIDADE CATÓLICA PORTUGUESA

TRUTH AND VANITY

THE RETOUCHING TECHNIQUES ON DRY PLATE NEGATIVES OF PORTUGUESE PHOTOGRAPHY COLLECTIONS OF THE FIRST HALF OF THE TWENTIETH CENTURY

Thesis submitted to the Portuguese Catholic University for the Doctoral Degree in Conservation and Restoration of Cultural Heritage

by

Catarina Luísa Cortes Pereira

ESCOLA DAS ARTES

February 2021



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VERDADE E VAIDADE

TÉCNICAS DE RETOQUE EM NEGATIVOS DE GELATINA E VIDRO DE COLEÇÕES PORTUGUESAS DA PRIMEIRA METADE DO SÉCULO XX.

Tese apresentada à Universidade Católica Portuguesa
para obtenção do grau de Doutor em Conservação e Restauro de Bens Culturais

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ESCOLA DAS ARTES

Fevereiro de 2021

"The gull that sees farthest flies highest."

"Jonathan Livingston Seagull discovered that boredom and fear and anger are the reasons that a gull's life is so short."

Richard Bach

Abstract

Pereira, Catarina C., *Truth and Vanity: The retouching techniques on dry plate negatives of Portuguese photography collections of the first half of the twentieth century*. Doctoral thesis in Conservation and Restoration of Cultural Heritage, February 2021, Universidade Católica Portuguesa, Porto.

This thesis aims to understand better the retouchings on dry plate negatives and contribute to their preservation, updating established conservation practices.

Archives of old photography studios, and photographers, are kept for their recognized historical and cultural value. These are mostly negative collections, which are frequently retouched.

The research focused on several Portuguese negative collections from the first half of the twentieth century. It was divided into a three-way approach: 1, establish a historical framework to explain the retouching practices, their acceptance, criticisms, and how they relate with contemporary aesthetics, social-cultural dimensions and contribute to a better knowledge of the visual culture of the time; 2, review the practice of retouching to identify motivations, identification of materials and techniques and understand intended effects; 3, revise the established conservation procedures.

Frequently not valued in the past, retouched photography exists since the birth of photography itself. Furthermore, although often criticized, retouching photography is an accepted part of the photographic process. However, it is not only relevant to explain and characterize a photographer's technique. While a hidden practice, retouching has a significant impact on the visual culture of its time and even how images and aesthetics of that time help evolve and influence photography today.

Many authors identified the approximation to the truth and the photographer's eye as the primary motivation. When photography was still debating its role in the arts, retouching was central to the discussion and used by each side as an argument both in favor and against. However, for the professional photographer, retouching negatives was necessary to please the client, assure flawless prints, and even a measure of pride in their work's quality.

Fourier-transform infrared spectroscopy (FT-IR) was used to complement the identification of retouching materials. The result is a compilation of spectra that can be used as references in future studies.

Some flaws in current conservation procedures have been identified, with consequences in the value and preservation of retouched negative collections. Conservation of archive collections can no longer be dissociated from digital dissemination. The conservator needs to take a more active role in advocating for collections' materiality in digital environments to ensure their preservation and truthful representation of the photographic cultural heritage.

The retouching practices were kept forgotten for a long time. This work now shines a light on the importance of preserving retouched collections and open directions for future research in the fields of Conservation, Art History, and other Social Sciences.

Keywords

Photography

Dry Plate Negative

Retouching

Portrait

Conservation

Portuguese collections

Resumo

Pereira, Catarina C., *Truth and Vanity: Retouching techniques on dry plate negative in Portuguese photography collections of the first half of the twentieth century*. Tese para a obtenção de grau de Doutor em conservação e restauro de bens culturais, Fevereiro de 2021, Universidade Católica Portuguesa, Porto.

Esta trabalho visa compreender melhor o retoque em negativos de gelatina e vidro e contribuir para a sua preservação, atualizando as práticas de conservação estabelecidas.

Os arquivos de antigos estúdios fotográficos, e de fotógrafos, são preservados pelo seu reconhecido valor histórico e cultural. Trata-se sobretudo coleções de negativos, frequentemente retocados.

A investigação focou-se em várias coleções de negativos portuguesas da primeira metade do século XX. Dividiu-se numa abordagem tripla: 1, estabelecer um contexto histórico que explique as práticas de retoque, a sua aceitação e críticas, e como se relacionam com a estética contemporânea, as suas dimensões social-culturais e como contribuem para a cultura visual da época; 2, rever a prática de retoque, identificar motivações, materiais e técnicas e compreender os efeitos pretendidos; 3, rever os procedimentos de conservação estabelecidos.

Muitas vezes não valorizado no passado, o retoque existe desde o nascimento da própria fotografia. Além disso, embora muitas vezes criticado, o retoque de fotografia é aceite como parte do processo fotográfico. No entanto, não é apenas relevante para explicar e caracterizar a técnica de um fotógrafo. Embora seja uma prática escondida, o retoque tem impacto significativo na cultura visual do seu tempo e até na forma como as imagens e a estética desse tempo influenciam a cultura visual até à atualidade.

Muitos autores identificaram a aproximação à verdade e ao *olho do fotógrafo* como as principais motivações para o retoque. Quando a fotografia ainda debatia o seu papel nas artes, o retoque foi fulcral para a discussão e usado por ambos lados como argumento tanto a favor como contra. No entanto, para o fotógrafo profissional, retocar os negativos era uma necessidade, para agradar ao cliente, para agradar o cliente, garantir a obtenção de provas perfeitas e até um motivo de orgulho na qualidade do seu trabalho.

A Espectroscopia no infravermelho com transformada de Fourier (FT-IR) foi usada para complementar a identificação de materiais retoques. O resultado é a compilação de espectros que poderão ser usados como referências em estudos futuros.

Foram identificadas algumas falhas nos atuais procedimentos de conservação, com consequências na valorização e preservação de coleções de negativos retocados. A conservação das coleções de arquivos já não pode ser dissociada da disseminação digital O conservador precisa de assumir um papel mais ativo na defesa e promoção da materialidade das coleções em ambientes digitais para garantir a preservação e verdadeira representação do património cultural fotográfico.

As práticas de retoque foram mantidas esquecidas por muito tempo. Este trabalho pretende trazer à luz a importância de preservar coleções retocadas e abre caminhos para futuras investigações nas áreas da Conservação, História e Outras Ciências Sociais.

Palavras-chave

Fotografia

Negativo de Gelatina e Vidro

Retoque

Retrato

Conservação

Coleções Portuguesas

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List of abbreviations and acronyms

AMLSB – Arquivo Fotográfico da Câmara Municipal de Lisboa [Lisbon's Municipal Photography
AMP – Arquivo Municipal do Porto [Porto's Municipal Archive]
Archive]
ANF – Arquivo Nacional de Fotografia [National Photography Archive]
APR – Aurélio da Paz dos Reis
BJP – The British Journal of Photography
BnF – Bibliothèque Nationale de France [National Library of France]
BNE – Biblioteca Nacional de España [National Library of Spain]
BP – Boletim Photographico
BPCMP – Biblioteca Pública Municipal do Porto [Municipal Public Library of Porto]
CPF – Centro Português de Fotografia [Portuguese Center for Photography]
FT-IR - Fourier transform infrared spectroscopy
Getty – The J. Paul Getty Museum
HML – Hemeroteca Municipal de Lisboa
HPLC-DAD-MS – High-Performance Liquid Chromatography coupled with the Diode Array Detection Mass Spectrometry
IP – Ilustração Portuguesa
IPCE – Instituto del Patrimonio Cultural de España [Spanish Cultural Heritage Institute]
Lupa – Lupa, Luís Pavão lda.
MCI – Museu Casa da Imagem
MGM – Metro-Goldwin-Meyer Studios
MHNC-UP – Museu de História Natural e da Ciência da Universidade do Porto [Natural History and Science Museum of the University of Porto]
MNTD – Museu Nacional do Teatro e da Dança
MoMA – Modern Art Museum, of New York
NEG – Colecção de Negativos e Provas, from the Arquivo Fotográfico da Câmara Municipal de Lisboa [Negative and Positive Collection, from the Lisbon' Municipal Photographic Archive]
NYPL – New York Public Library
TCE – Trichloroethane $C_2H_3Cl_3$ / 1,1,1 trichloroethane CH_3CCl_3 / 1,1,2 trichloroethane $CHCl_2CH_2Cl$
The MET – The Metropolitan Museum of Art, of New York
The NYT – The New York Times
UV-Vis - Ultraviolet–visible
V&A – Victoria and Albert Museum, London, UK

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Images are presented with a comprehensive caption describing the object and other relevant information. Each caption also includes a short identification of the institutions which hold the original photographic object and its identification number in the institution.

Important Notice

The images included in this text have been ***retouched*** with digital editing tools. It is recognized the irony in this, as it was necessary, for three reasons. One, when the images integrate a document, they lose quality. Two, the images in the final document are small, with no possibility of enlarging. And three, the images were taken from different collections without ideal lighting, and most retouchings are only soft markings on the surface of the negative and not always easy to capture with a camera, or only captured at an angle.

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Introduction

Is this truth?
The artist succeeded finally by retouching the negative.
(Vogel, 1871, p. 234)

What kind of man was Mr. Morgan in this respect?
If I should retouch the nose, he might be angry about it. […]
So I took the negative that I had made for Encke and retouched that nose as much as I dared.
On the good negative that I made for myself I did very little retouching,
except to make the nose a little more vague and remove spots that were repulsive.
When I took the proofs to Morgan, he thought the one I had retouched for Encke was fine,
and he ordered a dozen prints.
Then he looked at the other print that I had made for myself.
He said, "Terrible", and tore it into shreds.
(Steichen in Homberger, 1992, p. 118)[1]

Photography was meant to be the tool for capturing the truth. Since its invention, expectations were high. Where some saw the marvel, others soon recognized its shortcomings. The image existed; it was captured and finally made permanent, but only in black and white — this disappointed many. For acceptance and to resolve the issue, firstly, it was the will to color these images. Soon, more corrections were done. The practice of retouching photographs is not a novelty of digital photography. At the turn of the 20th century, using dry plates, a common way to correct any flaw or enhance aesthetics was to retouch the negative. Like a chemical intensification or a filter, these retouches had a specific purpose in the final image. They were one of many different steps taken in achieving the photographer's intention, which finally materialized in the print. Retouching is not a mark of the photographer's inability. It was done to change and improve the image intentionally and is part of the photographic object.

What is now known about this practice?

Are retouched negatives being adequately preserved?

[1] It was published originally in Edward Steichen, *A Life in Photography* (1984), ch.3 (unpaginated).

Does the public understand what a retouched negative is or can recognize its importance?

Is it essential to preserve negative collections, to preserve the object, after digitizing them?

What does that mean for future generations?

This research will go in-depth, exploring and giving answers to these and other questions. It searches for a better understanding of the retouching practices, their uses, and their importance to the general comprehension of photography's history and visual culture.

Of all of those dedicated to the research and preservation of cultural heritage, it is the conservator that still handles it, particularly photographic collections that are frequently converted into digital images. Most of managing and cataloging collections is now done using digital images instead of the object itself. This means that even if other collection caretakers acknowledge retouching, the detailed work can be overlooked in the digital image. The subtle retouching with an etching knife or pencil might look the same. As digital images of negative collections are frequently converted to positives, any retouching, more than overlooked, is often misrepresented or even made invisible.

It is the conservator's prerogative to hold the object; this allows insight into the photographic object and a very particular view on history and culture.

As the conservator profession evolves, this privileged access to the collection leaves the conservator responsible for doing more. It is already part of the conservators' work to search for reasons, why the objects were produced, by whom, what their uses were, and how their materials have deteriorated through time, and so on. At the end of the search, the conservators are not only better equipped for decision-making in conservation procedures, but they also gather insights on the entire production process and uses. So, the conservator also has the responsibility to conduct active participation in research and dissemination of knowledge on Cultural Heritage, actively contribute to the advocacy of Cultural Heritage values, and raise awareness of all conservation issues.

Research such as this opens new ways of understanding cultural heritage and the importance of the conservator's role. More specifically, this research efforts to reconcile the preservation of the object with its image. It aims to show how physically, technically, and culturally, the retouching practice is part of the object and therefore needs to be preserved. And although it is a conservation research, it aims to contribute to the history of Photography, reconciling the practice of retouching as part of the photographic process, one that exists, despite and outside theoretical debates about art. And finally, contribute to new interpretations in visual culture and the representation of truth and vanity.

Starting point

When attending a meeting on photography in the small town of Golegã in Portugal,[2] back in 2009, it was not possible to have foreseen that a relaxed discussion at the meeting dinner would develop in such an extensive research project on retouching. Many were the topics discussed around photography collections and research in photography in general.[3] One presentation stood out, by Duarte Ribeiro, with the title *O Retoque fotográfico: do manual ao digital* [Photographic retouching: from manual to digital]. This was a presentation on some colored and retouched large-format photographs by Portuguese photographer Teófilo Rego. Two main issues were evoked and discussed after. One was the importance of acknowledging the hidden practice of retouching in the interpretation, and correct historical representation, of the photographer's work, especially when dealing with negative collections. The other issue was the preservation of collections and how lack of knowledge and awareness by collection caretakers constricted the conservation of retouched negatives.

The first consequence of this meeting was a small research project on the retouching of negatives included in the author's master's degree in Science in Conservation. The project dealt with a negative collection from the Arquivo Fotográfico da Câmara Municipal de Lisboa (AMLSB).[4] The results were published soon after.[5]

At that time, the bibliographic search on state of the art returned very little information. Notable exceptions were *The painted photograph* by Heinz K. Henisch & Bridget Ann Henisch (1996),[6] *Coatings on photographs* by Constance McCabe (2005), *"Sans retouche"* by André Gunthert (2008)[7], and *Red skies and blackened cheeks* by Mark Osterman.[8]

With the increasing availability of online resources, now it is possible to verify that the issue was present

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[2] The meeting II Semana da Fotografia da Golegã: A Fotografia nos Museus - os Museus da Fotografia, Questões para o Século XXI, [2nd week of Photography at Golegã: Photography in the Museum – The Photography Museums, questions for the Twentieth century], held at the Casa-Estúdio Carlos Relvas, Golegã, Portugal, Oct. 2-3, 2009.

[3] Unfortunately, the proceedings of this meeting were never published.

[4] Arquivo Fotográfico da Câmara Municipal de Lisboa (AMLSB) – The Lisbon's Municipal Photography Archive.

[5] By the author: Pereira, C. (2010). O retoque do negativo fotográfico - estudo de uma colecção do Arquivo Fotográfico da Câmara Municipal de Lisboa [Retouching of photographic negatives - Study of a collection at AMLSB]. *Estudos de Conservação e Restauro - ECR, 2*, 38–57. https://doi.org/10.34618/ecr.2.3153.

[6] It focuses on the positive photograph, but it includes a note on negative retouching.

[7] In 2009 André Gunthert wrote several small opinion texts around the retouching subject, focusing on interpretations and its uses nowadays: *La retouche ne tue pas*; *La retouche en son miroir*, *La retouche, une affaire de morale*, and others. These were available online, but the pages have since then been deactivated.

[8] In 2009/2010, Mark Osterman published some notes on photography online, including the one referred, an excerpt from a previous publication with the same title, from before 2002. It was published in *The Collodion Journal*, a quarterly produced by France Scully and Mark Osterman. The online page was accessed in 2010 and is no longer available.

in the minds of other conservators, historians, and critics, and texts, mostly published between 2009 and 2015, are now found online from different countries. From this time frame, some examples in chronological order:

Retuše skleněných deskových negativů [Retouching of glass plate negatives] by Tereza Cermanová, (2010): Czech, examples from an unidentified collection, believed to be from the National Archive in Prague.

Técnicas de retoque de negativos fotográficos: historia y conservación [Photographic negative retouching techniques: history and conservation] by Rosina Herrera, (2011): in Spanish, but with examples from the George Eastman House Conservation Department Collection.

L'intervento di ritocco [The intervention of retouching] by Donatella Maté, Lucio Rocchetti, (2013): Italian, examples from private collections and unidentified photographers.

Anita Berber im fotografischen Blick von Madame d'Ora [Anita Berber in the photographic gaze of Madame d'Ora] by Sophie Vitovec, (2013): Austrian, master dissertation on the production of portraits by Madame d'Ora of dancer Anita Berber, from the Studio d'Ora-Benda's archive at the Austrian National Library.[9]

Retouching Revealed: Finishing Practices Observed in the Thomas Walther Collection by Lee Ann Daffner, (2014): American collection of the same name at The Museum of Modern Art, MoMA.[10]

Techniki i technologie retuszu fotograficznego [Techniques and technologies of photographic retouching] by Anna Seweryn, (2015): Polish, with examples from Polish manuals and unidentified examples.

These texts are structured in a similar manner, explaining the basic techniques and arriving at similar results as the one done by this author. Some focus on a collection. Others present unconnected examples from different periods as illustrations reviewing the specific uses and types of retouchings.

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[9] An earlier text exists, but not available online, by Christa Hofmann and Gabrieleon Schatzl, focusing on retouching practices at the Atelier d'Ora-Benda. It should be interesting as the abstract mentions that the authors made connections between retouched negatives and original prints, which are often missing in other negatives collections. It is a paper from a conference: Hofmann, C., & Schatzl, G. (2005). Fotographische Retusche: Beispiele aus dem Atelier d'Ora-Benda, Wien 1907-1927 [Photographic retouching: Examples from the Atelier d'Ora-Benda, Vienna 1907-1927]. In B. Baatz-Fischer, C. Hofmann, & A. Schäning (Eds.), *Mehr Schein als Sein? Retusche, Ergänzung, Rekonstruktion, Illusion: 19. Tagung des Österreichischen Restauratorenverbandes [Conference of the Austrian Association of Restorers, More Appearance than Reality? Retouching, addition, reconstruction, illusion], 11.-13. November 2004, St. Pölten* (pp. 71–77). Österreichischer Restauratoren Verband, Vienna, Austria. https://www.bcin.ca/bcin/detail.app?id=390083.

[10] It is peculiar research that studied the retouching of negatives analyzing the original prints. It is part of the project Object:Photo, the Thomas Walther Collection: http://www.moma.org/interactives/objectphoto.

The ones that only explain the retouching practice go little beyond the information found in manuals. The texts that give focus to one collection have the advantage of complementing the information on retouching with a social and historical context. Except for the research on the collection from AMLSB, as this is an artificial collection, a compilation of negatives and positives from different unknown sources.

Still, little bits of information in each text proved useful, complementing the findings of this research. This demonstrates that although seemingly simple to explain, the retouching practices are far from being completely understood. A compilation of different experiences and sources from other countries would give a more accurate understanding of general techniques and, in turn, better identification of specificities associated with a photographer, a photographic studio, a time, or a place.

One of the chapters from *Coatings on Photograph* (McCabe, 2005) deals with *Coatings on black-and-white glass plates and early film,* entering on the subject of the retouching practices (Pedersen, Kejser, Johnsen, & Christensen, 2005, pp. 108-131). A significant flaw of this text is the lack of context, temporal, historical, and social. Facts and conclusions are drawn from the authors' personal experience, apparently from Danish collections and other German sources. These geographic limits are not clearly stated in the text. They try to include in their observations the retouching techniques from all periods in one small chapter and present it as if the representation of all retouching in general, failing to identify the complexity of reasons for retouching, especially those relating to less technical aspects. In all, the text presents a few mistakes, inconsistencies, and contradictions, as it seems to have been written in sections by each author separately. The tables, in the end, connecting materials with written sources, are an interesting review. As Cermanová based part of her study on Pedersen's text, it presents some of the same problems.

Other texts exist on the uses and motivations of retouching. Some include a historical context, more and more into the digital age. These are centered frequently on ethics and retouching as a tool for deceit, image construction, and manipulating perception – in themes such as portraiture, advertising, propaganda, and the visual representation of the truth, the ideal, and the real. They usually approach retouching as a tool in communication and not part of the photographic process and focus on the published image and less in the photographer's practice or within a single collection. Also, the examples are, frequently, from situations where the image was manipulated *a posteriori* and not by the photographer. Among many, some notable examples are *Photo Fakery*, written by a former intelligence operative, Dino Brugioni, and his experience interpreting images and identifying "fakes" (1999); *The*

commissar vanishes by David King (1997), or *Making people disappear* by Alain Jaubert (1989), among others, that deal with images retouched for propaganda. Other examples like *Flesh and fantasy* by Penny Stallings and Howard Mandelbaum deal with constructing the image and manipulating public perception, re-telling the stories of the golden days of Hollywood's "star-making machinery," where actors had their lives as much as their images manipulated (1978).

In 2012 an exhibition at the Metropolitan Museum of New York (The MET) promised to expose the manipulation throughout the history of photography, titled *Faking it: Manipulated photography before photoshop*, curated by Mia Fineman, and a comprehensive catalog was also produced (2013). Part of it was dedicated to the practice of retouching, but mostly the exhibited images were prints, where one only sees the result and not the process. The exhibition was a success and an essential contribution to the history of photography, opening a window to the, not so long ago, past at a time when the digital has, permanently, taken over.

On the retouching practice, the best source of information is still the technical manuals on retouching photography, and they are countless. They were published until late in the twentieth century and then replaced by manuals of digital editing tools. Authors like Robert Johnson, Paul Piquepé, and C. Klary are more frequently cited and found, from Portugal at least; they were among the first to be reviewed. There are many manuals specifically written on retouchings and much more on photography in general that also include chapters on retouchings. A broad selection will be examined in this research.

But these manuals do not necessarily translate into the actual practice. After all, they are recommendations, with very few exceptions when the author is also a prominent photographer. Some relationships can be found in existing photographs and texts by the same author. One example of the very few exceptions is the books by Ansel Adams (1902-1984)[11] that give a real preview into his practice.

A more analytical and material approach, common in contemporary conservation research, also returns limited results, except for the work coordinated by McCabe, already mentioned (2005).

Other texts not dealing specifically with retouching still included it as part of different subjects, such as *The Varnished Truth*, by Corina Rogge, on varnishes used for tintype coating (2013). *The deterioration of Paul Strand's Satista prints*, by Lisa Barro, recounts how deterioration revealed the retouchings done on the prints by Strand (2003). *Matt Albumen Papers and Their Use in Austrian Portrait Photography*,

[11] Among other writings, Ansel Adams authored three essential texts: *The negative*, *The print*, and *The camera* (first versions published in 1948, 1950, 1970, respectively). In manual form, they relate to each part of the photographic process, and together they give a complete view of Adams' work process.

by Christa Hofmann and Gabriele Schatzl,[12] shows an example of the matt finish of prints, besides other aesthetical qualities, has the particular advantage of better concealing the retouching work (2003).

Each year more information is made available online, from recent research or older ones that only now became available, or more accessible, through the internet. As archives and libraries digitize their historical documents and other collections in the public domain, they become reachable in open access. And outside academia, there were always those attracted to the historical processes and rediscovering analog photography. The gelatin emulsion was once left outside these amateurs' interest, meaning lovers of the photographic processes, and their groups were called "alternative photography," alternatives to gelatin. But today, the gelatin emulsion starts to be included under a larger umbrella and with a new status of a historical process. As these amateurs struggled like the fathers of photography did, they unashamed also adopt retouching techniques, either inspired by the old model or modern resources. Nowadays, they leave their contribution in their blogs and other similar online resources in opinion articles, videos, and images of their proud results. Still, the issue is frequently misrepresented or not at all included in the general historical texts.

After this short review on state of the art, the issues discussed in 2009, at the meeting in Golegã, were still unanswered and unresolved. Some disperse information does exist but not enough to help the conservator dealing with entire collections, but in all, it felt like a solid starting point.

Defining concepts and scope

Concepts

The first thing to do was to identify and define the subject of the research – *Negative retouching*.

But this task of reviewing the subject of retouching and defining the scope and limits of this research was not an easy one at first.

Doing Boolean searches with online engines posed some problems as terms such as "retouch," "negative," or "photography" gave too many results on a diversity of subjects, and when related, frequently referred to digital editing tools. The search engines keep track of the most commonly accessed pages, and probably that is why by now, in the computer where this text is being written, the results seem to go directly to the subject, with little or no "digital retouching" results. Some sorrow

[12] Another text focused on the collection of the studio d´Ora-Benda´s archive at the Austrian National Library mentioned above.

exists in losing some accidental finds like the Czech and Polish texts mentioned above, which are now only found if by a direct search of its authors or translating the words to every language imaginable.

In this research, retouching is considered a part of the photographic process and a technique in creating the photographic object. And not for situations where the image is manipulated, altered, and used as a complement to a message, as frequently done in advertising or propaganda. This is a critical distinction, although, in some cases, the separation line is blurred.

As for a definition, to say negative retouching seems harmless enough and not challenging to identify by conservators and photographers. But as photography became digital and the negative became obsolete, it is quickly realized that younger generations of photographers might not know what a *negative* is, much less the general population.

Retouching, even limited to photography, is also a concept with many uses, and it seems to be some confusion to its definition in more recent research. The most straightforward meaning is *to correct or repair*, although correcting does not account for all the reasons for retouchings.

Retouching is done with a variety of techniques, utensils, and materials that differ in nature from the negative and the photographic process, excluding all things relating to digital photography. Although its effect is visible in the print, the retouching itself becomes invisible, at least when skillfully executed.

Because it is done on the negative, it is, of course, not considered retouching any alterations in photographic processes without the negative step, such as the daguerreotype or ambrotype. Later it will be shown that some retouchings were also done after printing the negative and in other positive images.

Still, it is only considered retouching when falling under the definition of "invisible" work, which does not include, for example, overpainting or coloring black and white photographs and other such interventions.

So, and for this research, retouching is any *additive or subtractive intervention done to the negative.*

Chemical retouchings can be included under this definition, but these are indelibly done to the negative, leaving no trace or residue material, again, if correctly done. Although they can contribute to the deterioration of the negative, they cannot be removed or otherwise be selectively affected during conservation treatments, and therefore not a concern in this research.

Contrary, the topic of masking negatives is included. Masks are frequently affected during conservation procedures and are often complemented by retouching or even done by retouching techniques. Masks

are set apart from retouching because of their specific effect. A mask covers part of the negative, and when converting the negative into print, the mask blocks the light, and the covered areas are left unaffected, blank. This can be achieved in different manners and done with an array of materials. Masks can be temporary or have a more permanent character. Two specific types of masking have only a partial influence, not blocking the image completely. They act by selectively correcting or changing exposure times during the printing process, often complementing each other, and are referred to as *Burning* and *Dodging*. The negative can be masked only part of the time, either reducing exposure in some areas, dodging, or adding exposure time by covering the rest of the negative, burning. These are not permanent masks, and the process needs to be repeated for each print, making it almost impossible to achieve similar results each time. Because of this, they are more frequent in art photography for producing unique objects and less used in commercial photography, where each negative is expected to be printed multiple times. Sometimes photographers do a preliminary test print and leave annotations and mark the areas to be burned or dodged. Like chemical retouching, and not including the test prints, there is no specific material to preserve and, therefore, also not a concern in this research. Other interventions should not be considered retouching in its strict sense. In the broad sense, yes, retouching is any alteration introduced by the photographer to the physical-chemical image. But this would then include any printing method that is not strictly a silver process, editing actions such as adding signatures, labeling, common in images intended for postcards or cropping. Even composition, lighting, or applying makeup to a sitter for a portrait would all be a type of retouching. This is acknowledged by several photographers and authors on photography but recognized as a separate category.

Scope

From the published studies, it was realized that they were all similar without giving a real answer to the conservator, also, that it was not enough to read the written sources and observe a few negatives. However, the research done in 2009 helped. The observations from the AMLSB archive made evident that portraiture was the one type of photography more systematically retouched and that the more complex retouching was done to the larger negatives. It was also clear that retouching was influenced by strong visual, social, and cultural components that demanded more than a technical and historical context. Moreover, to be useful for conservators, there was a need to gather information beyond identifying the problem and writing to raise awareness. A different and more complete approach was crucial.

It was concluded that it was necessary to observe entire collections or at least a large sample, as many examples as possible. The retouching practices needed to be correlated with the effect on the print and the teachings from manuals and the photographer's background. It also required acknowledging a visual culture of related cultural cues, such as artistic movements or inspiration sources.

The observation of "many examples" could not be unlimited, and a selection was needed for manageable research that fitted within the time frame of a Ph.D.

Recognizing that the retouching of photographs exists since the birth of Photography, the first limit was imposed on a photographic process. The choice was the silver halide gelatin emulsion on glass support negatives that, for short, and in this text, will be referred to as the dry plates.[13] Collodion collections in Portugal are limited. And Talbot's process on paper was less popular and now has little presence in Portuguese collections. When film replaced glass as a support, the negatives also became smaller and more challenging to retouch in detail. Although still retouched meant an entirely different practice of retouching that will be left for another research.

Defining the photographic process also determined the time frame. It was rounded to the first half of the twentieth century. History books tell that by the 1950s, the film was already the most common support in use, but there was a preliminary interest in a collection known to have used dry plates until late. On the other end, there is no one particular date to be defined in the nineteenth century. The transition from collodion to gelatine was a gradual one, different from place to place and with each photographer.

The following defining step was to choose dry plate negative collections from Portuguese archives. Although less interesting, yet at times the most relevant, the first selection criterion was availability and to choose from collections that would be accessible through the entire time of the research project. The second criterion was to select collections from photography studios. These usually present a continuous production that allows the study of several examples within a limited time frame. With most studios, portraiture was the primary source of work, which was already realized to be most frequently

[13] Silver halide gelatin emulsion on glass support negatives seems to be the complete description, although too long to be used with frequency. In other languages, it is common to find the designation of the silver bromide process. Although this designation is not untrue, it does not tell the entire story as the emulsions could be manufactured with silver bromide and silver chloride, and iodide and frequently as a combination of at least two. Also, gelatin emulsions are used both with rigid glass support or flexible plastic support of different materials. The designation of *dry plates* is historical and distinguishes from collodion known as the wet plate process; even if some dry collodion plates existed for a period, their uses were limited. And referring to it as plates quickly come to mind the individual negatives on a rigid support and not a roll of film with multiple frames.

retouched. Other collections were selected to differentiate the technical and aesthetical retouchings as a type of control group.[14] One of the selected collections is by an amateur photographer who did not work on commission but published his photographs. And another collection from a science museum, where truth is (or should be) the high value and less aesthetical retouchings are expected. The final selection was[15]:

Fotografia Alvão – Fond from a photography studio of the same name from the city of Porto now at the Centro Português de Fotografia (CPF),[16] in Porto – Important studio with heterogeneous work but mostly portraits and commissioned exterior work. The main photographers of this studio were also recognized as art photographers.

Foto-Carvalho – Negative archive collection of the extinct studio of the same name, now privately owned from the town of Estremoz, in southern Portugal – Important studio in its region, and an expected interesting collection for this research as it is preserved in its original boxes and not yet subject to any conservation measures.

Foto-Estefânia – Negative collection, from the photography studio of the same name, from Lisbon, now privately owned by Luís Pavão's company, Lupa – The final studio owner donated the surviving negative collection and some retouching equipment and materials that are absent in the majority of other known collections from this period.

NEG – Negatives and positives collection at the AMLSB, in Lisbon – Negatives from different unidentified sources, the same collection was the subject of the author's previous study (Pereira C. , 2010). At that time, the collection was already stored in individual envelopes and grouped in conservation containers according to size. Since then, it was subject to other conservation treatments, including digitization, now available online. The previous observations are now complemented with new knowledge.

Celebrities portraits, by Aurélio da Paz dos Reis (APR) – Stereoscopic negative collection, part of the Aurélio da Paz dos Reis Fond at the CPF, in Porto – Aurélio da Paz dos Reis (1862-

[14] Control groups are used in experiments to see the results when the testing element is not present. In this case, these collections serve to establish what was particular in retouchings to portrait studio photographs. What were technical and aesthetical retouching, or what was a photographer's personal choice or bound by client approval? These issues and others can influence retouching but might not be present outside portrait photography.

[15] This selection presents some differences from the original project as some collections were, in the end, not available, and others became available with interesting complementing elements.

[16] Centro Português de Fotografia – CPF [Portuguese Center for Photography], one of the Portuguese reference institutions on photography, is located in the city of Porto.

1931) considered himself an amateur photographer, although he would sell his work. He did not have a photographic studio and photographed mostly in stereoscopic format; despite this, the selected negatives are studio-like portraits.

Anthropology and Zoology collections from the Museu de História Natural e da Ciência da Universidade do Porto[17] (MHNC-UP) – Compilation of negatives from different sources produced for scientific purposes on the subject of Anthropology and Zoology used by the corresponding departments of the University of Porto, a collection now integrated in the museum.

Objectives

As no other such study was found on the subject of retouching, going beyond the characterization of the practice and the identification of retouching types, some objectives are purposely left broad and open to what could be found during the research.

The aim is to contribute to a deeper knowledge of the retouching of negatives and contribute to its preservation, recognize and raise awareness to its constant presence and place in the history of photography as an integral part of the photographic process. Also, to learn more about the practice, materials and techniques, uses, and the photographer's motivations and choices. And beyond the object itself, how the practice of retouching integrates with its contemporaneous social and cultural expectations, what are the inspiration sources and models, and the photographer's relationship with the sitter and how it influences retouching. Reveal how a hidden practice is reflected and contributes to visual culture in its social and cultural mores and values such as truth, reality, ideal, beauty, or vanity. Finally, contribute to updating the established conservation practices and overall preservation of retouched negative collections.

These objectives were divided into three groups, as summarized in Table 1. The first group relates to the identification and characterization of materials and techniques. The second focuses on intentionality, the historical and social context, and visual culture, and the third relates to the conservation practice.

[17] Museu de História Natural e da Ciência da Universidade do Porto – MHNCUP [Natural History and Science Museum of the University of Porto].

Table 1 – Research objectives

Materials and Techniques	Intentionality, Context and Visual Culture	Values and Conservation
A. Better understanding for better preservation, identification, and characterization: 1. Retouching techniques and materials. 2. Typologies. 3. Original purpose and uses. 4. Effects on the positive image.	B. Historical and cultural framework for a hidden practice with visible significance: 5. Revision of interpretations considering the retouching practice within a visual culture. 6. Identification of intentions and justifications. 7. Connecting the retouching practices with contemporary aesthetics trends and artistic movements. 8. Identification of Social and cultural implications 9. Cues to new interpretations and contributions to visual culture studies.	C. Contributions for an updated conservation protocol: 10. Identification of values and what justifies the preservation of retouched negative collections. 11. Diagnose present conservation conditions and how retouching affects the deterioration of the negative. 12. Revise of the established conservation procedures. 13. Identification of how the information associated with retouching is being cataloged and made available to the public. 14. Proposal for a detailed thesaurus on retouching to be used in the description of collections.

Methodology

The list of texts cited above showed that conservators are the majority as authors when researching and writing on retouching techniques and practice. This is not a coincidence or unexpected. Conservators are, after all, the professionals caring for collections that still handle the objects.

The methodology followed in conservation research is frequently *object-centered* to take advantage of the conservator's privileged position. What that means is that first observations start with the object. Then conservators search for reasons, historical and cultural context, and complement information reviewed in every other type of available source.

For sure, the objectives identified above could be the same for other researchers than conservators by changing methodologies. It would be possible to track back materials used by photographers and retouchers reviewing documentation such as invoices or catalogs. To find justifications for the retouching of negatives, a review of written sources would give ample material by itself with no need to look at a collection. Nevertheless, that is a secondhand experience, for what, at best, would be the expected, and conservators can do differently.

Reviewing a collection in hand gives insight into a complete understanding of the practice, its uses,

repetitions, and exceptions, subtle or more dramatic changes from one object to the next from one collection to the other.

The research was divided into different steps, and Table 2 summarizes the adopted methodologies.

Table 2 – Summarized methodology.

Materials and Techniques	Intentionality, Context and Visual Culture	Values and Conservation
A. Better understanding for better preservation, identification, and characterization:	B. Historical and cultural framework for a hidden practice with visible significance:	C. Contributions for an updated conservation protocol:
1. Survey of retouching dry plate negatives in selected collections, following the procedure already used in the previous study.	4. Review of the retouching practice as described in selected historical sources, giving particular importance to technical manuals.	6. Review of conservation conditions of collections that have already received any conservation treatments, comparison with others with no conservation treatment
2. Analysis of retouching materials in a small sample for verification of identified typologies.	5. Co-relate the retouching practice with the photographer's and retoucher's intentions within its contemporary social, historical, and cultural models, aesthetics, trend, and inspiration sources.	7. Survey of collection management procedures at CPF.
3. Co-relation of gathered data with other sources such as reference materials and other known examples.		8. Review of the established National conservation procedures for dry plate negative collections.
		9. Review of data presentation in National and International online databases for both Museum and Archive negative collections.
		10. Review of contemporary research in Conservation
		11. Co-relation of gathered data with other sources, such as interviews with collection caretakers, from National and International institutions.

First, it was with the observation of collections, identifying typologies following what was done in the previous study of the AMLSB collection. That is, to identify types of retouched photographs – such as portrait or landscape – what are the retouching techniques present in each object, if the retouching is done by adding or removing material, and in what surface – support or emulsion, and more.

For validation, the findings are correlated with written sources, giving principal value to technical manuals published, or with known relevance, in the first half of the twentieth century. Concurrent with the observation of retouching practices, the negatives are assessed for conservation conditions.

Centered on portrait photography, the search is followed by the identification of intentions and social implications. A relation is sought on typologies of retouching and the sources of inspiration, cultural and social mores, aesthetics, and trends of the time, including the photographer's will and his relationship with the sitter.

For complete material characterization, resorting to material analysis gives definitive answers. But for a representative sample to be analyzed, it would take the entire time, if not more, of that available for this research. There are also some bureaucratic limitations in removing negatives from collections for external laboratory for analysis. A small sample of negatives was selected for analysis, not for a complete characterization of materials used by one studio or photographer but for the validation of observations on specific examples. And the focus was to find a methodology using only small samples and compile a library of reference samples of known retouching materials.

Revising the established conservation procedures, current and past, was to follow. Because the conservator is not the only professional who cares for collection preservation inside institutions, the review included all management procedures relating to a collection since its acquisition to its public access. The CPF – Portuguese Center for Photography was chosen, and interviews were done with each staff member, identifying its role and procedures relating to the preservation of collections.

In each collection identified as previously having received conservation treatments, it was verified if they had affected the retouchings and ascertained each treatment's reasons.

Archives and museums are increasingly relying on online databases to give visibility to their collections. So, it is hypothesized that the digital image removes value from the physical object and even the awareness of its existence or the preservation needs. A critical assessment was done to a selection of National and International online databases.

Initially, the research intended to produce a database of retouching typologies in the collections, but because of legal restrictions in showing portraits, this idea was quickly dropped. However, a suggestion for an ideal database is presented as one of the conclusions.

It was also considered the preparation of replicas to test retouching techniques. However, the variables are immense, in addition to the fact that the collection plates are of industrial production that it would not be possible to imitate. Still, a few examples of retouching tests are presented. And some prints were done from a few negatives to be compared to the corresponding digital images and ascertain disparities between images digitized from negatives and prints.

Finally, a crucial part of this investigation was networking, attending meetings, visiting other

institutions, and interview professionals dedicated to the conservation of photography collections, both National and International. Although these could not be specifically planned, and the interviews had an informal character, the information gathered would allow some verification of the findings and co-relate results with examples from international institutions and other researchers.

From here

The work done is reflected in the following chapters, organized in themes that roughly follow the objectives. They do not comply, however, with the order. Instead of starting with collection characterization, it begins by giving a theoretical and historical framework that helps explain the observations described in the following chapters.

This first section is comprised of two chapters. Chapter one gives a framework for retouching in the history of photography. It is a compilation of examples and historical moments building to what was retouching at the beginning of the twentieth century. Because we interpret retouching from today's point of view, it was also extended to the present time, primarily to show that even when techniques are similar, the intentions and uses evolve and are influenced by their moment in time. It was written with the aid of general history books, manuals, catalogs, and others, and whenever possible crosschecking original sources. The second chapter is itself divided. The first part analyses and compares historical manuals on retouching and other related publications, such as commercial catalogs. The intention was to find differences and commonalities between authors from diverse backgrounds (scientists and artists) and countries. The second part delves in-depth into the more technical aspects of retouching. It also presents examples of uses and effects. It explains some of the general shortcomings of photography and how retouching helps overcome them and its implications to the overall aesthetics.

The third chapter gives a more analytical approach to the characterization of retouching materials. As little has been done in such regard, this part of the research gives initial material characterization. The objective was to know more about these materials and their chemical characteristics. Reference raw materials, varnishes, and commercial samples were analyzed using Fourier transform infrared spectroscopy (FT-IR), and a reference material database was compiled. Some samples were also analyzed from two of the selected collections: the Alvão collection, representing the first decades of the twentieth century, and Foto-Carvalho for later uses. FT-IR is a technique that uses a small amount of sample; still, historical samples need to be smaller. A protocol was developed for analyzing historical

samples of reduced size. The results verify initial assumptions of some standardization of the retouching practice and the use of commercial industrialized materials specific for photography retouching.

Chapter four examines retouching in each of the selected collections, offering relations to visual cultural issues. Initially, this section was divided into two. It began with an initial standalone chapter dealing with visual culture in general, analyzed separately for potential relations on retouching. A second part solely describes the findings in the collections. It was then realized that some theoretical issues would benefit from the confrontation with examples found. The consequences are that whereas the cultural aspects are only summarized to their most relevant parts as they relate directly to what was observed, the combined chapter now better underlines the importance of retouching as it relates to the different visual and cultural issues and how it extends beyond technical necessities. In this way, the addressed cultural issues are circumscribed to specific topics even if some intertwine. It aims to identify but also inspire others to look again at collections and recognize how retouching poses an integral part of defining visual culture, namely in:

Social photography;

Photography and science, with a particular focus on anthropology;

Perception and the third dimension;

Photography produced for collecting and commerce, specifically celebrities' portraits and studio photography;

Professional photography inside the studio, the relationship with clients, and the professional retoucher as an essential profession establishing image aesthetics;

Women and photography, both as professionals working inside the studio and as clients in front of the camera.

The last section is dedicated to conservation issues and is again divided into two parts. On the one hand, it was felt a need to find a framework for the conservation practice, which could explain its shortcomings, disparities, and advances, as it affects the preservation and value of retouched negative collections. On the other hand, it addresses the issues observed in each collection.

The first part starts by presenting a general bibliography review extending outside the conservation of retouched collections. This second review was necessary because, for one, the issue of retouching, as seen, has yet little representation, and second, the preservation of retouched negatives cannot be understood outside the established preservation and conservation practices. It then focuses on present-

day practice and how collections are being valued as documents and historical objects. It argues a change in perspective pulling in both directions. On the one hand, a rediscovery of the importance of negative collections.

On the other hand, the stripping of material value, as collections are mostly represented as documents – images – in digital mediums. It is defended that all of this affects conservation in the long-term. In some ways, it means a gain, but in others, a loss for the photographic cultural heritage.

The second part deals specifically with collections. At the start of this research, of all the collections, the Fotografia Alvão and APR are the only ones institutionalized and subject to systematic conservation treatment, even if not to its full extent. The Foto-Carvalho and MHNC-UP have received little conservation treatment and do not even have a complete inventory. Foto-Estefânia collection is used for research by the Lupa company, and while some negatives have received full conservation treatments, others are still in the original containers. So, a focus is given to the established conservation practice at the CPF (holder of the Fotografia Alvão and APR collections). It is also recognized that Luís Pavão, through his company Lupa, greatly influences Portugal's general established practice, and his general recommendations are also analyzed. It is defended that these practices, although always receiving improvements, were possibly only a good strategy when nothing was being done as an initial strategy. But it has its problems. It awards documental value above all others and neglects the most deteriorated objects regardless of their value. It is then presented recommendations where improvements can be introduced, calling out all involved and all steps in collection management that affect conservation and not just the conservator's role. Finally, it adds to the latter, specifically the role of advocacy, which is already becoming established inside institutions.

Whether recognized or not, retouching is present in all history of photography. Reaching the conclusions, it is shown that what is said about the preservation of retouched collections is potentially encompassing to photographic collections in general. But more so, retouching is not just a bothersome part of the object that the conservator needs to deal with. It has cultural and visual significance, which has been forgotten by the public. It is now, with the conservator as a professional dealing directly with retouched objects, the responsibility to preserve its materiality and significance and to make it known. And this research expects to contribute to it in all its aspects as they relate to preservation, a practice, the photographer's intention, visual culture, history, and cultural heritage.

1. Uses of retouching in the history of photography

Exploring the retouching of negatives gives us a journey in many directions as we search for the "how," the "who," and the "why"; it leads us back in history and to the present day. It takes us to considerations about the visual and the materiality of the photograph, the perception, and the practice, aesthetics, and criticism.

The approach adopted in this chapter is that of a conservator that observes first the object and then searches its reasons. Conservation procedures should start by recognizing the cultural value of the object to be treated. The conservator resorts to history and science to find how the object was produced, with what materials, its uses and evolution through time, and its present conservation conditions. All this information helps the conservator's decision process. As more information he has, the better he can decide the most adequate conservation procedure (The conservator-restorer: a definition of the profession, 1987; Hutchings & Corr, 2012; Orraca, 2010).

This chapter presents the uses and evolution of retouching procedures in history. Firstly, the information was gathered from the more generalist history books like those by Alison and Helmut Gernsheim and Beaumont Newhall. Other relevant authors with different perspectives were consulted, such as Josef Maria Eder, Michel Frizot, Charles Swedlund, Peter Pollock, and Marie-Loup Sougez. For the biographies, John Hannavys's *Encyclopedia of nineteenth-century photography* (2008) was a valuable resource. Also, some of the sources that first announced the news on photography were revisited. And finally, other authors were taken into account that focuses on specific individuals or topics. For example, Bridget and Heinz Henisch's *The painted photograph, 1839-1914: origins, techniques, aspirations*, is a historical account of painted photography and includes some notes on retouching. And Mia Fineman's catalog, *Faking it manipulated photography before Photoshop*, from the exhibition of the same name at the Metropolitan Museum of Art of New York (The MET) in 2012.

To find and understand the origins of retouching and its uses, one needs to go back to the very beginning of the invention of photography in the 1830s and follow it into the present day. As it is with

the history of photography, its origins lie in science and technology. And its evolution accompanies photography, its users, and its practices. As photography grows into a form of communication, an art, a profession, and into its many more uses, retouching is always present. This chapter is not intended to give a full history of the practice of retouching but to give a context and to show the broadness of its related issues. A focus is done, whenever possible, to portrait photography, where the retouching practice is more systematically used. It is also shown that portraits are more extensively retouched, and the used techniques more specific.

The invention of photography

La photographie est l'art de rendre permanentes, par des moyens autres que ceux du dessin manuel, les images perçues dans la chambre noire.
(Potonniée, 1925, p. 7)

Photography is born of coincidence and ingenuity. The knowledge needed for the invention of photography existed already. However, it was the will of many, born in the Industrial Revolution, that ultimately produced it.

The camera

The oldest schematic of a camera obscura that survived to modernity is a solar eclipse record in 1544 (Figure 1.1a). However, principles for the camera obscura exist in records long before that. The history books tell us that, in Europe, the optics of the camera obscura was significantly influenced by the work of Alhazen (born Abu Ali al-Hasan Ibn Al-Haitham 965-1040) and his *Book of Optics*[18], translated into Latin ca. 1200 (Alhazen, 1572). Later, others would describe in detail the principles of the camera obscura, as did Leonardo da Vinci (1452-1519), for example, in his notes and studies on shadows and the human eye.[19] Different types of such devices were made throughout the years to use in science, such as observation of solar eclipses, art, drawing aids, or entertainment. By the time of the invention of

[18] A Latin version, dated 1572, includes Alhazen's work translated of the original work in Arabic ca. 1027. This book also includes work by Vitello (ca.1230-?) that based his book *Perspectiva* on the work of the former (Alhazen, 1572). https://archive.org/details/bub_gb_V27nL0HJd78C/ [Retrieved February 2021].

[19] "71 How the images of objects received by the eye intersect within the crystalline humour of the eye" "72 In practice of perspective the same rules apply to light and to the eye." *The notebooks of Leonardo da Vinci* by Leonardo da Vinci; Richter, Jean Paul (1970, pp. 44-45). https://archive.org/details/notebooksofleona01leon/ It also includes a schematic on the principles of the camera obscura. This schematic appears in the *France Manuscript D* concerning the human eye at the bottom of page 8r. https://www.leonardodigitale.com/en/browse/france-manuscript-d/0008-r/ [Retrieved February 2021].

photography, in the first quarter of the nineteenth century, they were available in different sizes and materials, as pinholes or equipped with lenses.

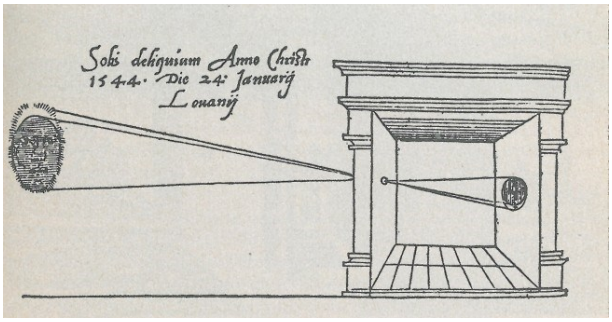


Figure 1.1 – a. First published picture of camera obscura in Gemma Frisius' 1545 book *De Radio Astronomica et Geometrica* (source: Wikimedia Commons).

The knowledge about lenses also existed for centuries but was largely improved in the nineteenth century. With some reciprocity, the improvement of lenses also gained in the years to follow with photography development. A highlight goes to the Petzval lens, invented in 1840 by Joseph Petzval (1807-1891), a mathematician. It was the first lens created for portrait photography specifically and the first based on mathematical calculations. Before this, lenses were mostly produced by trial, error, and experience, and the ones first used in photography were lenses mainly made for other ends. Josef Petzval learns about Daguerre and Talbot's inventions and, with the help of a team of military mathematicians, started to design a new lens. Peter Wilhelm Friedrich von Voigtländer is also credited with the lens design, also known as the Voigtländer-Petzval objective lens (Figure 1.2). It is composed of 4 lenses and had widespread use for portrait photography until the first quarter of the twentieth century, produced and sold by the Voigtländer company (Eder, 1972; International Center of Photography, 1984). Still, in use today, primarily in projectors, astronomy, and cinematography, has had, these later years, a resurgence for alternative photography. This lens's main qualities were almost no distortion and a significant shortening of exposure time to less than 1/10 of the time need with other lenses. It made possible exposure of a few seconds, which meant that "instantaneous" photography was achieved, a necessity for portraits. This lens is sharp, mostly in the center, but has an unfocused effect toward the edges. However, this effect made the center part of the image stand out and became to be appreciated in portrait photography. It is referred to as the vignette effect and was replicated with different approaches in future years. For example, vignetting apparatuses that could be bought or made were used to complement the camera work; the effect is achieved by placing them out of focus. Vignetting could also be achieved by retouching the negative, sometimes complemented with hand-

made masks or adjustable vignetters (Figure 1.3). Today vignetting is a common feature in digital tools for photo editing.

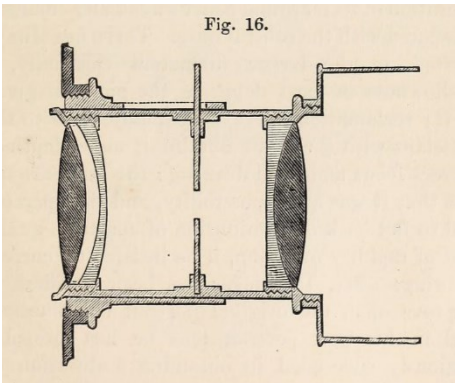


Figure 1.2 – Cross-section of a Petzval Portrait lens (Price, 1868).



Figure 1.3 – a. Vignette-board mounted on a headrest stand (Trask, 1872); b. Advertisement of a vignetting attachment for cameras by Kuhn; c. Salmon's Adjustable Vignetter, to use with printing frames (The British journal almanac, 1891).

The chemistry

That some compounds change with the action of light was also known. When photography was a much-needed and expected invention, several scientists were dedicating research to the properties of different compounds and the action of light. In Europe, the first success toward photography, although limited, came with Thomas Wedgwood (1771-1805). He is the first, known to this day, which tried to make permanent images with a camera using a compound sensitive to light (Eder, 1972; Sougez, 2017). Wedgwood's images needed to be kept in the dark and still soon faded, and none survived. He shared the research with Humphry Davy (1778-1829), that, by the year 1802, published the results in the

Journal of the Royal Institution of Great Britain[20]. The image was finally captured by light but could not yet be made permanent.

The permanent image

At this point, it becomes clear that the pursuit of a permanent light image in Europe was the pursuit of many that worked in collaboration or separately but with knowledge of each other's work.

Nicéphore Niepce (1765-1833), Louis Daguerre (1787-1851), Henry Fox Talbot (1800-1877), and Hippolyte Bayard[21] (1801-1887) are credit as the first to reach the goal of a permanent image. But many others, inventors and scientists, were in the pursuit of the desired light image at the same time. Their findings were presented in meetings and published in scientific journals, which in turn help develop the invention further by others in the following years[22]. In truth, since its birth, photography has not stopped evolving yet.

Sir John Herschel (1792-1871) is another of the names repeated throughout this century. He is credited to have coined this new invention as *Photography* in 1839; of note, he also refers to it as Art.[23] And referring to Talbot's process, he used *positive* and *negative*, terms still in use. However, before that, in

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[20] Davy, H. (1802) *An account of a method of copying Paintings upon Glass, and of making Profiles, by the agency of light upon Nitrate of Silver. Invented by T. Wedgwood, Esq. With Observations by H. Davy* in Journals of the Royal Institution of Great Britain., Physical Society (Guy's Hospital), & King's College London. (1802). London. 170-174 https://archive.org/details/b21299031/page/170/ [Retrieved February 2021].

[21] Bayard did not reveal his invention publicly until after Daguerre and Talbot; for this, he is less mentioned, but his work would influence others as he was not discouraged with the lack of recognition. In fact, in July of 1839, before Daguerre's announcement, Bayard participated in a charity exhibition with several positive prints on paper. Making this the first exhibition with photographs. (Kennel in Hannavy, 2008: 122-125).

[22] A note also to Hercule Florence (1804-1879), a Frenchman established in Brazil in what it is today Campinas. For a long time forgotten, today he is recognized as one of the first. He independently invented photography and use the term "photographie" years before Daguerre and Herschell. He was an inventor with many credits. The lack of printers in the area where he was established inspired him to invent photography and easily reproduce and print drawings and writings. Although he frequently published his findings, the knowledge of his inventions, as we recognize today, was unknown in Europe and did not influence further the development of photography. (Sena A. , 1991; Kossoy, 2009).

[23] Herschel gave a speech to the Royal Society of London on March 14th, 1839, but then redrew his document, only later published by Larry Schaaf (1979). The title of the presentation was "Note on the Art of Photography" it starts with a consideration by Herschel on the term "photography" as the name for the invention "to which it appears to me that the term adopted in the title of this note may on the whole be most appropriately applied." Historians debate why Herschel redrew the manuscript that was lost for a long time. An account of it was published on a note by the Royal Society of London in January of 1843, a collection of texts from 1837 to 1843. However, it is evident in both documents that he was aware of the works of Niepce, Talbot, and Daguerre.

Herschel, J. F. W. (1843). *Note on the Art of Photography, or the Application of the Chemical Rays of Light to the Purposes of Pictorial Representation.* Proceedings of the Royal Society of London, 4(0), 131-133. https://doi.org/10.1098/rspl.1837.0061.

Schaaf, L. (1979). *Sir John Herschel's 1839 Royal Society Paper on Photography*. History of Photography, 3(1), 47-60. https://doi.org/10.1080/03087298.1979.10441071 [Retrieved February 2021].

1819, he experimented with hyposulfite of soda (sodium thiosulfate) and silver halides. Later, when he learns about Talbot and Daguerre's experiments, he suggests using the hyposulfite of soda "hypo" to eliminate the unexposed silver halides, effectively fixing the image and making it permanent[24]. To this day, "hypo" is known and used as a fixative in photography.



Figure 1.4 – Dictyota dichotoma, in the young state; and in fruit, cyanotype, by Atkins (1843), Photographs of British Algae: Cyanotype (Spencer Collection, The New York Public Library, http://digitalcollections.nypl.org/items/510d47d9-4adb-a3d9-e040-e00a18064a99).

It is worth mentioning another contribution from Herschel, for he is also the inventor of the cyanotype, a non-silver photographic process[25]. The simplicity of the process gains to this day users in amateur photography. The cyanotype was used as a simple way to register specimens in science. Most notably by the botanist and photographer Anna Atkins (1799-1871), a contemporary of Herschel, which would become the first to publish a book illustrated with photographs: *Photographs of British Algae: Cyanotype Impressions*, published privately in 1843 (Figure 1.4). Cyanotype was also used to reproduce drawings until the digital age, commonly known as blueprints. However, the blue tint was not so much

[24] Herschel, J. (1819). On the Hyposulphurous Acid and its Compounds. *The Edinburgh Philosophical Journal*, *1*(19), 47–60. https://archive.org/details/edinburghphiloso11819brew/ [Retrieved February 2021].
However, he did not connect this experiment with Wedgwood's, nor he thought to use it himself to fix the silver salt images. After Herschel's suggestion, Daguerre soon started to use the hypo, Talbot resisted, but still, it is known to have used it. And after that used by the others in their processes.

[25] The cyanotype process is a printing process that can be used for contact print from a negative or with objects to obtain their contour. The process is based on a mixture of potassium ferricyanide and ferric ammonium citrate; this mixture is applied on paper and left to dry. On exposure to ultraviolet light, there is a reaction with the salts that result in ferric ferrocyanide (also known as Prussian Blue), which is insoluble in water. The material that did not react with light can be removed with running water, leaving a permanent and stable blue image.

appreciated by professional photographers, and today's collections in archives and museums show that it was less used in portraiture.

Searching for the portrait and the truth

Although first inventors were not seeking to produce portraits specifically, soon, it was the objective.

Nature's mirror

The *Daguerreotype* is credited to Daguerre but started as a collaborative invention with Niepce. After the latter died in 1833, Daguerre continued to improve the technique that would finally be known worldwide. Daguerre's invention's official date was August 1939, when it was announced to the French Academies of Sciences and Fine Arts, and the process was fully described in a publication of the same (Daguerre, 1839).[26]

Following the first successes, Daguerre's research would have two major concerns, speed, and color. Because he did not have the benefits of previous training in science, he developed his research by trial and error. (Pinson *in* Hannavy, 2008, pp. 363-366). He could not crack the color problem, but soon he managed to reduce exposer times from minutes to seconds.

Because Daguerre's invention was in the public domain, in the space of a year, many made replicas and adaptations to the chemical process and the daguerreotype camera.

Voigtländer was one of the companies that started the production of cameras with the Petzval lens, which had a luminosity far superior to those sold by Daguerre. The success was enough for replicas to appear in other countries such as Germany or the United States, where the name Voigtländer was used to identify it. (Hannavy, 2008; Sougez, 2017).

The plate was prepared and exposed in the moment, which meant that sitting for a portrait was a grueling task. The sitter needed to be several minutes under the strongest light possible, which at the time meant the sun, without moving. The exposure time was still dependent on weather conditions

[26] Francois Arago (1786-1853) presents Daguerre's invention officially to the French Academies of Sciences and Fine Arts on August 19, 1839. Daguerre itself had presented his invention earlier in September 1835 but withholding details of the process. (Hannavy, 2008). Arago was a scientist but also a member of the French Parliament's Chamber of Deputies. Before this announcement, he endeavors to obtain a monetary reward for the recognition of the invention to Daguerre and Niepce. Daguerre was also to disclose the process, for which he received more money. Several publications exist from 1839 with the invention's story, steps for its recognition by the government, the process, and some other observations, soon also translated in different languages. (Daguerre, 1839) However, Daguerre patented the invention in Great Britain, which would be, therefore, the only country where the daguerreotype was not free to use.

and time of day. A blue-tinted glass was used over the face to protect the eyes and help them to stay open, and a white cloth all around the studio to intensify light and reduce unwanted shadows. The result was stiff poses and sometimes blurred faces. (Gaudin, 1844, pp. 160-162). In Daguerre's publication, a comment by Susse Frères and an example of an advertisement (Figure 1.5):

> To make the portrait, it is also necessary to have a bright light; and this precaution is all the more necessary when the complexion of the subject is more colored; because here the red is, so to speak, the equivalent of black. We will only be successful by exposing the person to the sun, outdoors, with reflections of white drapery. We could, as Mr. Arago indicated, place a large blue glass pane in front of the person; this will avoid fatigue, which would cause an inevitable blinking; and the blue rays acting most energetically, the operation will not be less quick.[27] (Susse Frères in Daguerre, 1839, p. 88)

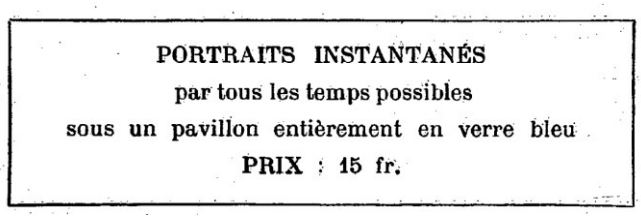


Figure 1.5 – Advertisement, reproduced in *Histoire de la découverte de la photographie* (Potonniée, 1925),.

To relieve the sitter and to restrain movement, headrests were invented (Figure 1.6). Even with subsequent improvements, these headrests would still be in use with the dry plates in the first quarter of the twentieth century.

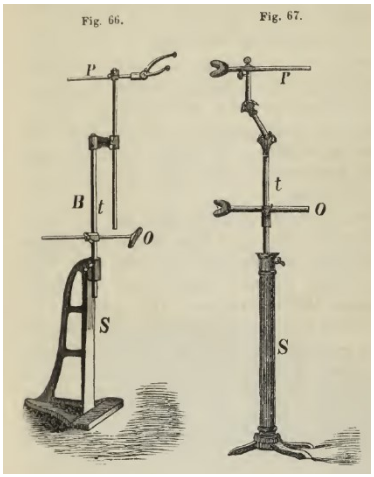


Figure 1.6 – Headrests, illustration in *Lehrbuch der Photographie* (Vogel, 1867).

The Daguerreotype image is still regarded today as one of the most wondrous. The description of "mirror of nature" is a proper one because the image is on a polished silver surface, like a mirror. Also,

[27] Author's translation.

it was usually presented incased with a protective glass that enhances the reflectiveness of the surface. One does not see the image in full straight light but his own reflection (Figure 1.7). And the daguerreotype can only be observed in a particular position. Finally, because it is a continuous silver surface and not a dispersion like the other silver processes, it produces the most detailed image. As Edgar Alan Poe described it:

> For, in truth, the Daguerreotyped plate is infinitely (we use the term advisedly) is infinitely more accurate in its representation than any painting by human hands, If we examine a work of ordinary art, by means of a powerful microscope, all traces of resemblance to nature will disappear - but the closest scrutiny of the photogenic drawing discloses only a more absolute truth, a more perfect identity of aspect with the thing represented. The variations of shade. and the gradations of both linear and aerial perspective are those of truth itself in the supremeness of its perfection. (Poe, 1840 in Trachtenberg, 1980, p. 38)[28]



Figure 1.7 – Daguerreotypes. a. photographed perpendicularly; b. photographed at an angle with shadow from the cover in half the surface. (author's images).

Nature's Pencil

Concurrently, Talbot was developing completely different processes on paper. He started his research inspired by the images of the camera lucida and the frustration in his lacking drawing skills to reproduce the images of nature he observed.

He started experimenting as early as 1834 to what he would call the *Photogenic Drawing* using ordinary table salt, the beginning of what would become known as the *Salt Print* process. He developed different methods to stabilize his images and to make them, after processing, less sensitive to light to prevent

[28] Poe, E. A. (1980). The Daguerreotype, originally published in 1840. In A. Trachtenberg (Ed.), *Classic essays on photography* (pp. 37–38). New Haven, Conn.: Leete's Island Books.

them from darkening or fade as happened with Wedgwood experiments[29]. Later he adopted Herschel's suggestion for using sodium thiosulfate – *hypo* – as a more permanent fixative.

His research continued, experimenting with different silver halides, and in 1840 he noticed what is known as the *latent image*. After a short exposure that left no visible alteration, the latent image was treated with a gallic acid solution that would bring out a negative image. This *developing* step would complete the necessary processing for what he would announce as the *Calotype* in 1841, also known as *Talbotype*.

His images were inverted laterally by the camera and in inverted tones. Talbot would then wax the paper, creating a translucent *negative* that could be converted multiple times to positive, repeating the process by contact printing. For the positive image, Talbot would frequently use the photogenic drawing process instead of the calotype, as exposure time was of less importance.

Contrary to the daguerreotype, Talbot's invention was patented, which limited its uses.

Talbot wrote the *Pencil of nature*,[30] which shows the many uses he envisions for photography. Plate XIV shows three people standing with a ladder (Figure 1.8), the text accompanying the picture digresses on portraiture:



Figure 1.8 – The ladder, plate XVI, in Fox Talbot's Pencil of nature.

> Portraits of living persons and groups of figures form one of the most attractive subjects of photography, and I hope to present some of them to the Reader in the progress of the present work. When the sun shines, small portraits can be obtained by my process in one or two seconds, but large portraits require a somewhat longer time. When the weather is dark and cloudy, a corresponding

[29] To this, Gernsheim mentions that Talbot would be unacquainted with Davy's publication of Wedgwood's work. (Gernsheim, 1969: 75). They arrived at near the same results, with Talbot probably benefiting from the research ideas that were in development by others in his time.

[30] The *Pencil of nature* was published in parts between 1844 and 1846, sometimes referred to as the first published book with photographic images. As mentioned before, Atkins had already published her studies with the cyanotype process a year earlier. Talbot's merit goes for doing the first book with photographic images obtained with a camera.

> allowance is necessary, and a greater demand is made upon the patience of the sitter. Groups of figures take no longer time to obtain than single figures would require, since the Camera depicts them all at once, however numerous they may be: but at present we cannot well succeed in this branch of the art without some previous concert and arrangement. If we proceed to the City, and attempt to take a picture of the moving multitude, we fail, for in a small fraction of a second they change their positions so much, as to destroy the distinctness of the representation. But when a group of persons has been artistically arranged, and trained by a little practice to maintain an absolute immobility for a few seconds of time, very delightful pictures are easily obtained. I have observed that family groups are especial favourites: and the same five or six individuals may be combined in so many varying attitudes, as to give much interest and a great air of reality to a series of such pictures. What would not be the value to our English Nobility of such a record of their ancestors who lived a century ago? On how small a portion of their family picture galleries can they really rely with confidence! (Talbot)

Talbot's reflections on *Pencil of Nature* show that speed was still a concern, although, at this point, the calotype could reach 1/100 of the exposure time of the photogenic drawing. Historical images show that he would resort to some sort of headrest, as seen in Figure 1.9, this one with a hoop instead of the clamp, Talbot himself operates the camera to the right.

Because the calotype and the photogenic drawing have the silver halides deposit directly on the paper support, paper fibers are visible, producing a less bright image, a matte surface, and unsharp definition. So, these processes were preferred for landscape and still life and less for portrait photography.

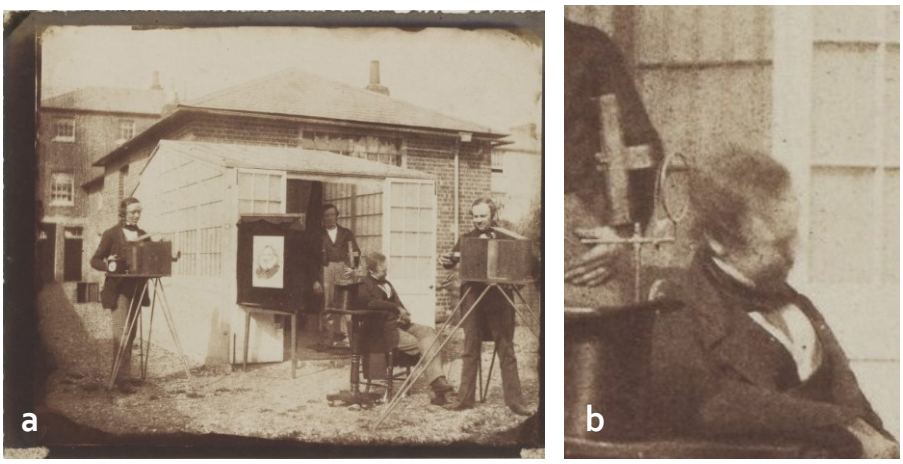


Figure 1.9 – Uses for photography, details from *The Reading establishment* (Talbot's studio and printing firm): a. reproductions and portraits; b. detail of headrest with a loop, Salted paper prints from paper negatives, attributed to Nicolaas Henneman, William Talbot, 1846 (The MET, 2005.100.171.1, .2).

Soon the idea of having a portrait grew and attracted everyone, who could afford it, to the growing number of photographic studios, mostly for Daguerreotypes.

Photography was no longer the practice of scientists and inventors, and being a Photographer became a new profession.

First expectations

When the rumor spread that two inventors had just succeeded
in fixing on silver plates any image presented before them,
it was a universal amazement of which we could not have the idea today,
accustomed that we have been for many years
to photography and jaded by its popularization.
(Nadar F. , 1899, p. 1)[31]

There it was, the will and knowledge put together, optics and chemistry, ingenuity and science. Some saw it as a wonder, as an art. Others quickly realize the possibility of profit.

Nevertheless, in records of the time, we also find many words of opposition. The most expected invention that would be the tool for the truth left much to be desired. The mechanical nature of the process and its harsh capture of the effect of light seem too far from beauty to be considered an art.

In a visual society such as the one today, it is an exercise trying to understand what were nineteenth-century people's reactions.

What was the reaction of a person seeing a photograph for the very first time?

And how did they interpret what they saw in that small object in front of them?

What were the visual references that they used for comparison?

Did it come close to their expectations?

Did they have any?

Many wrote about their first impressions of the new invention. The already mentioned, Edgar Allan Poe, was positively conquered by photography:

> The instrument itself must undoubtedly be regarded as the most important, and perhaps the most extraordinary triumph of modern science. (…) When taken out, the plate does not at first appear to have received a definite impression—some short processes, however, develop it in the most miraculous beauty. (…) All language must fall short of conveying any just idea of the truth, and this will not appear so wonderful when we reflect that the source of vision itself has been, in this instance, the designer. Perhaps, if we imagine the distinctness with which an object is reflected in a positively perfect mirror, we come as near the reality as by any other means. (Poe, 1840 in Trachtenberg, 1980, p. 38)[32]

Contemporary of Poe and one of the most well-known texts of opposition to the new invention's wonders was written by Charles Baudelaire. He writes about his reaction to the *Salon of 1859: The modern public and photography*. This was the first Salon (annual art exhibition in Paris) to include

[31] Author's translation

[32] Poe, E. A. (1980). The Daguerreotype, originally published in 1840. In A. Trachtenberg (Ed.), *Classic essays on photography* (pp. 37–38). New Haven, Conn.: Leete's Island Books.

works of photography. Baudelaire was a critic and, by his admission, exaggerated opinions for the sake of provoking reactions (Shawcross *in* Hannavy, 2008: 119-120). From his famous text[33]:

> The exclusive taste for the True (so noble a thing when it is limited to its proper applications) oppresses and stifles the taste for the Beautiful. Where one should see nothing but Beauty […], our: public looks only for Truth. […] a new industry arose which contributed not a little to confirm stupidity in its faith and to ruin whatever might remain of the divine in the French mind. The idolatrous mob demanded an ideal worthy of itself and appropriate to its nature— […] I believe in Nature, and I believe only in Nature (there are good reasons for that). I believe that Art is, and cannot be other than, the exact reproduction of Nature (a timid and dissident sect would wish to exclude the more repellent objects of nature, such as skeletons or chamber-pots). Thus, an industry that could give us a result identical to Nature would be the absolute of art.' A revengeful God has given ear to the prayers of this multitude. Daguerre was his Messiah. And now the faithful says to himself: 'Since photography gives us every guarantee of exactitude that we could desire (they really believe that, the mad fools!), then photography and Art are the same thing.' From that moment our squalid society rushed. Narcissus to a man, to gaze at its trivial image on a scrap of metal. A madness, an extraordinary fanaticism took possession of all these new sun-worshippers. […] As the photographic industry was the refuge of every would-be painter, every painter too ill-endowed or too lazy to complete his studies, this universal infatuation bore not only the mark of a blindness, an imbecility, but had also the air of a vengeance. I do not believe, or at least I do not wish to believe, in the absolute success of such a wild conspiracy, in which, as in all others, one finds both fools and knaves; but I am convinced that the ill-applied developments of photography, like all other purely material developments of progress, have contributed much to the impoverishment of the French artistic genius, which is already so scarce. […] It is time, then, for [photography] to return to its true duty, which is to be the servant of the sciences and arts—but the very humble servant, like printing or shorthand, which has neither created nor supplemented literature.[…]
>
> What man worthy of the name of artist, and what true connoisseur, has ever confused art with industry? (Baudelaire, 1956, pp. 229-230)

Meeting expectations

Photography was registering reality, but the camera obscura was bound by geometry, and how the light was capture through the lens and the effect inside the camera obscura. Many photography manuals note the changes introduced by the lens and how the same object is distorted from different relative positions to the camera (Figure 1.10).

As lenses got more complex, the simple geometric rules could not give examples to all possibilities described in the first manuals. Later, and even with digital photography, as an exercise, the different images obtained with different lenses, different light, different exposures times, and different apertures

[33] The original text was first published in 1859 divided into four parts between the 10th of June and the 20th of July: Boudleaire (1956), *The Salon fo 1859, Letters to the editor fo the Revue Francaise* in *The mirror of art: Critical studies*, 220-305. https://archive.org/details/mirrorofartcriti00baud/ [Retrieved February 2021].

of the diaphragm. American photographer Andreas Feininger (1906 – 1999), best known for his work for *Life* magazine (active 1943 - 1962), was also the author of several books on photography and in the 1970s, explored more in-depth this issue, that he called, *Photographic seeing* as opposed to the human eye (Feininger, 1973; Warren, 2006). Feininger had included the concept in his earlier books but, for some reason, felt the need to dedicate a book to it. Maybe as an indicator of how the issue was again relevant, and the subject of truth and art in photography was yet again in debate.

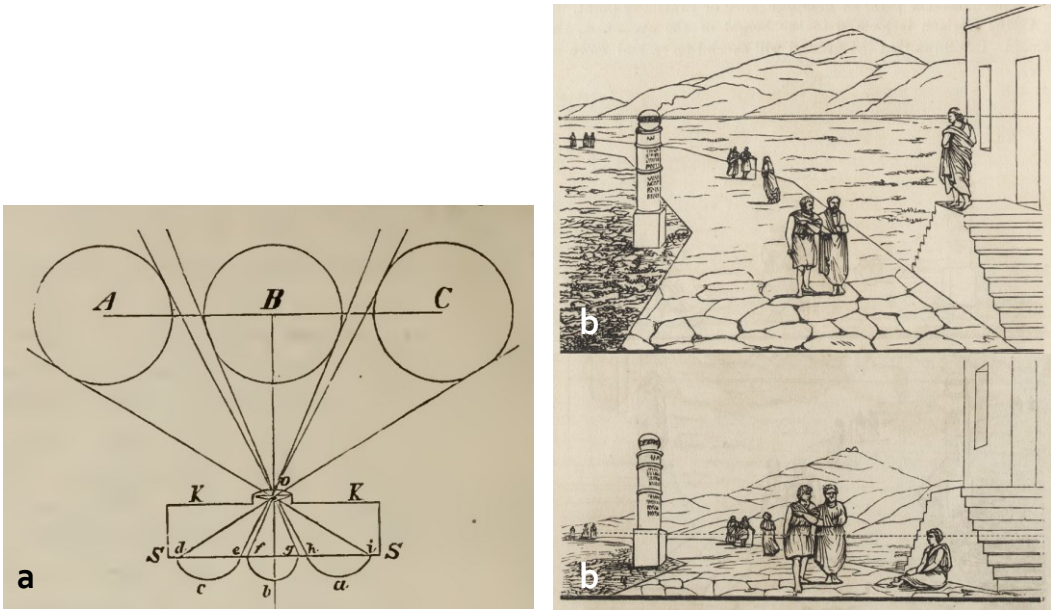


Figure 1.10 – Distortion of objects towards the limits of the image; b. differences of point of view (Vogel, 1870)

Even though the difference between eye and lens was already accepted, what is taken from Feininger's book is that even the purest photographer makes choices, for example, the type of lens, time of day, and what he chooses to include or not in the photographic frame. Photographers can creatively use all photographic variables, such as using a wide-angle lens to purposely introduce deformations or photograph late in the day to take advantage of light and produce an image with warmer tones. Figure 1.11 to Figure 1.13 show examples of how choices can be used to achieve specific effects.

Nowadays, even those that do not know about photography would have seen images in the various media available, all around, in today's society, and accept variations and deformations.

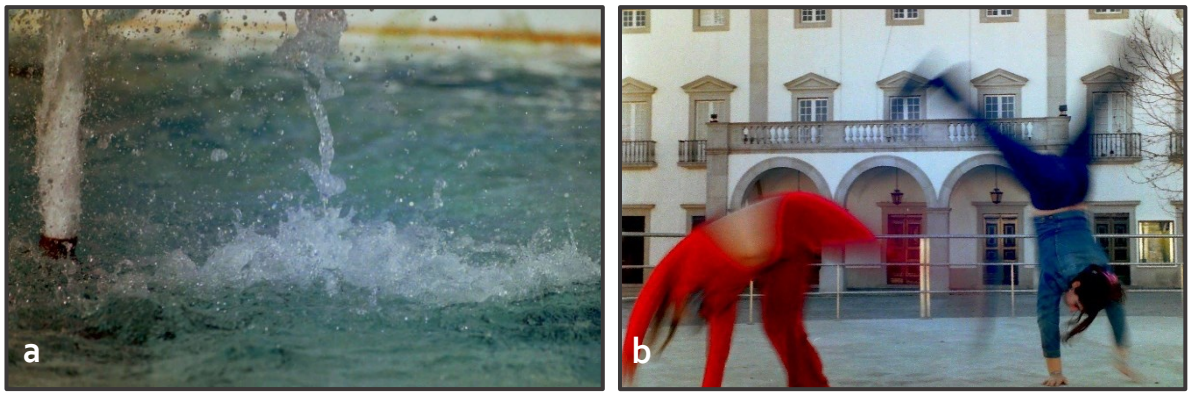


Figure 1.11 – Variation of speed, Theater square, Évora, Portugal: a. Fountain, 1/2000 s, high-speed, frozen movement; b. cartwheels, 1/2 s, slow speed, blurred movement (Author's photography).



Figure 1.12 - Variation of aperture a. Portrait: f6.3, large aperture, shallow depth of field, only the foreground is in focus; b. View of Segovia, Spain: f16, smaller aperture, deeper depth of field, all in focus (Author's photography).

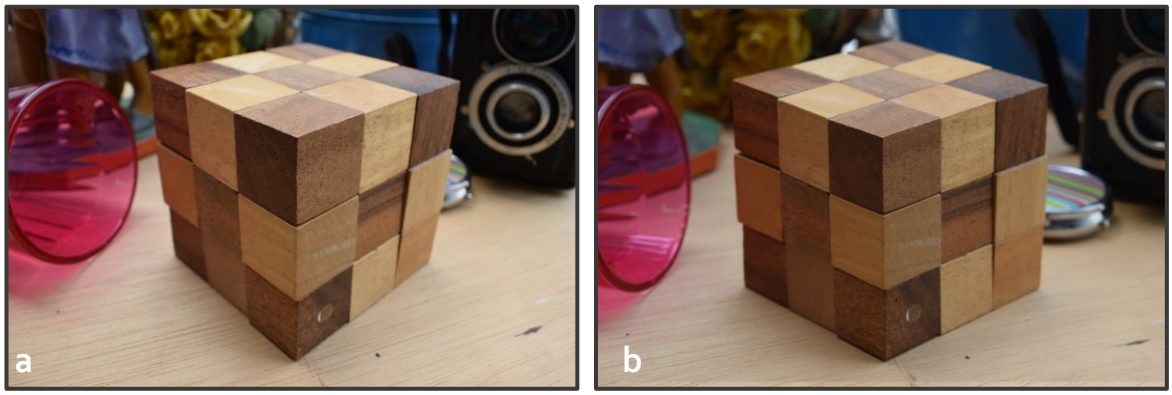


Figure 1.13 – Variation of the lens, composition with a cube: a. 18 mm lens, wide-angle lens, sharp perspective, objects in different planes; b. 55 mm lens, normal lens, corrected vertical lines, apparent smaller distance between objects in foreground and background (Author's photography).

Back in the nineteenth century, the situation was different; people expected photography to be the truth. They drew their expectations from what they knew, probably from paintings or similar. Optical distortions would be challenging to interpret. The knowledge about light, shade, and perspective would exist just for a small part of the society that studied the arts, and even among those, maybe not all would have seen an image through the camera obscura.

Like in Baudelaire's text, many were not impressed or were disappointed with the invention. Even among those that saw all the potential for photography, many recognized its shortcomings in rendering truth. Scientists and those looking to profit from it were the first to point them out and search for remedies.

First Retouchings

By the time you have said three paternosters – if you are still capable –
your face is printed, however ugly it may be
(opinions on Isenring portraits, in Gernsheim, 1969, p. 160)

Many who took up the new art as a profession were engravers, printers, or artists seeking a quicker way to reproduction and they recognized the economic potential of photography. They were particularly hopeful that it would result in a more effortless and cheaper portrait. The daguerreotype, although rapidly expanding throughout Europe and the United States, was none of that. Preparation and exposure times were still too long, and those with less "artistic" sensibility would produce poor results. In history stands out the Swiss painter and engraver Johann Baptist Isenring (1796-1860), the first daguerreotypist in Switzerland. He ordered a camera from France in 1839 and opened a portrait studio in Munich in 1841. Disappointed with the lack of color and the long exposure needed – about a minute – that produced blurriness, particularly in the eyes, he set off to improve the daguerreotype. With soft brushes or dusting, using cut-out masks, like a stencil, he would apply powder pigment and gum arabic onto the surface that would adhere by breathing on the photographic plate. To correct the eyes blurred by movement, he would scratch the daguerreotype surface. He is now credited to have been the first to invent a coloring method to over-paint the daguerreotype. None of his portraits survive, but still, he gets the merit of being the first portrait retoucher (Hannavy, 2008, p. 752; Gernsheim & Gernsheim, 1969, p. 160).

The coloring of daguerreotypes would become common practice. Isenring's process was patented by the British Richard Beard in 1842 and used by many, particularly miniaturists, that having photography as competition, saw in this an alternative for their skills and keep working.

The photographic plate is very fragile, and daguerreotypes are usually covered with a glass and enclosed in a protective case. Coloring over the protective glass can also be found.

The problem of color was a very relevant one. First, because the portrait was in black and white, and second, because the daguerreotype was only sensitive to blue, violet, and ultraviolet light. With blues

registering as white and the reds and yellows would be represented as black. When one sees a daguerreotype with a woman wearing an intense black dress, in reality, it might have been yellow or red or pink. A blue sky with white clouds would be completely white. In portraits, a form to correct or avoid the issue was to recommend a dress code. Gouraud, a daguerreotypist in the EUA as early as 1840, in an article about his work would recommend:

> The chair in which the person sits must be of yellow wood. The person, if a man, must be dressed in a clear gray coat, pantaloons of a little deeper hue, a vest of a fancy ground, either a little less dark or more deep than the coat. The toilet of a lady should be of the same shades, and in all cases black must be constantly avoided, as well as green and red. (Gouraud, 1840 as cited in Henisch, 1996, p. 7)

Despite the recognized daguerreotype's detailed image, portraits, particularly faces, are not as detailed as expected. To this contribute the long exposures, that would result in slight blurring, and the usual mounting system that enhanced mirror qualities and limited direct observation. The future processes would resort to retouching to correct extreme detail in faces as the image showed every wrinkle and fault, but surprisingly this was not necessary for most daguerreotypes. In any case, other more corrective retouchings that would be used in future processes in the negative were impossible on the daguerreotype.

Although with less use in portraiture, Talbot's photogenic drawings are the first to present retouching like those studied here. Because it is a negative-positive process, it is easy to introduce retouches to the negative that, although they change the positive, become otherwise invisible.

No record is known as to who was the first to retouch a negative, but it was probably Talbot himself and if not one of his associates. The earliest known example is a set of negative and correspondent print from 1846 by Calvert Richard Jones (1804-1877), a group portrait of Capuchin friars in Malta.[34] Jones was a draughtsman and painter but soon became an enthusiast for photography. He learned the process from Talbot himself and later learned the daguerreotype process; he also met Bayard, that independently developed a paper-based process. Hoping to sell his work, in an arrangement with Talbot,[35] Jones set out on a trip to photograph the Mediterranean. In his travels, he also meets Reverend George Bridges (1788-1863) that brought news of the Calotype process; the two would produce images of Malta, Italy, and the Holy Land from 1845-46.

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[34] Print and negative were shown in the exhibition *Faking it: Manipulated photography before photoshop* at the Metropolitan Museum of Art of New York, Oct. 2012-Jan 2013, curated by Mia Finneman. Images accessible at https://www.metmuseum.org/art/collection/search/294821; https://www.metmuseum.org/art/collection/search/294818. [Retrieved February 2021].

[35] Jones had even hoped that his images could have been included in the *Pencil of Nature*. None of them were.

Jones had limited resources as photography supplies were hard to obtain in his traveling. Still, he set off with pre-prepared paper from Talbot's studio, and some of the images were also printed returning to Talbot's Reading establishment. In Talbot's correspondence, he praises Jones for his ability to choose and arrange compositions (Barnes *in* Hannavy, 2008, pp. 781-782). Jones's artistic skills might have been behind the retouching of the mentioned Capuchins Portrait. The intention was probably was to arrange the composition. The print show four Capuchin friars, but the negative shows that a fifth existed and was cleverly deleted with Indian ink. The black and opaque effect of the Indian ink in the negative produces a white area in the print that disappears as the background's white sky.

Because Jones did not print many of his images, Mia Fineman suggests that they could have been retouched by Talbot's associate Nicolaas Henneman (Fineman, 2013, p. 4).

The negatives and print presented below (Figure 1.14)[36] are by John Murray (1809-1898). He was a surgeon established in India that continued to use the calotype negatives even after the introduction of the collodion process. He had the eye of a resident and not that of a tourist, and his images show in-depth knowledge of the region and valorization of its cultural heritage values. His retouches show that he was concerned with the aesthetics of the view and that he effort to obtain the image that most resembled his eyes and intention. The first couple of images show a calotype waxed negative by reflective and transmitted light. The image shows the Taj Mahal with the sky completely blocked out with black pigment on both sides of the paper. Even today, it is difficult to register a sky in a landscape depending on weather conditions, at that time, even more so. As mentioned, the blue sky would register white, and clouds in the sky would give an unfocused or faded effect. A common solution would be to proceed, as in this case, the black retouching results in a completely flat white sky that, in turn, makes the subject of the image stand out.

The second example shows the Diwan-i Khas (Figure 1.15), retouched in yellow chromate of potash[37] and gum arabic in the more shaded areas to return values that would be lost in the print, a leveling of tones, as we would do today with digital tools. The sky appears to be also blocked out.

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[36] Images accessed here: https://www.metmuseum.org/art/collection/search/282068 [Retrieved February 2021].

[37] Retouching materials are indicated in the online record for this object. The yellow chromate of potash (potassium chromate) has many uses, including dyeing and printing for textiles (Packer, 1830). Due to its toxicity, it is an unusual choice for an art colorant. One explanation may be that this compound would be known and available to the photographer as an indicator in titrations of silver salts. Titration is a quantitative method for determining the concentration of a substance. Potassium chromate produces a red coloration when free silver nitrate is present in a solution and was used during emulsion preparation to verify silver nitrate's complete solubility (Abney, 1876). Images accessed here: https://www.metmuseum.org/art/collection/search/266025 and https://www.metmuseum.org/art/collection/search/266026 [Retrieved February 2021]

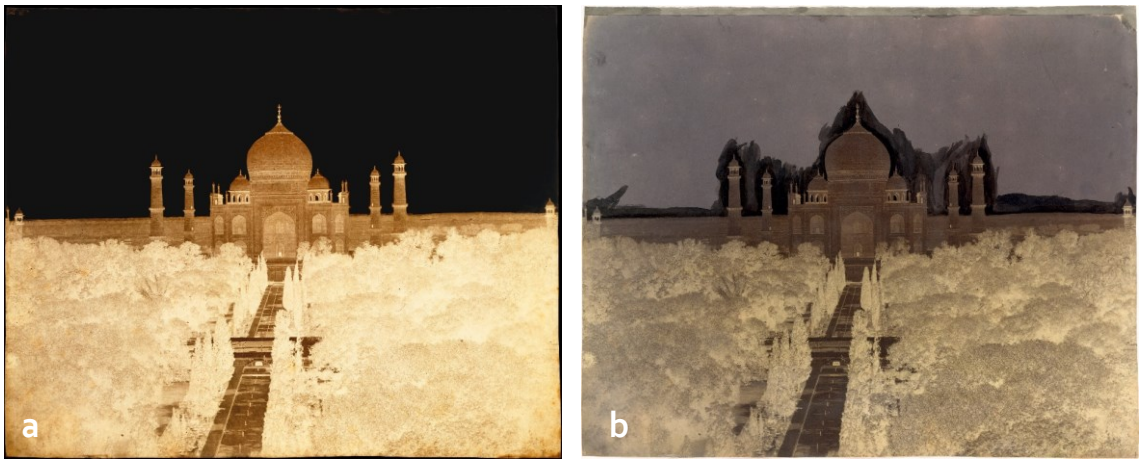


Figure 1.14 - Taj Mahal, and Gardens, waxed paper negative, viewed with transmitted and reflective light, John Murray, c1855 (The MET, 1997.382.57).

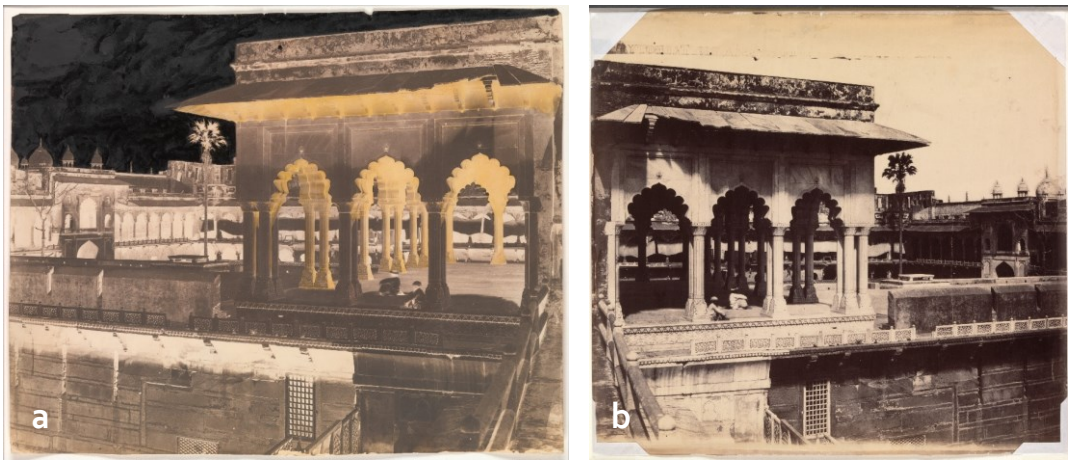


Figure 1.15 - The Diwan-i Khas from the Mussaman Burj, Agra Palace, waxed paper negative and albumen silver print, John Murray,1862-64 (The MET, 1988.1134.1/2).

The credit of first to retouch studio portrait negatives goes to the German photographer Franz Seraph Hanfstaengl (1804-1877).[38] He studied lithography at the Art Academy of Munich. He specialized in the reproductions of art and portraiture of celebrities from Bavaria. He also had a publishing house in Munich dedicated to art reproduction[39]. After 1853 he turned to photography, initially with the calotype. His portraits made him famous across Europe for their quality, at the time said to be unsurpassed. He constructed his celebrity portraits following a similar composition, inspired by the

[38] Josef Maria Eder referring to the invention of negative retouching does not mention Hanfstaengl. Instead, he credits Emil Rabending. He supposedly worked in Vienna in 1860, when it became known that he retouched negatives (Eder, 1972, p. 354; Eder, 1898, p. 6). This may be an Austrian pulling some credit to his compatriots as several sources contradict him.

[39] Kunstverlag Franz Hanfstaengl – active between 1833-1980 - A catalog from 1903 preserved at the New York Public Library registers more than 200 pages of entries to various artworks, mostly paintings from innumerous artists. https://archive.org/details/verlagskatalogv00hanfgoog/ *Verlags-Katalog von Franz Hanfstængl Kunstverlag München...*, Volume 2.

already recognized and established in Painting. The portraits frequently show the individual in 3/4 length, standing or seated with a hand resting on a table or chair; behind him, some drapery and sometimes a column; typically also included an object related to the sitter, like the portraits in Figure 1.16.



Figure 1.16 – a. Portrait of Carl August von Steinheil (1801-1870), astronomer and physicist c1857; b. Portrait of Hans Christian Andersen (1805-1875), writer, 1860; by Franz Seraph Hanfstaengl (source: Wikimedia Commons)

He participated in the Universal Exposition of 1855 in Paris, exhibiting retouched and untouched negatives that earned him a gold medal (Gernsheim & Gernsheim, 1969; Hannavy, 2008).

Other photographers may have retouched portraits before him, but without admitting it publicly. This is how Nadar mentions him, in 1899, and a Portuguese photography journal, an article on the "history of retouching," from 1903:

> However, the retouching of the photos, all excellent and detestable together, like the Language in Aesop's fable, but certainly essential in many cases, had just been imagined by a German from Munich, named Hampsteingl, who had suspended in transparency at the end of one of the galleries of the Exhibition a retouched photograph with proofs before and after the retouching.[40] (Nadar F. , 1899, p. 216)

> The results obtained [with early portrait photography] were regrettable, and the situation of photographers became increasingly precarious, when suddenly, in 1854, it was known in Paris that a photographer of the boulevards had an extraordinary device, unique in the world, that instead of making ugly portraits, even embellished the models. Needless to say, everyone rushed to the studio of the skilled inventor. And it goes without saying that the skilled Inventor did not invent anything. He only imagined retouching; that is, he was the first in France to apply this process, recently discovered by Munich's lithographer, Hanfstaengl. This was made clear the following year, in 1855, in the first

[40] Author's translation.

> Universal Exhibition, the first with photography, Hanfstaengl exhibited in the Palace of Industry the same portraits with and without retouching and even retouched plates, making his process of public domain.[41] (Wurtz, 1903, p. 136)

A new way of seeing

> *Talbot's photographs were faulty, without fineness, rough, with the paper's grain doubled by the printing of the proof positive under negative. Bayard's process was too slow.*[42] *(Potonniée, 1925, p. 212)*

For portraits, besides Potonniée's opinion, the paper prints would attenuate the most criticized extreme detail that other processes would show, where every wrinkle, hair, and blemish was captured. The paper texture would give a smooth look to the skin, the same characteristic that would be sought after in future portraits.

If not by Talbot's patent restrictions, the process might have gained the same notoriousness and more acceptance. The opinions were divided. Some saw beauty and continued using the process long after new processes were available. Others were satisfied with the bright and detailed image of the daguerreotype that matched their expectations.

By the second half of the nineteenth century, photography was no longer the wonder of one's first time seeing the light image captured by a camera obscura. The photographer established himself as a professional, and people could compare results and be less forgiving of the process shortcomings or one less able photographer.

The pursuit of the perfect picture continued. There were obvious advantages with Talbot's negative-positive process that allowed reproducibility. In comparison with the daguerreotype, it yearned for a clear picture. Glass would be the support for the new negative.

Many answered the challenge. To name a few, again, Herschel, but his glass negative was not successful. Another to show results was Claude Félix Abel Niépce de Saint-Victor[43] (1805-1870). In 1847, his process followed similar to the calotype but using glass and an albumen emulsion (from egg whites). Although successful in achieving more clarity, this process was difficult to reproduce, mainly obtaining

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[41] Author's translation.

[42] Author's translation.

[43] Later Niépce Saint-Victor would again be distinguished in history books for his experiments, with Edmond Becquerel's contributions (1820-1891), in color photographs that he called *héliochromie*. He had difficulties fixing the image, and the process was not developed further.

an even coating of the glass. It could not be used in portraiture as it had a low light sensitivity that demanded long exposures.

Meanwhile, in the same year, Louis Désiré Blanquart-Evrard (1802-1872) also experimented to improve the salt print, using an albumen emulsion but on paper. By 1850 he presented his results to the Académie des Science (Hannavy, 2008; Lemagny & Rouillé, 1987). His progress was key. The albumen surface was glossy and smooth, recovering the image brightness. Because this was a layer above the paper support, it was capable of reproducing better the image details and sharpness lost in the salt print's paper fibers. It would be known as *Albumen Print* and quickly became the preferred process – until the gelatin print – and still in use in the first decades of the new century[44].

Frederick Scott Archer (1813-1857) was also in this pursuit. He was a sculptor and knew and was a keen user of the calotype process. Initially, he uses the calotype as an aid to his work as a sculptor. Soon, he started experimenting with glass as alternative support but changing the albumen with collodion[45] (Hannavy, 2008; Gernsheim, 1982). A collodion solution was poured onto a glass surface; while still wet, the collodion was sensitized, exposed, and developed. Because the entire process needed to be done before the collodion had dried, it became known as the *Wet Collodion* process[46]. The plate thus obtained was a negative and could be printed multiple times by different processes.

Gustave Le Gray – mastering light

An avid enthusiast of photography, Gustave Le Gray (1820-1882) would venture beyond the image into chemistry, developing new processes, improving others, and passing his knowledge writing treatises and teaching new photographers. He also experimented with collodion, and some dispute exists to whom did it first. However, Archer published his results, while Le Gray only mentions that he is experimenting without disclosing methodology or successful outcomes. (Gernsheim, 1982, p. 13).

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[44] By the time both processes existed, the choice was that of preference. Albumen prints presented warmer tones that became appreciated, and because of that, some photographers would still use them in later years. The silver gelatin print showed grayer cooler images. The silver gelatin prints are frequently toned or tinted and present warmer reddish-purple tones or other colors such as blue or pink, sometimes misleading in its identification.

[45] Collodion is prepared from guncotton (nitrocellulose) dissolved in a solution of ethanol and ether with potassium iodide. This mixture was available as a dressing for wounds and used in surgery. Schönbein, C. F. (1849). "On ether glue or liquor constringent; and its uses in surgery." The Lancet. 1 (1333): 289-290. https://doi.org/10.1016/S0140-6736(02)66777-7.

[46] The major problem with collodion is that after drying, the developing and fixing solutions could not penetrate it. Because of this, the entire process needs to be over while the collodion is still wet. This meant that a portable laboratory was necessary when photographing away from the studio. Because the collodion is sensitive to water and moisture, the collodion plates, after drying were, usually varnished for protection. The most common varnish was prepared with sandarac gum and alcohol, sometimes with the addition of lavender oil.

Painter and miniaturist before being a photographer, Le Gray would have the artistic eye for capturing emotions, as his famous seascapes testify. His photographs are done as an art object rather than a simple mechanical capture. As he wrote in his treatise in 1854[47], he believed that an artist photographing the same object could render different results, and only the artist could achieve perfection:

> It is mainly in the hands of artists that Daguerre's instrument can achieve a complete result; the artist can value or sacrifice this or other parts, produce a powerful effect of shadows and light, or an effect of sweetness and extreme softness, and this by copying the same view, the same model.
> So it is really only the artist or the man of taste who can surely obtain a perfect work using an instrument capable of rendering the same object with an infinite variety of interpretation since he alone has the intuition of the effect that best suits the subject it reproduces. (Le Gray, 1854, p. v)

As mentioned above, registering the sky was one of the major challenges in landscape photography, and many settled on a flat white sky. That is why when Le Gray showed his cloudy seascapes in his first exhibition, he had enormous impact and accolade from his peers and the general public, existing records mentioning print sales in the hundreds. However, the clouds' dramatic effect was so intense that some doubted that it was an actual record. One such image, titled *Le Brick au clair de lune*, gained notoriety not just when it was first shown but still today, as Le Gray manages to capture the clouds and the sky without overshadowing the sea in one take. Even today, if not a skilled photographer or luck, an image with direct sunlight will only have a dark outline of the elements in the foreground.

Other of Le Gray's seascapes would be accomplished by retouching and double printing. He would create an image with proper exposure for the sea and a second image with the sky's correct exposure. Then he would carefully remove the areas that would overlap in one of two ways. One, in the same way, shone above in John Murray's photographs, blocking out with ink or paper mask the undesired part in each image and then exposing twice the print. Alternatively, scraping the emulsion on the undesired part, creating a transparent section in the negative and then with both negatives together, carefully aligned, expose the print[48].

Figure 1.17 shows that Le Gray reuses the same "clouds negative" for the creation of multiple compositions. Because the clouds are not cut out at the same height, the most probable method used by Le Gray would be that of double exposure masking the unwanted areas with only a temporary mask, possibly using an opaque paper cut-out.

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[47] Le Gray, Gustave (1854), *Photographie Traité Nouveau theorique et pratique des procédés et manipulations…*, Lerebours et secretan, Paris.

[48] With the paper negative, it was even easier to accomplish this by cutting each negative and joining the different parts, creating one negative.



Figure 1.17 – Gustave Le Gray a. Grande lame, Méditerranée, nºn19, 1857 (BnF, reserve FOL-EO-13 (3)); b. Étude de nuages, clair-obscure 1856-57; (BnF, reserve boite FT 4-EO-13 (1)); c. Marine, bateau quittant le port 1857 (Getty, 84.XP.218.71)

Correct exposure was always a problem when the scene had a significant difference in light and shadow areas. Because of this, background negatives with different motifs, like clouds and other effects, were sold to less resourceful or less skilled photographers, sometimes with evident and terrible results. Many photographers would resort to these *Photomontage* techniques throughout the years. However, the overuse and bad compositions by some would be a source of criticism, especially by those clamoring for pure photography, directly from the camera and with the sky from the same moment as the rest of the image.

Roger Fenton – Documenting reality when the reality is faster than the camera

Portraiture and landscapes would rule as photographic subjects in the middle of the nineteenth century. But some photographers would take on documenting reality and current events. For the first time, people did not just hear about events but could see their impact through photography. Most famously, Roger Fenton (1813-1869), a British photographer, and his work documenting the Crimean war (1853-1856) (Hannavy, 2008).

Because the exposure times were still too long for instant photography, Fenton's images mostly depict the aftermath of war. When they include people, they are frequently and visibly staged.

Some debate exists about his most famous image *Valley of the Shadow of Death*, of 1855, because a second version exists showing more cannonballs scattered on the road[49] (Figure 1.18). Many presented hypotheses. For example, it was a coincidence and that the extra cannonballs were simply put there by soldiers that were gathering them to be later recovered. Another theory is that the cannonballs were staged for the photo by Fenton himself or someone at his request. Taking two successive images with

[49] The image is also challenged because the cannonballs are not together as the ones in the center of the image.

similar highlights and shadows would be unlikely. The preparation time of gathering or staging the cannonballs would be enough to change the sun's position. Most likely, it was retouched.

If the cannonballs were added by hand in "postproduction," a simple capture of the retouched negative into another negative is enough to erase proof. However, the retoucher might not have been Fenton and manipulations done back in Britain. Staged or not, the discussion of such images would be revisited frequently and into the present day[50].



Figure 1.18 - *Valley of the shadow of death*, Crimean War, Roger Fenton, 1855. a. with no cannonball on the road (source: Wikimedia Commons); b. with scattered cannonballs, salt paper print 27.6 x 34.9 cm (Getty, 84.XM.504.23)

The Portrait Era – Popularizing photography, pleasing the client, and art.

The front-rank photographers did not stoop to flattery by retouching.
(Gernsheim, 1962, p. 60)

Photography was far from slowing down development, but for a few years, the wet collodion and the albumen print were the standards. Free from patents[51] quickly everywhere, new photographers started the craft either in studios or itinerant with portable laboratories.

The public demanded it, the society wanted another truth, and a new profession was created that of the retoucher. It was no longer the photographer that did the retouching. In a studio, the photographer

[50] The legitimacy of retouchings, particularly in photojournalism and war photography, is still a debate today. One may find some parallels between these and others. One comes to mind during the Iran war of 2008 when one image was presented by Sepah News showing four missiles in the air in the desert. Later, the Associated Press released a second version with only three missiles successfully launched. The first version had been retouched with digital tools for more visual impact, and later it was withdrawn by Sepah News.

[51] Archer never claimed his work for profit with a patent. Talbot, although initially declaring that the collodion process should fall under his patent for the calotype, after the outcome of some lawsuits fell short of his expectations, he did not renew his patent (Watson in Hannavy, 2008).

was responsible for capturing the image with the camera, and sometimes not even that. He would monitor the developing process and finishing steps, like retouching, and supervise the various workers specialized for each step. Many retouchers were miniaturists that had less work since the invention and dissemination of photography. Others learned to retouch as an opportunity for employment in practical courses, taught by established photographers-retouchers, or by studying treatises and manuals on retouching, which started to become popular.

André-Adolphe-Eugène Disdéri (1819-1889)

Following the steps of Daguerre, Disdéri's first endeavors were the daguerreotype and the diorama. Only later, in 1854, he would establish a portrait studio in Paris. With a strong sense of entrepreneurship, he announced and prepared an ample luxurious space, at the time the largest in Paris. His strategy was to develop a quick and cheap product. He patented the *carte-de-visite* format, a card with, on average, 6 x 9 cm with an albumen print[52]. His success was not the card's size but the fact that he would use a single plate in a camera with multiple lenses. One plate could hold eight images done simultaneously or with several poses, producing in one sitting eight copies, and significantly reducing costs. He could also open part of the lenses at different times, obtaining in one plate several poses. Furthermore, he established standard compositions to accelerate the process. Frequently, the composition was the patron standing in full-body images with a curtain in the background, a pillar where the patron could lean, and some other elements like a plant or a table.

Disdéri's contributions were not so much in improving the photographic process but making portraiture something collectible. There is no debate on his images' artistic quality – they were not objects of this kind. Although Disdèri, and others, would start announcing their studios as *artistic* and their work *artistic* photography, the result was not art, to the time standards, and it was more closely to popular entertainment. Self-promotion and a "strategy to boost the status of their profession in the eyes of the public" (Frizot, 1998, p. 108). Catalogs of celebrities were produced alongside those with views from foreign places. Still, to his credit, he established standards in portrait aesthetics.

By the end of the height of the carte-de-visite, Disdéri was poor, a victim of his democratic invention. Photography such as his became a popular item repeated everywhere. Paraphrasing Poe, "everyone (we

[52] Despite Disdéri's patent, the *carte-de-visite* format would be sold by others. The standard card would have the photographer's name or studio appear at the bottom. Although sometimes left blank, the card's back would be decorated, frequently, again with references to the photographer or studio.

use the term advisedly) everyone" in Europe and beyond would see and know what a photograph was. Photographers and photography studios were multiplied. With some, the portrait was just a person sitting or standing, and group portraits, a bunch of people put together. With others, an intention for composition is obvious, and a pose is not just a standard based on older cannons of paintings but had an awareness of light and photographic qualities. The great "front-rank" photographers would go on establishing their portrait aesthetics. These were also the ones privileged to photograph the most prominent celebrities or, in a very modern concept, being a celebrity was to have the privileged to be photographed by them.

Of note, when speaking of a particular photographer, it is frequently in reference to a photographic studio that employed a large staff. Disdéri had over 70 employees to give a response to the increasing public demand. Although scholars usually attribute authorship, of the most famous portraits, to one chief photographer, they also usually agree that for the general public, the portrait was done by another camera operator. Sometimes it is not easy to differentiate images and accurately give authorship because they would follow the lead photographer or learn as apprentices in the same studio. They were no longer the scientist or the aristocrat that traveled abroad and met in person Talbot or Daguerre. This new photographer was a class worker that learned photography in a studio and saw photography as any other profession.

Gaspard-Félix Tournachon – Nadar

It is not possible to write about portraiture without mentioning Félix Nadar (1820-1910). He started as an average painter and caricaturist, but by 1853 he had conquered mastery in the collodion process. He was interested in the distinguished society, not so much royalty or aristocracy but distinguished individuals such as artists or intellectuals. He started to collect portraits with the intention of composing the *Pantheon-Nadar* of caricatures. And his studio became a meeting point to the political and cultural society of his time.

His work is not just recognized by the notoriousness of his patrons. As pointed out by Gernsheim, in the quote above, Nadar was one of the front-rank photographers, by his own right, for his prints' quality and the ability to capture a psychological image of his sitter, establishing aesthetics in his time. Coincidently, and unless Gernsheim's statement was ironic, Nadar's writings and preserved negatives

are testimony that at least some of Nadar's images are indeed retouched[53]. It is known that he had in his employment more than twenty staff members, including "six retouchers of negatives and another three artists to retouch the prints" (Newhall, 1982, p. 69). Discussing Disdéri's carte-de-visite, Nadar would criticize the loss in artistry but, at the same time, was forced to recognize and succumb to it and the demands of the public.

Negatives by Nadar at the Musée d'Orsay show retouching with a reddish ink applied by brush in the dark areas.[54] This was done to attenuate underexposed areas that otherwise would print too dark. The result is not just a balanced image, but it was also possible to enhance details and textures.

Nadar knew about pencil retouching of portraits,[55] but he also resorted to other techniques to attenuate blemish and unwanted features and essentially avoid it. Surviving prints show that he would purposely unfocus the face, creating the same blurriness of the pencil. Figure 1.19 shows Alexandre Dumas and Charles Baudelaire's portraits, visibly out of focus. In Alexandre Dumas's portrait, the lens's blurred effect is complemented by the salt print process, where paper fibers are visible, which also creates visual interference. Finally, the print was varnished, possibly to imitate the glossy surface of the albumen print.

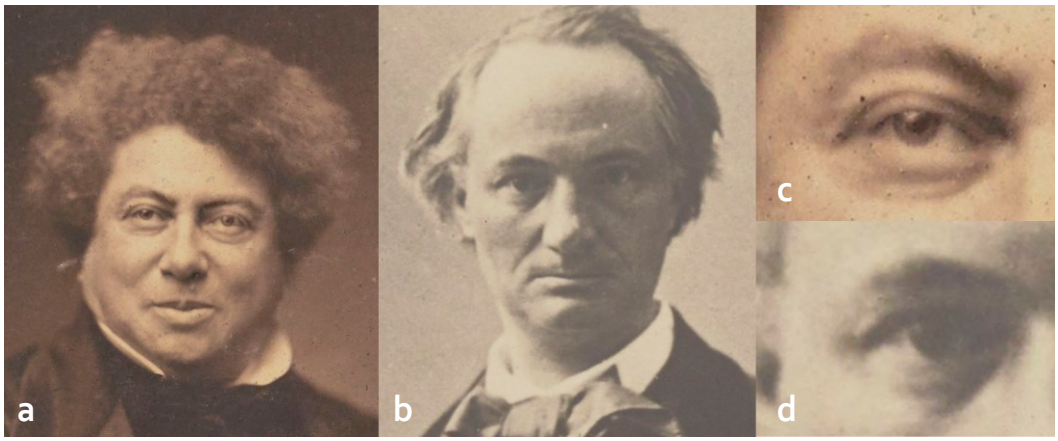


Figure 1.19 – Felix Nadar: a. Alexandre Dumas père, writer, varnished salt print, 1855; b. Charles Baudelaire, writer, albumen print, 1862, c. & d. Detail of the eye showing lack of focus, Félix Nadar (BnF, PET FOL-EO-15 (5); FOL-EO-15 (5)).

[53] Nadar wrote *Quand j'étais photographe* [When I was a photographer], in 1899, where he accounts the introduction of the retouching practice in France by Hanfstaengl [written Hampsteingl]. He is clear in his opinion about retouching practices. He considers it "necessary as much as harmful, detestable as much as essential" (Nadar, 1899: 195). Recognizing this way that he would also resort to retouching when needed.

[54] For example, a known a Gustave Coubert's portrait: Wet collodion negative 11 x 22 cm, Nadar, 1861, identification number DO 1982 57, Museé d'Orsay, retrieved from https://www.musee-orsay.fr/fr/collections/catalogue-des-oeuvres/notice.html?no_cache=1&nnumid=065550&cHash=7b8fc70131 [Retrieved February 2021]

[55] See above *First Retouchings*.

When talking about Nadar, one must remember that they were three family members, all photographers. While Nadar became immortalized by his remarkable artistic portraits, his brother and his son were also keen photographers.

Adrien Tournachon (1825-1860) is Félix Nadar's brother; he was also a painter and was Gustave Le Gray's student. Like his teacher, he aspired to instill into photography the artistic quality even in the common portrait. Of the three, he was the one that worked less time as a photographer.

Nadar's son that, continuing the brand, signed his work as Paul Nadar (1856-1939), would surrender to the business and public demands of a quicker and more serialized portrait with comparatively less artistic aspirations. More inclined to please the general clientele, P. Nadar would retouch more systematically his work, but in his writings[56], he cautions its uses only as a remedy:

> This retouching should only serve to reduce freckles and all the marks of the skin, which, by their color, are made more visible on the print than our eye perceives in reality. Very cautiously used, it can still soften certain features that imperfect lighting sometimes accuses too cruelly.
> In any case, it should never be used except as a complementary means. A bad retouching that will have the effect of removing the resemblance and destroying the whole model of a photograph will give as a final result the most execrable print possible. To this, it will be a hundred times better the print without retouching, with all its imperfections or exaggerations.[57] (Nadar P. , 1891, p. 365)



Figure 1.20 – Paul Nadar: Mss Deveck, test print album, albumen print; b. detail of the face; c. detail of the waist, Atelier Nadar, 1875-1895 (BnF, FT 4-NA-238 (24)).

Retouching was indeed a common practice. This is visible in the preserved books of test prints at the Bibliothèque Nationale de France (BnF). Although Paul Nadar's portraits are sharper in some features, other areas' unnatural smoothness denounced where retouches were done. In the example, Figure 1.20,

[56] Paul Nadar was also director and owner of the *Paris-Photographe,* a monthly journal printed from 1891 to 1894?. That gave news of photography in its day.
[57] Author's translation.

the face is entirely erased of expression lines, meaning a more extensive retouching to smooth the skin. To the author, it seems excessively retouched and the face entirely devoid of its character. However, it is possible that at the time, having a defined cheekbone was considered unflattering, as it was also customary to erase collarbones. Close attention shows that he would retouch even further. In this test print, it is noticeable a strange blurriness around the waist betraying the retouching done to reduce the lady's waist. These retouches were probably done by a retoucher in the studio and not by Paul Nadar himself. Either way, they give insight to standards of beauty of the time.

Jean Laurent – Exporting portraiture to Spain

In Spain, we witness differences and similarities in the aesthetics of Jean Laurent's (1816-188?/189?) photography. He was born in France but moved to Madrid in 1843. He would only start as a professional photographer in the mid-50s when he opened a studio. He became one of the most influential photographers of his time in Spain, especially for his campaigns documenting landscapes, architecture, and the cities and country's modernization. The catalogs also included a significant number of views from Portugal and artworks from Prado and other museums. His catalogs were sold in Spain and Portugal but especially abroad in London by the Marion Co., and in Paris, where he had his own gallery.

Laurent is known to have employed a large number of studio workers and several other photographers, most notably José Martínez-Sánchez (1807-1874), recognized as one of the first Spanish great photographers (Hannavy, 2008; Pérez Gallardo, 2007). Other employers were his son-in-law and stepdaughter, Alfonso and Catalina Roswag[58], that would continue the studio after Laurent's death.

His notoriousness also rose as the Spanish Royal Family's portraitist, and he would include from 1861-1868, the title "Fotógrafo de Su Majestad la Reina" – Photographer of Her Majesty the Queen – in the signature of his photographs.

He also produced a catalog of celebrities' portraits[59]. Laurent's architectural photographs are acclaimed for his technical quality. However, most of his studio portraits are simple commercial products, with repetition of known poses and lack of attention in composition, that were sold mostly as collectibles

[58] Alfonso Roswag publishes the catalog *Nouveau guide du touriste en Espagne et Portugal, Itinéraire Artistique* [New guide of the tourist in Spain and Portugal, Artistic itinerary] of 1879. Roswag describes in his prologue the production of five thousand photographic plates to produce a summary of all artistic and picturesque aspects of Portugal and Spain. This catalog is a testimony of Laurent's interest in documenting cultural heritage http://bdh-rd.bne.es/viewer.vm?id=0000000199.

[59] The portraits presented standardized poses and were sold primarily as collectibles continuing the trend set by Disdéri.

continuing the trend set by Disdéri. Figure 1.21 presents examples of portraits by Laurent. The first example shows a studio group portrait with each sitter in a different pose, all typical of the time. Like a *collage*, they are put together, disconnected from each other. It results in a disorganized portrait, a composition that draws our attention to the nonfigurative element, the empty chair in the center[60].

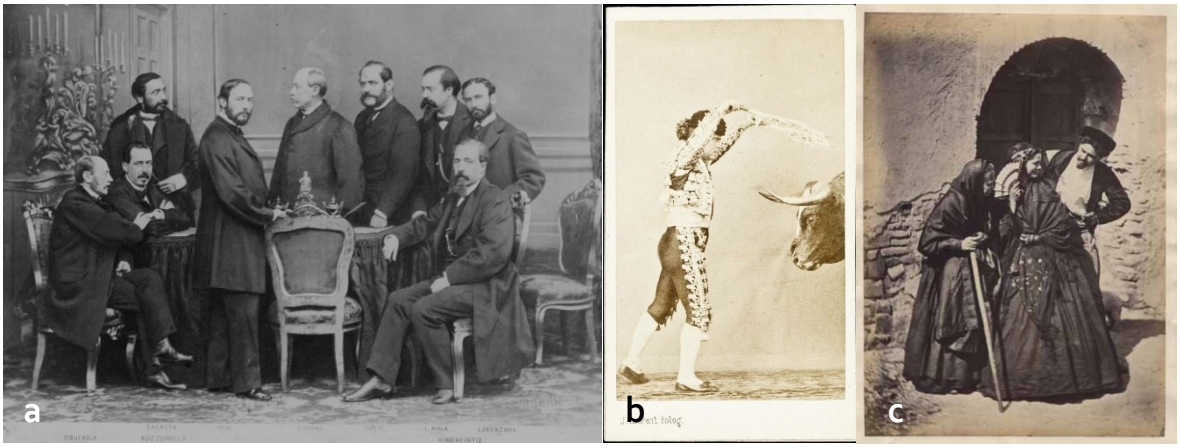


Figure 1.21 – J. Laurent: a. Provisional government, carte-cabinet (tarjeta Americana), 1868 (source Wikimedia Commons) b. Villaviciosa, bullfighter, carte-de-visite, albumen print, 1861-63 (IPCE, SB-0105); c. The conversation, albumen print, 1862-1870 (Navarra University 002014. BD FFF).

Some of the celebrity's studio portraits are dramatized, for example, a bullfighter posing as if preparing to stab the bull with the *Banderillas* (Figure 1.21b). But again, with no special attention to artistic composition. The third example is a different portrait on the exterior (Figure 1.21c). This one has a more careful composition, as the photographer is not depicting a specific individual for a quick carte-de-visite, but makes his interpretation of a cultural portrait of the common people of Cordoba. Resulting in a more interesting portrait as the artificial framing by the doorway in the background focuses our attention on the movement by the two younger elements. And the older woman, slightly lining "through the door" to observe the couple. The aesthetics and composition of the studio portraits may have been influenced by public demand. People expected their portraits to look like those seen before, leaving little room for the photographer's artistic license. Also, the studio portraits may have been done by other studio operators copying models and following demand.

[60] Portrait of the Provisional Government, 1868. All nine provisional government members are present in this photo, so probably, the chair does not represent a missing member. Although the order and the position of some suggest an intention, our focus is drawn away from the central individual, the new president as a pyramid, or a round table. The main focus is the chair and the figure standing next to it; in a matter of opinion, of course, this denounces a lack of a deliberate composition by the photographer.

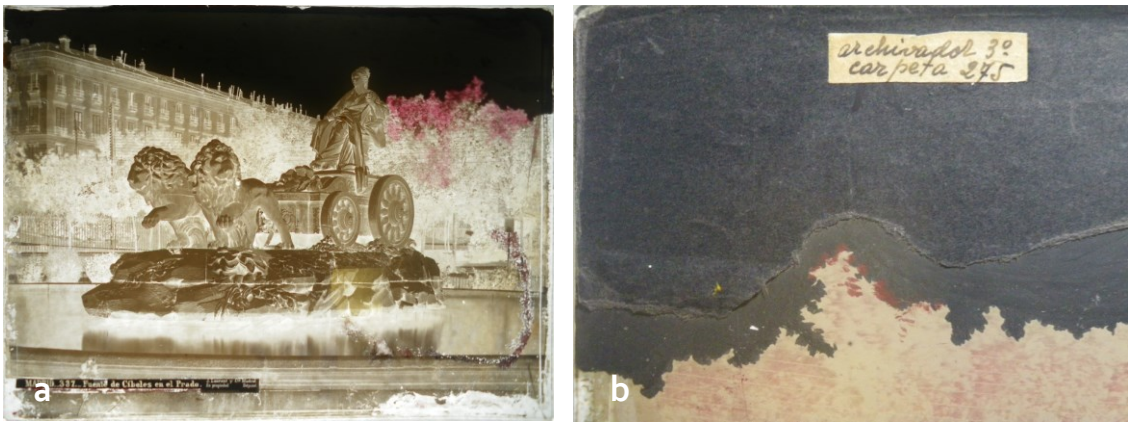


Figure 1.22 – a. Cíbeles fountain in Prado, Madrid, collodion glass negative with applied media, J. Laurent & Cª (IPCE, VN-00215); b. detail showing black paper and ink mask and retouching with red ink, and original identification tag.



Figure 1.23 – Philippines exhibition 1883, Igorretes, Tinguianes and bulls, Retiro park, Madrid collodion glass negative, Jean Laurent; a. Digital positive, from the original negative; b. negative viewed with transmitted light showing retouching with red ink; c. Emulsion surface with varnish area; d. Enhanced digital positive, with pencil marks in white (IPCE VN-01567)

All of Laurent's photography is intended as commercial products. As a result, the purpose of retouching observed in Laurent's images was to achieve technical perfection and not artistic expression. Instead of artificial clouds, Laureunt's images have white skies. Many of his exterior photographs have been retouched by blocking the sky with a mask of opaque black paper, and black ink was also used, surrounding the details. Some more detailed retouches were done to correct tone values and sharpness. Figure 1.22 shows a negative of the well-known Fountain of Cibeles in Madrid with a blocked-out sky

and red ink on the background trees to correct the dark tones. It is also visible, in the right corner, retouching with red ink. Probably not original, but a later restoration to correct a loss in the emulsion. The second example (Figure 1.23) is titled *Igorrotes, Tinguianes, Carolino y Negrito*[61] it is an image done for the Philippines exhibition at the Retiro park in Madrid in 1887. The details show one of the oxen's head with a round smudge, where the retouching varnish was applied in preparation for retouching with a pencil. The ox was blurred because, contrary to people, it could not be asked to stay still. In the enhanced digital positive, the pencil marks are the white lines. The negative is also completely covered with red ink on the glass surface, visible in transmitted light. This reduces intensity in the background and more contrast to the human figures that are not covered by the ink.

Carlos Relvas – A very professional amateur photographer

As Micheal Gray points out, the history of photography in Portugal seemed to have forgotten Carlos Relvas (1838-1894), but this was like the French forgetting about Nadar or the British forgetting Fenton (Gray in (Relvas & Museu Nacional de Arte Antiga (Portugal), 2003, p. 73). After an intensive restoration of Relvas' photographic studio and archive, he is now recuperating his most deserved place in photography history.

From a noble family with considerable wealth, Relvas could dedicate his time to the practice of photography as a hobby rather than an income source. Albeit a rather expensive hobby. He would always be a peculiar amateur that ran his studio as a business and employed studio workers and models. Of his interest in photography, aside from portraiture, he also explored other subjects, as many as they were at the time. He photographed in stereoscopy, and he made photographic records of national monuments, landscapes, and the customs of Portugal. He was a member of different international photography societies such as the Société Française de Photographie and Die Photographische Gesellschaft Wien. He participated in several photography exhibitions, both national and international, including the Vienna World's Fair in 1873, when he wins several recognitions and a silver medal.[62] His name is mentioned by international authors, such as Léon Vidal (1879)[63] and Alphonse Davanne

[61] Igorot, literally meaning mountain people, is a common designation of various ethnic groups in the Philippines, and so is Tinguianes. The animals Carolino and Negrito are water buffalos indigenous to the Philippines called "Carabao."

[62] Various sources mention that he also participated in the Paris Universal Exposition in 1876 (Relvas, 2003; Hannavy, 2008). However, Paris' exhibition was in 1878, and the one in 1876 was in Philadelphia.

[63] This particular text, Vidal, L. (1879). *Traité pratique de phototypie ou Impression à l'encre grasse sur une couche de gelatine*, It describes a photographic process by Relvas, an adaptation of the Jacobi's process. It also includes a reproduction of a portrait by Relvas identified as "Phototypie de M. Carlos Relvas, de Collga (Portugal)" (Vidal L. , 1879, pp. 222-227).

(1885).[64] Evidence of a communicating international photographic community and the recognition of his inventiveness and contributions to the development of photography.

Relvas was not just another photographer. Free from the pressure of selling his work, he would photograph his portraits mostly in large format instead of the carte-de-visite. The preserved archive shows that, although he used the wet collodion process, later, he would also photograph with the silver-gelatin process, which becomes known, in opposition, as the dry plate process.

He photographed his family, friends, and models that he would arrange in picturesque poses, but it is evident from the surviving negative archive that his favorite model was himself.

The negatives show systematic retouching, but as seen in these digital reproductions, nothing beyond the normal, this is, without exaggeration. Retouching was used to compensate for the lens's unforgiving sharpness to wrinkles, movement, strong shadows, and pink faces.

The photographic process of Relvas, including retouching, remains to be studied. The extensive preserved archive awaits the opportunity to show the work inside the studio and what motivated such a unique photographer.



Figure 1.24 – Carlos Relvas: a. Self-portrait, digitally converted positive from stereoscopic collodion wet plate negative, 1868/9 (Source Wikimedia Commons); b, Peasant; c., Cattle; Instantatnée, phototypie C. Rlvas Phot. Amador Gollegã Portugal; illustrations in Traité pratique de phototypie (Vidal L. , 1879).

The original retouching

Besides the retouching of negatives and prints, a third kind of "retouching" would be pointed out by various authors. Instead of the laborious work that manual retouching demands, photographers would just remove an unwanted element or add another.

[64] The text by Davanne was the result of a conference organized for the inauguration of a new statue in honor of Nicéphore Niepce. The statue was made by subscription, and Davanne mentions contributions by Relvas, Vogel, Laurent, and others (Davanne, 1885, p. 29).

This third kind of retouching – third to the retouching of negatives and prints – effectively changed the image, but unlike negative retouching did not leave any evidence on the object. Only a very keen eye could identify it, and because of that, it generates less discussion and less controversy.

As celebrities' portraits became a commercial success, photographers noted that artists would be the most gracious sitters for their ability to express emotions but also for the use of props and make-up for emphasis. Hermann Wilhelm Vogel (1834-1898), a photo-chemist, also wrote on this:

> The ladies of the stage have other means at their command to cover such shortcomings. They are in reality the inventors of a third kind of retouch, which, to distinguish it from positive or negative retouch, we have called the original retouch, as it is with paint, poudre de riz, and rouge, applied on the person itself, and at present this kind of retouch is in many of the Berlin ateliers (not only by ladies of the stage) practiced with good success. (Vogel, 1871, p. 303)

This attention to retouching was not only for portraiture or when the photographer needed to please his client. The original retouching was also done outside the studio. The photographer would stage his scenes to adjust to long exposures or to arrange a better composition. L. Whitney Standish (1919?-?), an American architect, photographer, president of the Boston Camera Club (1939-1942),[65] and writer noticed:

> We have heard of the photographer who goes out to take landscape pictures armed with a saw, ax, and shears. There is a man who knows the value of eliminating the wrongly placed line. Many a time when composing a picture that looks pretty good and yet is spoiled by a tree branch or similar object in the wrong place, I have been tempted to follow suit and buy myself a sturdy set of such "retouching tools." (Standish, 1949:108-109)

The same way he could choose, position for the lights, use a filter, the lens, the direction where to point the camera, exclude or include different aspects or features, or even the many ways to develop and mount a print. At the turn of the twentieth century, discussing yet again truth, art, and the legitimacy of retouching, Steichen remarks:

> Ye Fakers
> It is rather amusing, this tendency of the wise to regard a print which has been locally manipulated as irrational photography—this tendency which finds an esthetic tone of expression in the word faked.
> A manipulated print may not be a photograph. The personal intervention between the action of the light and the print itself may be a blemish on the purity of photography. […] But long before this stage of conscious manipulation has been begun, faking has already set in. In the very beginning, when the

[65] Biographical elements retrieved from Peterson, C. A. (2012). *Pictorial photography at the Minneapolis Institute of Arts: history of exhibitions, publications, and acquisitions with biographies of all 243 pictorialists in the collection.* Privately published. http://www.luminous-lint.com/app/photographer/L_Whitney__Standish/A/

> operator controls and regulates his time of exposure, when in the dark-room the developer is mixed for detail, breadth, flatness or contrast, faking has been resorted to. In fact, every photograph is a fake from start to finish. (Steichen, 1903, p. 48)

The many choices differentiate one photographer from another, one photograph from the next. It was called "original retouching," "the best retouching," or "the third retouching." Sütterlin, a Polish author of a retouching manual, refers to choosing the proper lighting system, lens, filters, and using the "right photographic material" as "optical retouching" (K. Sütterlin. (1968) *Retusz* [retouching], Warsaw, as cited by Seweryn, 2015, p. 59). For those who used it and admitted it, retouching the negative was just another way, another type in the many manipulation options the photographer had to obtain his imagined images.

Oscar Gustav Rejlander – Art and reality

Picture making instead of picture taking
(Gernsheim, 1965, p. 162)

Oscar Gustav Rejlander (ca. 1813-1875) studied painting before becoming a photographer, and painting, mostly classical themes, would influence his way of conceiving photography as an art. Born in Stockholm, he would establish in England as a painter and miniaturist. He learns about the collodion process with Nicolaas Henneman[66] and starts as a photographer ca. 1852. After that, he has a prolific career, albeit almost forgotten by the time of his death. Besides producing photographs, he wrote essays on photography and taught others (Hannavy, 2008).

Le Gray obtained great results combining two plates for his seascapes, others followed, but Rejlander pushed the technique to new heights. His most recognized work, *The two ways of life* (1857), combines images from over thirty separate collodion plates. The method was similar, each negative was prepared by blocking-out the unwanted parts with black ink, and then the print was done by multiple exposure. To modern viewers might escape us the difficulty of such endeavor. This was not like paper negatives that one needs just to cut and put together like a jigsaw puzzle. There was no "undo" tool like in digital editing tools. This image was obtained with great effort, preparation, and vision. At least three versions exist – probably as many as there were copies[67] (Figure 1.25).

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[66] Mentioned before, Nicolaas Henneman was a Talbot' associate, head of the photographic printing establishment in Reading.
[67] These exist in different institutions, but little is written about that, finding but a mention from Gernsheim (1982: 38). He knew the versions presently at the Victoria & Albert Museum (V&A E.25-2014), and the one belonging to the Royal

When it was first shown, it gave rise to must controversy. Even later, historians would be divided into the praise and criticism of Rejlander's work[68]. The greatest impact at the time was the nude women figures included by Rejlander, inspired by classical compositions. But, as photography was established on the principle of reality, some had difficulty accepting nudity as artistic allegories, even if accepted in painting. For them, the reality was that these were just *real* naked women.

Others criticized the composition itself. Interestingly the lack of Rejlander's success with this composition would be its detachment from reality.[69] When Le Gray had used the technique to correct a technical difficulty, his images remained realistic. In a way, even when photographs were admittedly done by compositions or photomontage, to be accepted, they needed to be, if not realistic, at least plausible.

Rejlander would dedicate the rest of his life to portraiture, although his interest was not the traditional studio portraiture but composing allegories. His work stands out, especially for introducing humor, capturing human emotions, and portraying people as they were. If old and dirty, then they would be "old and dirty." His images are arranged compositions to express an idea or narrative, notably influenced by his painting background (Spencer, 1984). In these portraits, he stopped using a more "artistic" retouching. Instead, his images show that he would purposely capture his sitters unfocussed, and in this way, avoid more visible defects and the need to retouch. Also, being more an allegory, it was better accepted the flaw, wrinkle, or messy clothes.

Photographic Society collection (V&A RPS.1641-2017) is the one that is reproduced in his books. Gernsheim only mentions that he found differences in the two versions, without specifics. There is another version at the University of St Andrews Library (EPM-OR-1), accessed online. Some parts of the image are not correctly aligned, noticeably the arm of the standing female figure, to the left (Figure 1.25b). https://collections.st-andrews.ac.uk/workspace/individual/544183 [Retrieved February 2021]. The most striking in the versions, from the University of St Andrews Library and the Royal Photographic Society, is that the central figure resembles Rejlander himself. The second one at the V&A shows instead, what it seems, a younger man with a black beard. Also, in the central duo, the woman covering her head appears to be a different woman. The V&A possesses a study for this duo that does not correspond exactly to either but similar to the one included in the V&A 2nd version (V&A, RPS.1417-2017) https://collections.vam.ac.uk/item/O1394585/artists-study-two-women-reclining-photograph-rejlander-oscar-gustav/. A conclusion might be that the composition was not permanently arranged and that each copy would suffer changes. More than a change of mind, the differences in composition might have been necessary. The print was too big to handle (78,6x40,6 cm original size) and could not be done as one piece, and some parts could have deteriorated before another copy was made.

[68] Going through some of Alison and Helmut Gernsheim's texts, it is evident that their position is against all interventions in photography after the camera work. When writing about Rejlander's *The two ways of life,* they stand, undoubtedly, against it. Still, the historians that defend Rejlander usually praise him more for the rest of his work.

[69] Not so coincidently, the discussion on realism was also happening in other arts at the time in France, extending into the turn of the century and other Western countries. In photography, reality was linked to truth, which meant representing nature.



Figure 1.25 – Rejlander: *The Two Ways of Life*, a. large composite photograph – two albumen prints joined along a non-regular line; b. detail showing misalignment in one of the woman figures, 1857 (University of St Andrews, EPM-OR-1).

Others would use this photomontage or composite photography technique, but with less artistic intentions reuniting pantheons of notorious contemporaries. The first known example is George Washington Wilson's (1823-1893) *Aberdeen portrait groups* ca.1857. Others were set as curiosities like *Les Jambes de l'opera* (the opera's legs) by Disdéri (Figure 1.26). And books were written explaining how to play with photography like *Photographic pastimes* by Hermann Schnauss (1891), *Photographic amusements* by Walter Woodbury (1896), or *Trick photography* by Richard Penlake (1906)



Figure 1.26 – a. *Aberdeen portrait group no.2*, a montage of photographs of Aberdeen notable people, George Washington Wilson & Co, ca. 1852-56, (University of Aberdeen GB 0231 MS 3792/A3255X); b. *Les Jambes de l'opera*, photomontage, albumen silver print mounted on a card, A. Disdèri, ca. 1862 (Getty 84.XD.428.12); c. Head on plate and ghost, by J. H. Crabtree (Penlake, 1906, fig. 20,23); d. Doble-pose (Schnauss, 1891, p. 53).

Canada - Unusual group portraits and snow inside the studio

In Canada, it would stand out the work by William Notman (1826-1891). A Scottish established in Montreal in 1857, as other photographers of his time, he opened a photographic studio. He also did commission work documenting modern engineering constructions, landscapes, and customs photography. With a strong sense of business, Notman would successfully open several studios both in

Canada and the United States. His later work would present the same composition work but changing to the silver-gelatin emulsion, the dry plate process.



Figure 1.27 – William Notman: a. Macduff family, composite, wet collodion glass negative, Montreal, QC, 1874; b. Yale College S. C. Class group, composite, wet collodion glass negative, 1872 (McCord Museum II-11119, I-73371)



Figure 1.28 – Topley Studio: a. Mr. A. L. Burgess, studio portrait, glass plate negative, 1876; b. detail showing cleverly placed "snow"; d. Dry plate negative with fake snow drawn directly on the emulsion; e. detail from a page of the studio's book of proofs (courtesy Elspeth Jordan, Library and Archives Canada, 3477493, MIKAN no. 3497071).

His specialty was composite photography creating scenes depicting events or group portraits (Figure 1.27) by photographing each person separately – an unrealistic way to do a portrait but guaranteeing that everyone was the best possible and in focus. Also well-known are his over-painted photographs, either painted by him or others, most distinguished John Fraser, a water-colorist with training from the Royal Academy in England. (Henisch, 1996).

William James Topley (1845-1930) was Canadian-born. He started working with tintypes[70], but in

[70] Tintype or ferrotype is another process using the collodion emulsion, a cheaper brother to the ambrotype, but on a metal plate. The plate is previously lacquered in black, and the image is a direct positive. The tintype did not usually have the same mounting system as the ambrotype or daguerreotype but frequently would be enclosed in a paper mount.

1864 joined as an apprentice to William Notman. He would be the one to manage Notman's branch in Ottawa, and in 1875 he opened a studio in his name. Specialized in portraits, he photographed the Ottawa society.

Preserved at the Library and Archives Canada is a collection of more than 150000 items of Topley's studio archive. Some show curious snow composites obtained with cleaver retouching and masking – Figure 1.28. These exemplify how some photographers contradicted Disdéri's standard poses. A portrait was frequently constructed by setting light and poses and creating "impossible" environments with retouching and other ingenious techniques.

Henry Peach Robinson – The *Pictorial Effect*

[The artist] must keep strictly to the truth of nature – that is absolutely imperative – but he may select the best and most picturesque nature he can get.
(Robinson, 1892)

Henry Peach Robinson (1830-1901) started as a self-taught draughtsman and painter. Later became interested in photography, opening a studio in 1857. Thrived as a photographer, Robinson has a place in history also for writing treatises and manuals, the most well-known entitled *Pictorial effect in photography* (1892).

Robinson's most recognized photograph, *Fade Away* (1858), is a composite of five negatives. He had learned composite photography with Rejlander (Frizot, 1998, p. 191). But unlike Rejlander, his picture sets a realistic composition. The use of different negatives is comparable to Le Gray before him, capturing each part with the best exposure for the intended effect. *Fade away* is set as an interior scene, and at the center is an open window that creates a high contrast between inner and outer light. Using different negatives was the solution to what would be otherwise impossible to achieve. Even after artificial light, or today with digital photography, this composition or photomontage process, joining images with different exposures, is a common practice. At the same time, this composition is meant to capture a psychological and *emotional light.* Unlike Rejlander that wanted to show how photography could be art by imitating classical themes, Robison would work with light to give emotion and art to photography.

With Robison, it is recognized the beginning of a movement that assumed the role of establishing photography as an Art. It would be coined, like Robinson's book, *Pictorialism* (c1891-1910). In the twentieth century, photographers would still pursue this play on light and emotion, with different

methodologies and photographic processes. In Europe and North America, many would devote work to pictorial photography, for example, England – Alfred Horsley Hinton (1863-1908); France – Robert Demanchy (1859-1936) and Constant Puyo (1857-1933), EUA – Alfred Stieglitz (1864-1946) and Edward Steichen (1879-1973), Germany – Heinrich Kühn (1866-1844); Portugal – Domingos Alvão (1872-1946) and San Payo (1890-1974); Spain – Antonio Cánovas "Kaulak" (1862-1933), to mention but a few. Posthumously also recognized by artists and historians, Julia Margaret Cameron (1815-1879).

In the beginning, to elevate photography to an art form, these artists draw inspiration from painting. They borrowed themes and compositions, and some tried to reproduce different textures, particularly with pigment-based photographic processes, to achieve the effect of a drawing. While Rejlander and Robinson used photomontage, this technique was less used by later artists. Defending artistic license versus reality, photographers would use every tool and technique available to create their photographs. In the first quarter of the twentieth century, artists would reject the comparison with painting and aspire to consecrate photography as an art by its intrinsic photographic characteristics.

For pictorialists, the issue of photomontage divided opinions among artists. When Rejlander abandoned the experiments with photomontage, he would strongly criticize it and the use of retouching (Robinson, 1891:118).

As pictorial photography developed, retouching also became just another photographic manipulation, part of the artistic process.

Gelatine – the last emulsion

> *But a few years ago gelatine was only known to photographers as one of the substances used to mount their prints. At a later date it became of greater importance as one of the chief sensitive agents in the carbon, or, more properly speaking, the pigment printing process. To-day it promises to replace collodion as the medium or vehicle for forming the sensitive layer of the glass plate for use in the camera; and, if we may venture on a prophecy, tomorrow it will replace that plate, and become itself the transparent support of the sensitive medium.*
> *(A visit to Messrs. George Nelson, Dale and CO.'s gelatine manufactory, 1880, p. 353)*

As popular, the collodion processes became to be, and the daguerreotype before that, these were laborious methods that limited the photographer's work. As before, scientists continued researching ways to improve photography, but also professional photographers were adapting methods to their specific needs. The goal of many was to obtain an emulsion that could be prepared in advance, a *dry* process. Another motivation was to achieve a profitable process, a ready-made product. The

professional photographer was evolving, but the market was also in the rising number of amateurs. Many photographers also gave classes, and studios offered various services to the amateurs like printing, framing, or retouching (Figure 1.29). In the last quarter of the nineteenth century, amateur photographers represented a significant part of the business for studios and photography supplies companies.

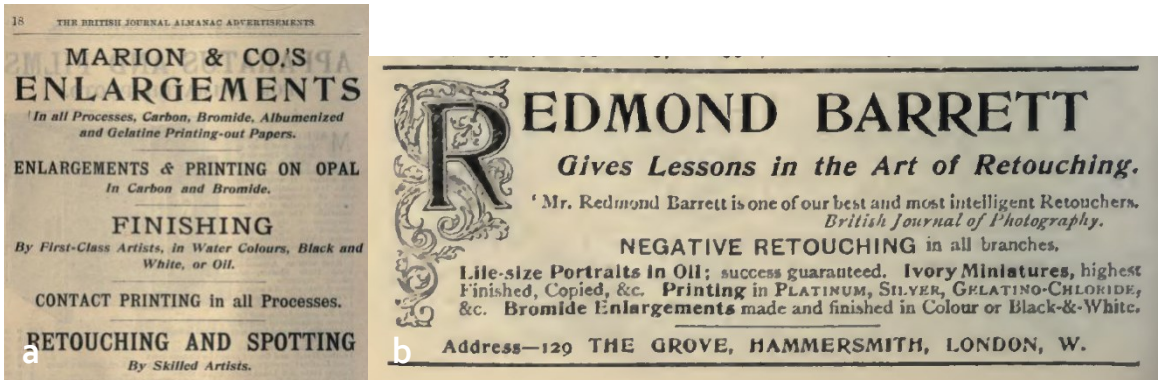


Figure 1.29 – Retouching services: a. Marion & CO. advertisement including services of "retouching and spotting by skilled artists" (The British Journal Almanac, 1880); b. Personal advertisement by Redmond Barret for retouching lessons (The British Journal Almanac, 1898).

In an attempt to improve the wet collodion process, dry versions were tried, and different additives were tested, such as honey, beer, or rum (Ward in Hannavy, 2008). Continuing to use a glass support, the dry collodion, as the albumen, proved to be inferior replacements. What was gained in preparations was lost in longer exposures. The solution would be gelatin[71], the "last emulsion" that is still in use to this day. The sights were set on profit, and many set out to produce a commercial product. Unlike the ones before, this new process was not the result of one researcher or inventor, and not exactly a collaboration. History would record that the most significant advances came from small experiments done for personal use by Maddox and Bennett.

Richard Leach Maddox (1816-1902) was a physician that already used photography to document

[71] Gelatin or gelatine is a protein derivate of collagen extracted primarily from animals' skin, bones, or connective tissue. From this period, it is frequently found the mention of "Nelson's gelatine." This was not food-grade gelatine but a more purified version made particularly from buffalo and ox's skin, produced by the Geo. Nelson, Dale Co. It was known to exist three commercial versions explicitly produced for photography, the No.1, No. 2 and Nelson "X." They were particularly praised for the consistent quality and causing fewer defects during the photographic process. The production existed until the late 1960s. (*A visit to Messrs. George Nelson, Dale and CO.'s gelatine manufactory*, 1880) [Retrieved February 2021] https://archive.org/details/britishjournalof27unse/, http://www.mirrormist.com/george_nelson_dale_and_co.htm.
The Nelson no.1 is the gelatine mentioned in Maddox and Bennett's experiments published in the British Journal of Photography.

organisms under the microscope – microphotography. As an enthusiast of the technique, he set out to improve it, especially the image's speed and quality, most needed for his work with live microorganisms. Reportedly, Maddox was concerned about the toxicity of the chemicals used and the effects on his health. In 1871, he wrote a paper about his experiments using gelatine as an alternative to collodion[72]. However, he was not satisfied with the result, and he timidly justifies the publication as a possible inspiration to others. He writes a rather humble paper that might explain why he was seemingly forgotten for some time and the authorship of the invention disputed. He would be recognized and rediscovered after a decade, when the process was already established as a substitute for the collodion (Eder, 1972, first published in 1881).[73] According to Maddox:

> The collodio-bromide processes have for some time held a considerable place in the pages of the British Journal of Photography, and obtained such a prominent chance of being eventually the process of the day in the dry way, that a few remarks upon the application of another medium may perhaps not be uninteresting to the readers of the journal, though little more can be stated than the result of somewhat careless experiments tried at first on an exceedingly dull afternoon. It is not for a moment supposed to be new, for the chances of novelty in photography are small, seeing the legion of ardent workers and the ground already trodden by its devotees, so that for outsiders little remains except to take the result of labours so industriously and largely circulated through these pages and be thankful. […]
> As there will be no chance of my being able to continue these experiments, they are placed in their crude state before the readers of the Journal, and may eventually receive correction and improvements under abler hands. So far as can be judged, the process seems quite worth more carefully-conducted experiments, and, if found advantageous, adds another handle to the photographer's wheel. (Maddox, 1871)

Not much is known about Charles Harper Bennett (1840-1927). Still, his contributions recorded on The British Journal of Photography (BJP) in 1878 were the breakthrough needed to allow the gelatin to become the elected emulsion. On March 29, answering readers' requests, Bennett describes the process that he had used to obtain some images left on display earlier that month at the BJP headquarters. In his text, *A Sensitive Process*, he explains that he was able to increase sensitivity by heating the emulsion for several days[74]. That same year the BJP prints various interventions challenging

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[72] "An Experiment with Gelatino-Bromide," *British Journal of Photography*, Sept 8, 1871, 422. Reprinted in 1903 in a special publication on the obituary for R.L. Maddox that died the year before in British Journal Almanac. And in 1954, a facsimile in the Image Magazine.

[73] Josef Maria Eder (1855-1944) first published *Die Geschichte der Photographie* [The history of photography] in 1881, crediting and establishing recognition to Maddox. Eder was an Austrian photo-chemist and historian, with much credit himself for advances in photography, particularly to the gelatin dry plate process and dye sensitization (Canossa, in Hannavy, 2008: 428,469).

[74] This becomes a crucial step in the preparation of the bromide-gelatin emulsion known a *ripening*. It had similar or better results, but most importantly accelerated the process. Later the ripening process was altered, decreasing time and increasing temperature.

Bennett's accomplishments and many testifying their legitimacy. Images from Bennet were left on display at the BJP that could be carefully analyzed. Records in the BJP of that year refer to images obtained at night, with artificial light or freezing movement in conditions not known possible to do with the wet collodion. In November of the same year, Charles Bennet is elected as a member of the Photographic Society of Great Britain. The BJP highlighted Bennett's achievements in separate entries from 1878:

> Mr. Mawdsley stated that it appeared to him that Mr. Bennett's remarks at the previous meeting had been imperfectly understood by some of the members. The view of the interior of an artificially-lighted room then exhibited had been obtained in the camera on a dry gelatine plate. He had been present when Mr. Bennett was operating, and could testify to the extreme sensitiveness of his plates. (April 12, BJP, 1878, p. 175)

> The negative is fully exposed, and an application of a magnifying glass shows very plainly the drops of water trickling down upon the flowers from a jug held on high by the lady whose portrait is taken in this unusual position. The picture is a great triumph for dry-plate photography. (May 17, BJP, 1878, p. 238)

> In the practical applications of dry plates the wonderful results obtained with gelatine plates are chiefly noticeable. The process formulated by Mr. Charles Bennett, while bringing in nothing of a specially novel nature, combines so completely all the best qualities of gelatine as to place his process far ahead of all others (December 27, BJP, 1878, p. 611)

Capturing colors – Ortho- and Panchromatic emulsions

These new plates were still not sensitive to the entire visible spectrum and still more sensitive to the blue and ultraviolet light. Hermann Wilhelm Vogel[75] (1834-1898) achieved critical improvements to correct this issue with his dye sensitization research.

Vogel was a photochemist who did his Ph.D. dissertation in photography theory and the properties of silver halides and light. His interest in photography ruled his entire career. As a researcher, he holds many "firsts" in the history of photography in Germany, and will be referenced repeatedly throughout this text. He was a professor in photochemistry at the Berliner Gewerbeakademie – The Commercial Academy of Berlin, later Technical University – where he introduced photography as a field of study. Among his many students was the photographer Alfred Stieglitz. Vogel also participated in various photography expeditions and exhibitions. He left an important legacy in written books on photography.

[75] Vogel also joined the race to conquer the desired dry plate. He experimented with a mixture of gelatine and collodion in hopes of obtaining the best of both compounds as he felt that the bromide-gelatine emulsion, known at that time, decomposed too quickly, took a long time to dry, and would peel-off easily. (Vogel, 1883).

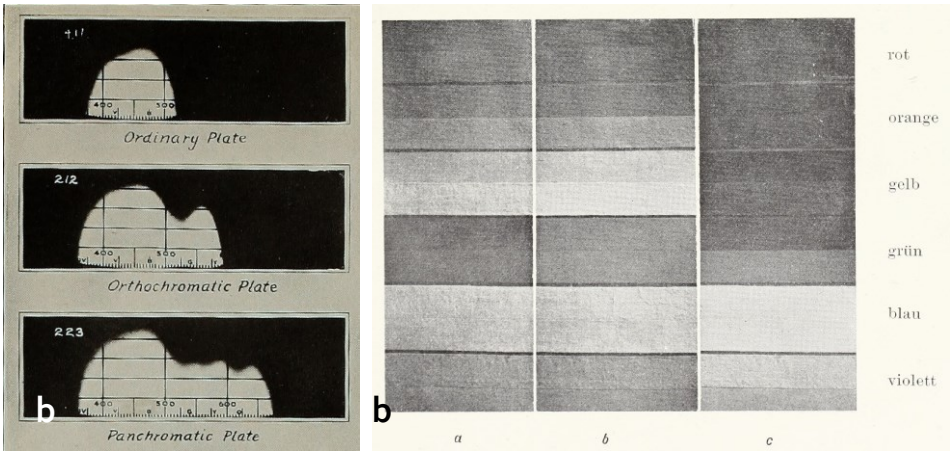


Figure 1.30 - Spectrograms showing the regions of color sensitiveness of the three types of dry plates[76] (Walters & Davis, 1921, p. 352); b. Color chart composed of intensely colored wool stripes, "The images were taken with the same exposure times without a filter, a on pinacyanol bath plate, b on pinachrome bath plate, c on ordinary plate The low sensitivity of the pinacyanol for green is clearly expressed at a." (Vogel, 1906, Plate II).

In 1873 Vogel experimented with dye sensitization.[77] By adding different dyes to the collodion, Vogel noticed that the emulsion became sensitive to other wavelengths. He accomplished finding dye combinations to improve sensitivity to yellow, green, and even orange and red. Many others contributed to this field, like E. Becquerel, Major J. Waterhouse,[78] or J. M. Eder,[79] to name a few (Hannavy, 2008; Gernsheim, 1982; Vidal, 1891). The plates sensitive to all the wavelengths were called panchromatic – from the Greek *pan* and *chromatic*, meaning *all* and *colors*. Some emulsions were prepared only with some of the dyes to "correct" the emulsion rendition of color tonal values but still insensitive to the red light. These plates are called orthochromatic[80] – from the Greek *ortho*, meaning *correct*. This was ultimately practical. While panchromatic plates needed to be processed in complete darkness, the orthochromatic plates could still be processed in the darkroom, with the typical red light. Figure 1.30a shows the absorption spectra of the different emulsions type. Designating it *chroma* was

[76] The letters V, B, G, Y, O, and R indicate the colors—violet, blue, green, yellow, orange, and red. They are placed at the center of the region recognized as being occupied by these colors. Beyond the violet and the red are the invisible rays, called ultraviolet and infra-red. All photographic plates are sensitive farther out into the ultra-violet than is indicated by these spectrograms. The cutting-off of the ultra-violet is due to the glass used in the optical system of the spectrograph. A glass lens, such as is ordinarily used in a camera, has the same characteristic. (Walters & Davis, 1921: 352).

[77] Other researchers wrote on Vogel's experiments, declaring them erroneous. Only in 1874, E. Becquerel demonstrates that Vogel's results were in did correct experimenting with chlorophyll. (Vidal, 1891; Gernsheim, 1982)

[78] Waterhouse experiments with Eosin: Photography Journal, January 15, 1876, *The action of Eosin on photography of the solar spectrum.* (Vidal, 1891; Gernsheim, 1982).

[79] Josef Maria Eder experimented with erythrosine and filters to achieve the orthochromatic effect of the dyes, proving once again Vogel's findings (Vidal, 1891; Gernsheim, 1982).

[80] It is also referred to as isochromatic, from the Latin *iso*, meaning *equal*. Ortho- and iso- would be used to identify similar plates, depending on the source or manufacturer.

maybe a naïve exaggeration as the emulsion would still reproduce only shades of gray, and the same about this correctness. Figure 1.31 shows examples of orthochromatic photography where color tones are visibly not so correct. Unless, like with these images, there are objects with known colors, this characteristic cannot be identified by simple observation.

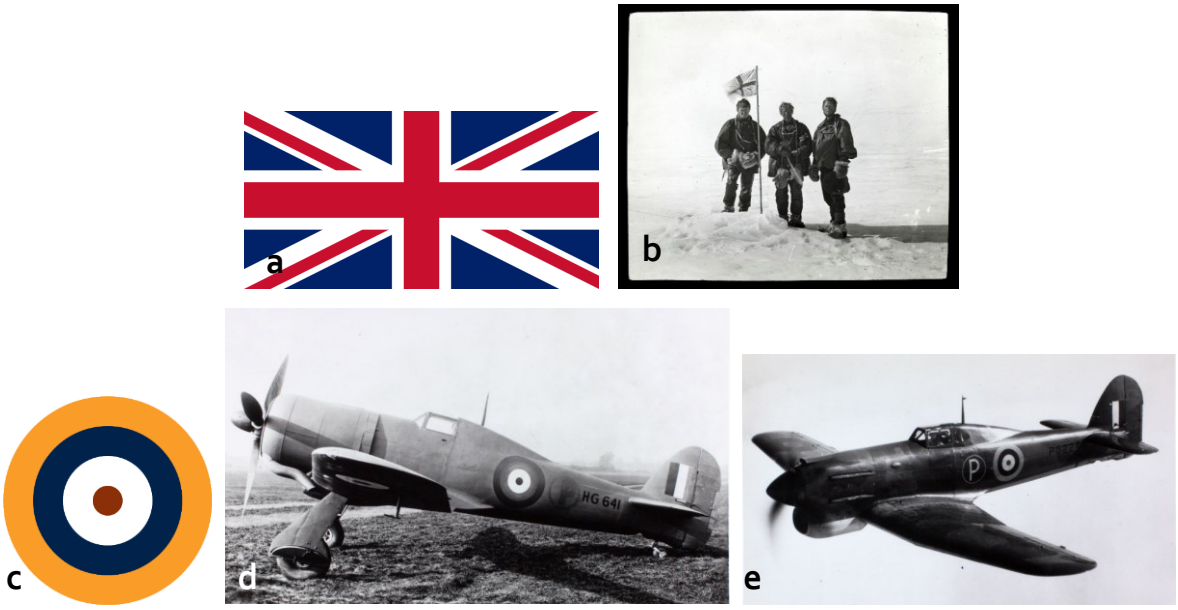


Figure 1.31 – a. Union Jack or the Union Flag, the official UK flag; b. Explorers around flag planted at Magnetic South Pole, lantern slide, 1909 with Union Flag (State Library of Victoria H90.31/35); c. Color reproduction of 'Type A.1' RAF roundel; WW II British Hawker Tornado exhibiting 'Type A.1' RAF roundel: d. orthochromatic emulsion, e. panchromatic emulsion (San Diego Air and Space Museum Archive, 15_002600, 15_002598)

Its generalized use would come with the dry plate. The dye sensitization was adopted and made available by companies by mass-production of ortho- and panchromatic plates with many variants.

Not all plates of the same type (pan or ortho) had the same composition or properties. Slight variations existed according to the manufacturer, and one company could produce plates with different sensitivity for various conditions by adding different dyes. The examples in Figure 1.30b were obtained from emulsions using pinacyanol and pinacrhome dyes. These are cyanine dyes that are used to prepare panchromatic emulsions sensitized to the entire visible spectrum. The image demonstrates that, comparatively, and although showing sensitiveness in the reds, pinacyanol is less sensitive to green. The resulting emulsion would be less suitable for landscape photography, but it would be a property less relevant for studio portraits. Different dyes can also change other properties like contrast or speed. Using one or another could be for the experienced photographer a matter of personal choice, not just for the type of work but as an aesthetic preference.

Since the 1860s, companies offered premade photographic plates but with small successes. In 1879 in

the town of Ilford, UK, Alfred Harman would start production of photographic plates, at first by hand, using a teapot, later with mechanic coating. By the turn of the century, it would adopt the town's name, and the Ilford name is still a reference for photographic films and related products to this day (Hannavy, 2008). The company would also publish a comprehensive book, *The Manual of Photography,* reprinted several times in 10 editions, the latest from 2011.

Numerous companies would emerge in different countries and many with significant presence into the twentieth century. Each company would have its version of the dry plate in a variety of products. Among others stands-out: Agfa, created in Germany, in 1873; the Société Lumière, established in 1884 in France, that would commercialize "l'étiquette bleue" orthochromatic plates since 1890; and the Gevaert & Cie. in Belgium from 1894 (later it would become the Agfa-Gevaert company). In Figure 1.32 it is visible the description of the plates by different manufacturers using iso- and ortho-, and pan- prefixes.

John Clayton and Tailfer, following Waterhouse's experiments with eosin, would produce the first isochromatic gelatin plates commercially in 1883. Panchromatic plates would be available in the first decade of the twentieth century. Manufacturers would have their secret recipes with varying dye combinations, and some would be more or less sensitive to specific wavelengths. For example, E.J. Wall, in his book *Photographic facts and formulas* (1924), lists more than 260 different plates used in America. For example, from this list, 22 are from Ilford, including five types of film. A second list, mostly German manufacturers, lists almost 200 different plates and films (1924, pp. 55-69).



Figure 1.32 - Dry plates from different manufactures: Agfa "isochrom platen," Société Lumière "Plaques au gélatino-bromure d'argent," and Ilford "Press ortho plate" and "Panchromatic plates." (images by the author and Wikimedia Commons).

Professional photographers would adopt the dry plate process and buy the premade plates that would stay in use long after introducing flexible films and, in some cases, as late as the 1950s. The camera's conversion from wet to dry plate was simple, mostly changing lenses and shutters apt to the new speeds. Delaying new investments in equipment might be one justification for the prolonged use of the glass plate. Later the cellulose-based films were also produced in the same plate sizes, said sheet film, but the

film's thickness meant more adaptations to the plate camera. Finally, the inertness of the glass plate would be preferred for scientific purposes by some until the digital, as in aerial and astrophotography[81].

The democratization of photography

In the United States, a revolutionary and visionary change would occur. This time, not because of a new improvement to the photographic process but entrepreneurship that would set worldwide democratization to photography.

George Eastman (1854-1932) was but a bank clerk in Rochester that started photography as a hobby with the wet plate process. He learned about the dry process when he subscribed to The British Journal of Photography in 1878, which included Bennet's article. By 1879 Eastman had patented a coating machine. In 1880 he would start producing the dry plates that he would sell at first through another company. Less than a year later, he got an investor, and the Eastman Dry Plate Company was born. However, his initial breakthrough success was, in 1884, producing a paper-based film that would relieve the photographer from carrying the weight of the glass plates. In 1888, he would introduce a camera that anyone could use and the slogan that goes with it: "You Press the Button, We Do the Rest," the Kodak Camera (Figure 1.33).

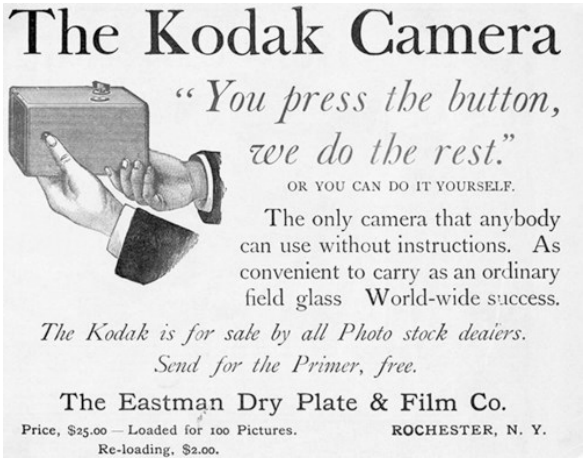


Figure 1.33 – Advertisement for the Kodak Camera, The Eastman Dry Plate & Film Co.

Kodak, a made-up word by Eastman, was registered as a trademark that same year, and, after 1892, the name of the company also changed to Eastman Kodak Company. It eventually established other

[81] Cellulose films are more sensitive to temperature and humidity variations, which impacts dimensional stability, affecting measurements. Later, the more stable polyester film also became an option.

branches in the United States, and, in 1891, a factory in England would supply the European market. And by 1888, for 25 dollars, anyone that could afford it could be a photographer[82] without knowledge of physics, chemistry, and without a darkroom.



Figure 1.34 – Advertisements Kodak cameras, from Kodak catalogs (1900, 1914, 1908).

Kodak introduced the first transparent film in 1889, which would allow the birth of the motion picture. And, in 1900, the Kodak Brownie camera had a cost of 1$ and used a film that could be inserted with daylight, meaning by the user, for 15 cents a roll. This camera was specifically marketed to women, *The Kodak girl*, and advertisements were also made in special editions for children (Figure 1.34). After that, photography was in reach to virtually everyone, and *Kodakists*[83] were found everywhere.

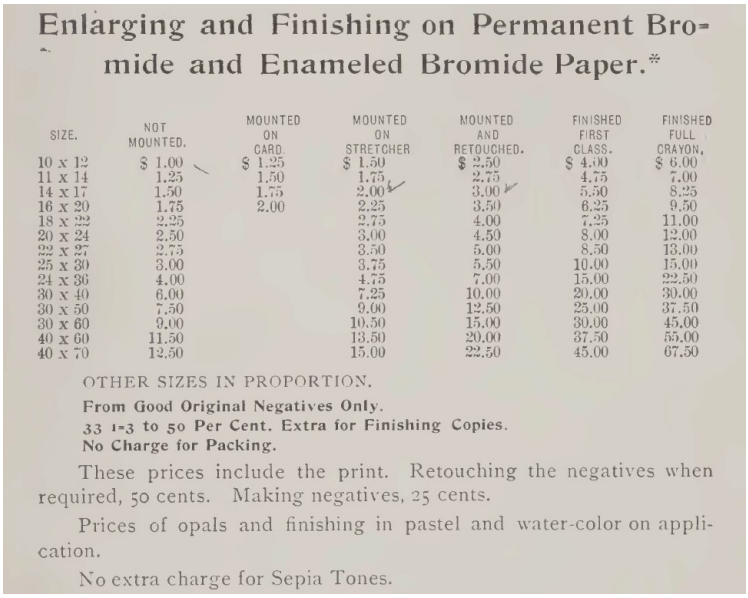
These popular Kodak cameras and prints were mass-produced in standardized formats meant for amateur photography. Not much information exists about retouching, but probably, many would not be retouched. For one, the prints were relatively small, and second, the original paper film did not produce a very sharp image. The less definition would work favorably, hiding minor defects and making retouching less necessary. In any case, these were not meant for professional use, and any

[82] George Eastman kept detailed records of his finances since a young age, and the records show that he had paid 49$ for the photographic equipment for the wet plate that he bought when he started the hobby of photography. Adding to that, he also took photography lessons for an additional 5$. The Kodak camera came preloaded with a roll for one hundred images for 25 $. When finished, the camera was sent to Rochester for processing and returned reloaded for 2 $. (Hannavy, 2008; https://www.kodak.com/au/en/corp/aboutus/heritage/milestones/default.htm, Eastman Kodak Company). [Retrieved February 2021]

[83] The term usually refers to photography enthusiasts that did not process their own work and carried their cameras everywhere.

imperfection could be attributed to the user. Notwithstanding, Kodak would also offer retouching services to amateurs described as *crayon work*. In a description from a Kodak Catalog from 1895:

> Definition of Crayon Work.
> *Mounted and Retouched.* This includes spotting and mending, and a few artistic touches in the background, sufficient to make a readily salable finished print from a good negative.
> *Finished, First Class.* This includes an artistic background, smoothing the face, sharpening the eyes and hair, and all work necessary to make a highly finished print.
> *Finished, Full Crayon.* Includes working over the entire print, the result being a highly finished crayon drawing. (Catalogue, 1895:142)



Enlarging and Finishing on Permanent Bromide and Enameled Bromide Paper.*

SIZE.	NOT MOUNTED.	MOUNTED ON CARD.	MOUNTED ON STRETCHER	MOUNTED AND RETOUCHED.	FINISHED FIRST CLASS.	FINISHED FULL CRAYON.
10 x 12	$ 1.00	$ 1.25	$ 1.50	$ 2.50	$ 4.00	$ 6.00
11 x 14	1.25	1.50	1.75	2.75	4.75	7.00
14 x 17	1.50	1.75	2.00	3.00	5.50	8.25
16 x 20	1.75	2.00	2.25	3.50	6.25	9.50
18 x 22	2.25		2.75	4.00	7.25	11.00
20 x 24	2.50		3.00	4.50	8.00	12.00
22 x 27	2.75		3.50	5.00	8.50	13.00
25 x 30	3.00		3.75	5.50	10.00	15.00
24 x 36	4.00		4.75	7.00	15.00	22.50
30 x 40	6.00		7.25	10.00	20.00	30.00
30 x 50	7.50		9.00	12.50	25.00	37.50
30 x 60	9.00		10.50	15.00	30.00	45.00
40 x 60	11.50		13.50	20.00	37.50	55.00
40 x 70	12.50		15.00	22.50	45.00	67.50

OTHER SIZES IN PROPORTION.

From Good Original Negatives Only.

33 1-3 to 50 Per Cent. Extra for Finishing Copies.

No Charge for Packing.

These prices include the print. Retouching the negatives when required, 50 cents. Making negatives, 25 cents.

Prices of opals and finishing in pastel and water-color on application.

No extra charge for Sepia Tones.

Figure 1.35 – Pricing for enlarging and finishing with retouching and crayon work, the three last columns refer to pricing for retouched enlargements, Kodak catalog, (1895, p. 141).

Into the new century

By the turn of the century, the history of photography opens in many branches, color photography, the moving picture, and the 35 mm film are but a few of the innovations that would take over the new century. Photography is also permanently established as a form of communication, as a recording medium, and as an art.

It is not possible in the scope of this research to give a full account of all the uses of retouching. So, the twentieth century is reviewed through relevant examples that illustrate the constant presence of retouching practices and some of the social and cultural issues and technical evolution. Included also are innovations that affected the overall understanding and the practice of photography when relevant to the development and adaptation of retouching needs.

Still, the text will try to follow the same structure as before, which is divided by topics with examples

from the work of prominent and relevant figures. It will try to follow a general chronological order, that is, however, not always possible as some topics expand throughout the century.

Sources are more dispersed as photography history books, for the twentieth century, focus more on the resulting image. At the same time, the more technical aspects are described in practical manuals or dispersed in journals that don't usually include a historical context. The more generalist histories are now considered those by Naomi Rosenblum, Mary Warner Marien, and Tom Ang, that in a more contemporary approach to history also include some of the technical information that is missing from other authors.

The examples are also chosen by the availability of information, either from photographers that wrote about their work, catalogs, and other publications that include the more practical aspects of photography.

For the biographic information, Lynne Warren's *Encyclopedia of twentieth-century photography* is now the correspondent to Hannavy's for the nineteenth century. Finally, for color and digital photography, Robert Hirsch's *Exploring color photography*, an encyclopedic type compilation, was a valuable resource.

Soft-focus lens

Since first engineered by Petzval, lenses continued evolution, always keeping special attention for portraiture use. These were lenses preferred for their "defects," particularly the slight unsharp feature, the soft-focus[84].

At this point, when many other options and advances in technology are available, the soft-focus lens was not chosen for speed or to overcome other technical difficulties but as a standard effect and an accepted and recognized aesthetics in portraiture (Figure 1.36).

All photography companies and lens manufacturers would produce their versions of these lenses. These lenses also had other desirable qualities. The soft-focus recalled some painting techniques, like *sfumato*, and gave a misty romantic effect that would be assiduously used by the pictorialists. The most practical aspect was the lack of detail that demanded less retouching in portraits. Photographs were still retouched but mostly done for other technical issues, manipulation accidents, or composition and multiple printing techniques, as seen before.

[84] See above Chapter 1 – The camera, and the Petzval lens.

It was also possible to achieve a soft-focus effect with filters or other homemade resources. For example: photographing through a thin fabric or translucent paper. Or after the shot, retouching with ink on the negative's glass surface or again covering it with paper. Or even, although less controllable, by blowing smoke in front of the enlarger's lens.



Figure 1.36 – Soft-focus: a. A frugivore from Barcelos, postcard, Alvão, ca.1917 (private collection); b. Marchesa Casati, photogravure, Adolf de Meyer, 1912 (Camera Work no. 40, plate III); c. Head of a young girl, photogravure, Eva Watson-Schütze, 1905 (Camera Work no. 9, plate I).

If anyone can do it, can it be art?

you don't take a photograph you make it
Ansel Adams —[85]

The Kodak cameras revived the question about art. Was photography just a recording medium? Producing an "artistic" portrait did not mean an art object. Still, it was a professional product not to be confused with the amateur photography of the *kodakist*, that did not know about photography manipulations.

One small note, at that time, the word manipulation did not have the same connotation of today, of altering or retouching an image in any way. It referred to the sequence of steps needed to achieve the final photograph, including setting the camera and all other preparations, all the negative processing, including retouching, and all the print processing.

[85] Quote attributed to Ansel Adams, but not from any known publication.

Before, *picture making instead of picture taking* was meant as a criticism of any alteration to the photograph after the camera work, but now it would be the artist's statement, only the amateur took pictures. The conception and preparation before and after the camera – the manipulations – was what differentiated artists and professional photographers from all others. Throughout the century, this would include the arrangement of lighting systems, processing the negative and the print, including retouchings, or later the choice of subject or intentionality[86].

Art photography became independent and more defined among artists. Each photographer would identify themselves in the category they felt adequate, as artists, professional photographers, or amateurs, though the lines that divide them were frequently blurred.

Pictorialism in the twentieth century

Gradually such photographers as "vignetted" and "retouched" became the fashion;
a little faking began to be indulged in and was not considered illegitimate.
The public was pleased to have the hard facts of form modified and approved
the attempts to " say more " in simpler form.
Thus art in photography made its feeble beginning.
(Beck, 1903, p. 49)

Pictorialists would still be the ones pulling for photography's art qualities until the great war. They got inspiration from paintings and drawings. These do not depict every detail, so pictorialists often used retouching, soft-focus lenses, and alternative printing processes to give an overall blurred atmosphere and less detailed image. Retouching was standard practice for artists, but for many, it was no longer the artist's tool. It was just another step of the photographic process, done for technical necessity. The original negative was often "straightforward, optically sharp and tonally rich" (Frizot, 1998, p. 316). The artist's mastery was in the manipulations, mostly, of the print. They would prefer the alternative printing processes, meaning non-silver. Some would choose to print in color using, for example, the carbon printing process,[87] or chemically change the overall tone of the image, called toning, such as

[86] It would take half a century for unprocessed photography to enter the museum collection not just for their historical, scientific, and social values but as art objects. Of mention photographers like Henri Cartier-Bresson (1908-2004) would promote the "the decisive moment" aesthetics, from his text with the original title *Images à la sauvette* published in 1952.

[87] It was invented by Alphonse-Louis Poitevin (1819–1882) in 1855 and further developed by Joseph Wilson Swan (1828–1914) in 1864. It is a contact printing process based on the properties of the pigmented gelatin layer to harden when exposed to light. It is called the carbon process because initially, the pigment used was carbon but can be done using any light stable pigments. Carbon prints do not fade (unless used with pigments and colorants not stable to light) or present other characteristic silver process deterioration. It was sometimes referred to as *Permanent Photographs*. Still, they are very delicate

sepia or sanguine tones that recalled the drawings of old masters. Using non-commercial printing paper and favoring those used for watercolor with a rough surface would also give a drawing feel. Notably, the bromoil and gum bichromate processes were the pictorialist signatures.

However, not for all, a notable artist who used retouching as part of her approach to pictorialism is Anne W. Brigman (1869-1950), an American photographer. The Eastman Museum owns several versions of Brigman's work, including prints, transparencies, and negatives that suggest an elaborate production and manipulation process, including non-technical retouching of the negative.[88]

Like Robinson, several photographers would write their visions and opinions on Pictorial Photography. Pictorialists also gathered in clubs and other associations with the purpose to actively promote photography as an art. Many of these clubs would also publish magazines that allowed them to share their work, encourage discussion, and inform technical novelties, publications, exhibitions, and much more. Some would be more focused on the technical aspects, and today when reuniting all issues, one gets a complete treatise on photography as practiced at that time. Others would work as forums for sharing ideas and opinions and promote discussion. These give valuable insight into their visual culture.

Many of these texts are now reproduced in digital archives and allow searches by keywords. For example, a search using "retouch" or "retouching" returns, surprisingly, at least at first look, little results in some of them.

Just a few years before, artists and photographers, in general, were reclaiming retouching as a legitimate means to achieve truth in photography. Now, little is mentioned except for incidental references of bad retouching work. For example, Horsley Hinton (1863-1908), landscape photographer, only casually refers to retouching in his work *Practical Pictorial Photography*, first published in 1898 (1902, p. 87). This is because frequently retouching is circumvented by pictorialists, not because they are against it, but because of their systematic use of soft-focus techniques. At the same time, Hinton recognizes it is a necessity in professional photography.

Rejlander and Robinson needed to retouch to compensate for photomontage's technical problems. But for these other pictorialists, retouching was not done to change aesthetics or search for the truth. It was

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and susceptible to deterioration by mechanical action. They were sometimes varnished for protection and to give a glossier look (Stulik & Kaplan, Carbon, 2013).

[88] The Eastman Museum online database shows many works by Ann Brigman. One example, *The Heart of the Storm* (1906), exists as negative and print and several interpositives – as positive transparencies – and internegatives, some with evidence of retouching. The interpositive with identification numbers 1976.0061.0089 is one example and can be accessed at https://collections.eastman.org/collections/20331/photography/objects [Retrieved February 2021].

now just one of the "mechanical manipulations," a part of the photographic process as common and necessary as developing or printing even if they were still criticizing exaggerations and flagrant misuses. In an article by Otto Walter Beck (1864–1954), an American painter and sculptor, in the No 1 issue of *Camera Work* magazine wrote:

> The public having approved, professional photographers made haste to introduce this legitimate "faking" and have unconsciously edged away from mere science toward that control which is art; until to-day such faking as succeeds in the art of telling things satisfactorily is considered good. It is but a step now to replace this term with that more significant word, so long established in the vocabulary of the fine arts, " treatment," and thus to remove the sting that the word " faking" usually carries with it. In this year of our Lord 1902, photography affords so many means of modifying the negative and the print that absolute control is no longer a chemical problem, but rather a question of art-education. (Beck, 1903, p. 51)

In the studio

Studio portrait photography still followed the practices of the previous century, particularly in the first decades. Some poses had become photography standards and were replicated again and again. For the print, the gelatin will gradually substitute the albumen that, nevertheless, is sometimes used for aesthetic reasons (Figure 1.37b). At the same time, the format *carte-de-visite* and *cabinet* continued to be produced, although now the albumen is replaced with a gelatin silver print (Figure 1.37a).



Figure 1.37 – a. Woman portrait, gelatin print styled like carte-de-visite, Alvão: 190?, Porto, Portugal (private collection); b. Group portrait, dry plate negative with a notation to be processed as albumen print "alb.ª" [from the Portuguese albumina], Alvão, 190? (CPF, ALV, 120/12748).

Studios were improving their service. Spotlights, fill lights, reflectors, and diffusers were now studio standard pieces of equipment and, although technology introduced improvements, they will be to this day. Manuals often show schematics, give recommendations on how to use them, and some even gave instructions on how to build them (Figure 1.38).

Artificial light was becoming everyday use, which allowed studios to photograph every hour of the day and with every weather condition. Advertisements, from the beginning of the century, announced these advantages over the competition (Figure 1.39).

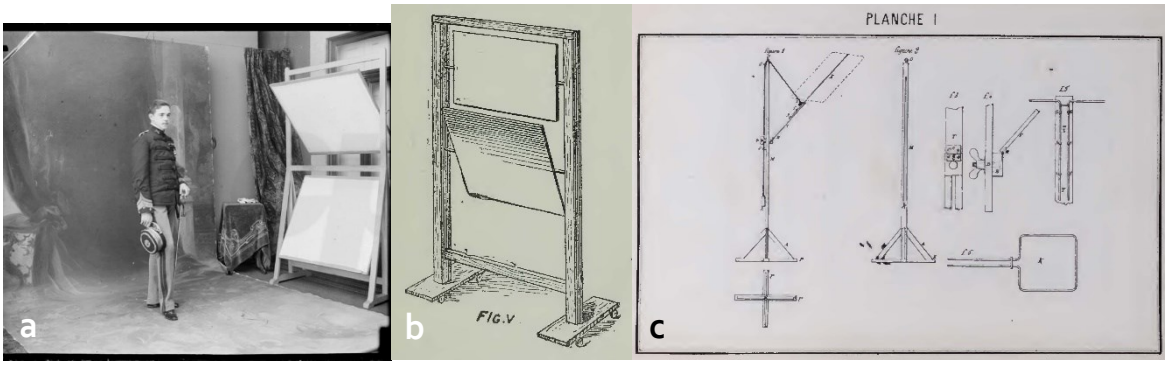


Figure 1.38 – a. King Manuel II of Portugal, taking a portrait at Photographia Perez (?), 1908, half stereoscopic plate, Aurélio da Paz dos Reis (CPF, APR, 1052); b. Illustration of light reflector, *The art of retouching* (Hubert, 1895, p. 35); c. Hoe to build a reflector, *Application d'un système d'éclairage* (Klary, 1875, plate I).



Figure 1.39 - Postcard Fotografia Perez, reads "We operate with all-weather," 1904 (AMP, D-EPH/A1-579)

Lighting systems were a concern for every photographer, not just for the artistic effects they could produce but also because proper lighting systems were, acknowledged by all, the first step to reducing retouching needs. Many manuals on photography in general and retouching describe studio configurations and their uses, either as idealized studios or as a collection of existing studios. Like in the books by Rodolfo Namias[89] (1911) from Italy, or H. P. Robinson (1891) in the UK, among others

[89] Rodolfo Namias was a chemist from Milan and an important figure for the development of photography, the Italian equivalent of Hermann Vogel. He was co-founder, with Mario Ganzini, of the Laboratory School and Applied Photochemistry, and they also created the magazine *Il Progresso Fotografico*, in 1894, still an active publication. Namias authored many technical books, notoriously the *Enciclopedia Fotografica*. (Cavatorta in Hannavy, 2008: 1298). His work was also translated to other languages and, as found in this research, particularly Spanish. In his books, Namias, like other authors, recognizes and cautions the abuses of retouching. Also, like others, he acknowledges its importance and benefits and gives retouching instructions. «One might say that are few the negatives that cannot be improved by judicious use of pencil or

(Figure 1.40). Edward L. Wilson (1887) presents American examples, and his descriptions of the studios also explain their best uses, for the example:

> Mr. James Landy, Cincinnati, Ohio, inclines his side light still more, and uses it variously as a top, side, and even front light, according to the subject in hand. It is peculiarly adapted for "shadow" and "Rembrandt" effects (Fig.72). (Wilson, 1887, p. 80)

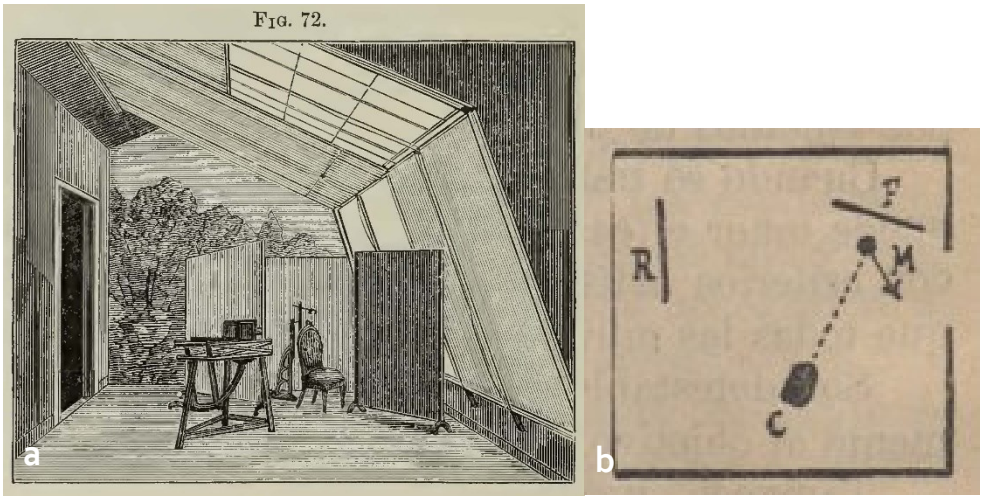


Figure 1.40 – Rembrandt studio: a. Illustration 72 for Mr. James Landy' studio (Wilson, 1887, p. 80); b. Studio configuration for Rembrandt lighting portraiture - R reflector; C camera; M model; F backdrop [from the Italian fondo] (Namias, 1911, p. 134)

Many manuals refer to *Rembrandt*-styled portraits or *Rembrandt lighting*. These were portraits done with a dark backdrop and with high contrast light in the face, sometimes also the hands. The light would come horizontal to the face and slightly from behind. Namias advises:

> In [Rembrandt lighting] system it is convenient to put the sitter in profile or in 3/4 and direct the lighting so that it comes from behind. The side that is in the shade is lightened with a screen, but very slightly, so that lines are but a guess rather than clearly visible. (Namias, 1911, p. 130)

Or, as Robinson described it:

> The Rembrandt portrait is usually a head, more or less in profile, lighted from behind and the side, and as unlike anything Rembrandt ever painted as possible. (Robinson, 1891:42)

Rembrandt style portraits were challenging to do correctly and to achieve good results. Artist photographers that could do it gained recognition, like William Kurtz[90] in the US. Ourdan would

brush» [author's translation] (Namias, 1911: 363). Believed to have circulated in Portugal, it was not included in the above review because no available copy was found.

[90] William Kurtz (1833-1904) was a German photographer that also learned painting and lithography. Later he would move to the US, where he would establish a portrait studio in New York. After 1883 the studio worked with electric light. His work

notice faults in others and mentions in his manual on retouching:

> As a rule, photographers who attempt this style of lighting either make the light upon the profile too strong or the shadow too deep. One fault is equally as troublesome as the other to the retoucher. (Ourdan, 1876, p. 53)

The Rembrandt lighting, and other shadow lightings, meant longer exposures and created high contrasts and intense shadows that needed to be corrected by retouching and a subject in many retouching manuals, for example, Klary's (1891), Ourdan's (1895), or Weisman's (1903). These and other authors' views on retouching will be discussed further in the following chapter.

Not enough speed - resting stands and other "original retouchings"

Plates were commercialized with descriptions of *rapid*, *instantaneous,* or *high speed*, which was important for photography outdoors. But studios, particularly portrait photography, using light and shadow as aesthetic tools and relying more and more upon artificial light, still needed long exposures. And the headrests that were firstly used by daguerreotypists were still required. While the ladies' dresses conveniently cover the headrests, for gentleman and children's portraits (Figure 1.41), these were sometimes visible and needed to be eliminated by retouching.



Figure 1.41 – a. Portrait of a man, dry plate negative; b. Detail of a digitally converted positive, showing cast iron headrest's base behind the feet, Alvão, 190? (CPF, ALV, 12387).

Other tricks, also inherited from collodion portraits and Disderí's compositions, helped the sitter to stand still. Catalogs would sell, besides more standard photographic equipment and materials, all sorts

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is best known for his "Rembrandt" portraits. From Vogel, he learned a three-color process that he improved and patented, the halftone. He was a pioneer in photography and printing in America and with the halftone color process. He is the author of one of the first colored prints, a well-known still life of fruit published in 1893. (Hirsch, 2015).

of chairs, tables, and other props (Figure 1.42). Position chairs corrected the stance, helping to maintain the spine straight. The chair afforded a more elegant posture in the picture, reducing extra folds in clothes and unwanted protruding body parts that would later need retouching. It is interesting to notice that even women straddled the posing chairs (Figure 1.43).

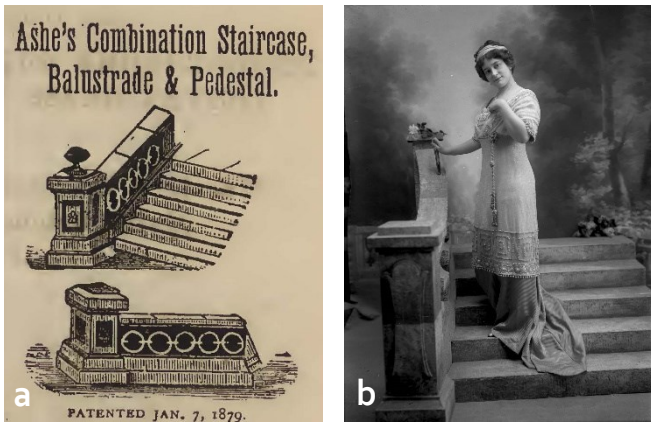


Figure 1.42 – c. Advertisement, Ashe's Combination Staircase Balustrade & Pedestal, In *The art of retouching* (Ourdan, 1880); d. Actress Palmira Bastos, dry plate negative, [Arnaldo Fonseca], 189?-190? (AMLSB, NEG 527).



Figure 1.43 – a. Anthony' Position Chair, in *Photography in the studio and in the field* (Estabrooke, 1887, p. 137); b. Actress Lucilia Simões, c1908, from dry plate negative, Photo Guedes, ca.1908 (AMP, F-NV/FG-M/11/28); c. Actress Lucilia Simões, half stereoscopic plate, Aurélio da Paz dos Reis, 1925 (CPF, APR, 003364).

A note on retouching at the beginning of the twentieth century

The retouching of dry plates and their uses in portrait photography in the first half of the twentieth century is the main focus of this research and will be developed further in the following chapters. Enough to say that there will be differences and an evolution of techniques, aesthetic and social uses that can be verified in the practice of different studio photographers. There will be those that linger on the pictorial aesthetics and those evolving with the contemporary tendencies of social mores, visual media, and taste.

The techniques of retouching, in an overall view, evolve little since first announced by Hanfstaengl or

tracked even before with the paper negatives, the difference will be how they are used. Nonetheless, there are novelties in the retouchers' materials and instruments introduced by photography companies, and keen inventors, for example, or electric devices, or the retouching varnish that becomes available pre-made and industrialized.

People were more familiarized with photographs and were more demanding, but in short, all portraits were retouched[91]. The retouched portrait, in professional photography, had become the standard despite any criticism. Within limits, retouching is now just another step of the photographic process, and all professional and technical photography uses it. Even amateur photography, when concerning portraits, will demand some touching up.

And despite any evolution, the idealized self-image still demanded retouching and a portrait where wrinkles disappear and other fashionable corrections. A Hubert cautions those learning to become retouchers:

> Let me give you an important piece of advice. Do not on any account forget to touch ladies' waists in a specially hearty manner if you want to keep on good terms with them. You are always safe in cutting off an inch on each side, and in some cases, where corpulence is rather conspicuous, two or more inches will never be missed. (Hubert, 1895, p. 48)

The most successful photographers would retouch their images or hired the best retouchers. On its opposite were the studios that offered quick, less expensive portraits with standard retouchings. These would be the most criticized for being dated, old fashioned, and because in all portraits, the retouching was the same, and everyone looked alike.

Photographers that avoided manual retouching would achieve similar effects, as it has been shown, with light diffusers, the soft-focus, or other "original" retouching techniques.

But mostly, a difference, or rather a gradual evolution, is observed on the effects of retouching that will progress into modern aesthetics. One cannot forget that successful studio photography is, after all, ruled by general social acceptance, meaning less tendency to be adventurous or dramatic changes.

Art, in general, is also evolving into new aesthetics replacing in photography the old academic standards of painting, repeated until now. New sources for style, tendencies, and inspiration will be in printed photographs in the news media and the movie picture. Magazines dedicated to photography

[91] Saying "all portraits" it is hyperbole, of course. Nevertheless, despite evidence observed in records and negative collections that some sitters would request an untouched portrait, they would still receive some level of retouching.

but also other topics, including society and fashion, became increasingly illustrated by photographs. The most successful magazines would be illustrated by the most successful photographers, repeating styles, and setting influences. The moving picture industry also sets the standard, especially how the actors are portrayed in posters and magazines. These are now viewed as the new models.

The idealized retouched version of the portrait was no longer inspired in paintings but followed through time and place the accepted cultural aesthetics and taste, social mores, set conventions, art photography, and the new visual media.

The 35mm film and the Leica camera

With the industrialization of photography, science and innovation are developed inside photography companies and with mass production and profit in mind. However, some inventors stand out, recovering the initial spirit of photography and its birth.

An Interregnum for the moving picture

In 1889 George Eastman had been experimenting with the new flexible nitrocellulose-based film coated with gelatin emulsion. This new support inspired Thomas Edison's assistant William Kennedy-Laurie Dickson (1860-1935). He was one of those inventors, this time contributing to the motion picture and inadvertently changing photography forever. His contribution was a celluloid film intended for Edison's Kinetograph. He began experimenting with a medium format film that was 70 mm in width. He then split the film in half, resulting in a 35 mm wide film. It was then perforated in both edges to allow the controlled advancing of the film, resulting in a 22 cm wide image frame. There is no known justification for establishing the height at 16 mm, but that set the 3:4 ratio that only in recent years was overthrown from photography, television, and computer screens. The potential of this invention was quickly exploited by patents and the entrepreneur spirits of Edison and Eastman. This film was the format adopted by the Lumiere Brothers in 1896. With little modifications to this day, the 35 mm became established as the standard format for film. (Belton, 1990).

Oskar Barnack and the Ur-Leica

Another of such inventors was Oskar Barnack (1879-1936), a German engineer that worked at the Ernest Leitz German Optical Industry (Ernst Leitz Optische Werke). Several are the stories of the come

about of Barnack's invention. A story tells that he was just looking for a way to test the new films used for the motion picture (Newhall, 1949). The author's preferred story includes tales about his asthma and how he wanted a better way to photograph that did not imply carrying heavy equipment but with the quality closer to that of the dry plate — the same feeling of frustration that inspired the inventions of Maddox and Talbot before him.

In the first decade of the twentieth century, numerous *miniature* cameras were being developed, but Barnack's camera would change photography forever.

Barnack would adopt the 35 mm film for photography. But instead of using it vertically, the film was oriented horizontally, allowing for a larger frame size of 24x36 mm and an aspect ratio of 2:3. He would also need to find a new camera lens, as the ones used for photography, at that time, could not be adapted to the new film size. The new lens came from Max Berek, another engineer at the Leitz company. He developed a 50mm lens that is still the standard lens for the Leica cameras. With a completely metal compact body, in 1914, Barnack produced the prototype *Ur-Leica* (Original LEItz CAmera).

By 1924, his boss, Ernst Leitz II, decided to produce Barnack's camera, now as *Leica I*, or the Leitz camera, and presented it, in 1925, at the Spring Fair of Leipzig[92]. (Jeffrey, 1981; Warren, 2006)

Barnack accomplished what he set out to do, a quality camera that was light and easily used. It was the first commercial success for a miniature camera that could hold a 36 images film roll. Another standard set by Barnack, supposedly because he would cut the film in length as big as his arms stretched out.

This camera also allowed for photographs to be taken without awareness of the photographed subject and do images in quick succession. Photojournalists and street photographers would adopt and prefer cameras such as this.

Up to this point, the print usually had the same size as the negative, as they were obtained by contact printing. To compensate for the small size of the negative, the images obtained with this camera needed to be printed with an enlarger. When the camera, film, and enlarger were perfected, they could rival large format cameras. But for retouching, it became close to impossible due to the negative size. For 35mm photography, retouching would be done on the print.

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[92] From the Leica webpage: "The refined and improved version of Barnack's camera went into serial production under the name of Leica (LEItz CAmera) and was presented to the public in March 1925, at the Leipzig Spring Fair. It was fitted with a non-interchangeable Leitz Anastigmat 50 mm f/3.5 lens designed by Max Berek in a collapsible mount. Soon afterward, the lens was given the name Elmax (Ernst Leitz, Max Berek). In the same year, Berek employed a new glass type in his design for the Elmar 50 mm f/3.5 – a lens that was to become as world-famous as the Leica itself." https://en.leica-camera.com/World-of-Leica/Leica-100-years/Leica-100-years/Legendary-Leicas. [Retrieved February 2021]

Photography inspiring photography

When readers of the American magazine Camera Work, in 1903, asked which were the most relevant publications for those wishing to know more about picture making, they responded, in the no. 4 of that year, identifying several magazine titles in America, but also from England, Germany, and France. Notoriously, *The Amateur Photographer*, from London, edited by Alfred Horsley Hinton, a feverous defender of Pictorialist photography and author of numerous books, and the *Photography Art* Journal, similarly to *Camera Work*, that was dedicated to pictorial photography. From France, the Photo-club magazine *La Revue de Photographie* [Photography review] with significant contributions by Constant Puyo, another pictorialist, that through the magazine propelled art photography in France (Hannavy, 2008, p. 1179). And from Germany, the magazine *Photographische Rundschau* [Photographic review], launched in 1887, a publication from the amateur photography club of Viena, that by the turn of the century had broadened the scope to photography in general, including art-photography, and until before the war, was of decisive influence in Germany (Warren, 2008, p. 1096).

Many other publications existed, some like the ones mentioned that started from photographic associations or photographers that wanted to promote photography as an art. Others kept a more technical approach, for example, the still-running *British Journal of Photography*, first published in 1854.

These and other news journals and thematic magazines, including women's magazines or fashion, would also start to make use of photography as recurrent means of illustration. Sometimes the illustrated section of the Journal would be sold as a supplement to manage cost control.

They would start to employ, on a regular basis, professional photographers. They would work on a permanent basis or commission for feature articles and gave photographic coverage to the day occurrences or travel as correspondents – an international collaboration between journals allowed for photography and the photographer to influence outside borders. The most relevant events could no longer be told without photographs.

Some of the photographers did not work out of a portrait studio, and because of that, they were unbound from the traditional lighting systems and poses.

Photographs were now the vehicle for the dissemination of photography iconography. Not only in art from established photographers but also the most incidental amateur, that by chance or luck would get a place in a magazine and could reach the public in the way the great masters of painting never did. These new professional and amateur photographers that did not follow the artistic tendencies of the

pictorialists would also begin to influence new ways of seeing photography.

In 1940, Madame Yevonde (born Yevonde Philone Middleton, 1893-1975) writes about art photography and her expectations as she prepared her exhibitions. Madame Yevonde was a studio portraitist, active between 1916-1960, and she reflects on art, which was no longer the inspiration source for young artists, they no longer visit the museums. And she says:

> Very few people have any knowledge of painting and our daily newspapers and periodicals, our hoardings and visits to the movies apparently supply us with a sufficiency of pictorial representation. (Yevonde, 1940, in Heron & Williams, 1996, p. 121)[93]

Portugal – Boletim Photográphico

Worm & Rosa, a store for photographic material in Lisbon, published the monthly journal *Boletim Photographico* (*BP*) between 1900 and 1914, with artist and studio photographer Arnaldo Fonseca as editor until 1910. The bulletin was not a publication dedicated to art photography, having a more specialized and technical character. It was the only magazine dedicated to photography in Portugal at the time and until 1906, with a parallel edition published for the Brazilian public.

The *Boletim Photographico*, like other similar publications throughout Europe and the US, was intended as a forum for sharing innovations or experiences between professionals and amateurs (Barrocas, 2014, pp. 367, 368). Moreover, it served as an intermediary between Portuguese readers and news from Europe, Brazil, and the United States. Worm & Rosa received foreign publications that were then announced in the magazine, some given to the Portuguese public via translations. They also promoted events such as competitions and exhibitions in Portugal and other countries. Professional and amateur photographers were encouraged to participate and send their works for illustration of the bulletin. Among the long list of contributors are several members of the Portuguese Royal Family, including Queen Maria Pia (1847-1911), known lovers and promoters of the Art of Photography in Portugal, the French Pictorialist Constant Puyo (Figure 1.44e), and the French and author C. Klary. The Portuguese magazine was also advertised in Klary's publications of *Le photograme*.

With 23 cm height, the illustrations frequently occupied an entire page. The back of the page would be left blank or sometimes with the description of specifications, including the type of lens used, exposure time, distance, developing conditions, and even brand of the negative.

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[93] It is an excerpt from the *Exhibitions and Commercial Work*, included in the compilation of essays on photography, titled *Illuminations*, edited by Heron and Williams, in 1996. However, it was first published in *Camera*, The Woman's Book Club, London, 1940.

Retouching is casually mentioned in many articles, either the typical criticism of situations when it was used in exaggeration or recognizing it as a standard step in professional photography. It includes sections on chemical retouching, the retouching of prints, and an essay on the history of retouching by the photographer Wurtz (1903, pp. 134-138).

The opening statement of the magazine gives an interesting view on the development of photography as it talks about how photography came to be an art by great names and the anonymous and the recruitment of countless enthusiasts. It says that were the amateurs, man of science, that advanced photography by studying, inventing, and teaching along with the professionals that used perfected and simplified (Boletim Fotográfico, vol1, Jan 1900).

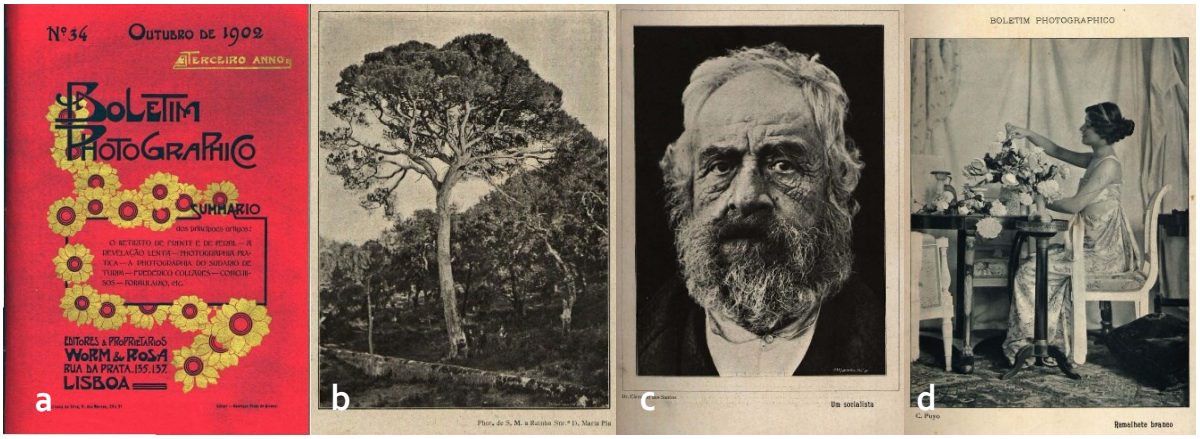


Figure 1.44 – Pages from *Boletim Fotográfico*: a. Magazine cover, no. 34, 1902; b. [Hunting party under a tree], outside contest gold medal, by Queen Maria Pia; c. "A Socialist," portrait, by Dr. Clemente dos Santos, no. 2, Feb. 1900; d. White Bouquet by Constant Puyo, no. 19, 1901.

The second number gives an account of the first National amateur photography exhibition, inaugurated in Dez. 31 of 1899, at the Geographical Society in Lisbon, won by the amateur photographer Camilo A. dos Santos with an interior view of Allambra (Figure 1.44c).

It is a curious text that gives insight into their definition of art photography, signed by A. F., probably Arnaldo Fonseca himself. One must not forget to view these texts with some temporal perspective. They were evaluating photography from the idea of what art was at that moment, and as defined by the same groups and artists that were promoting their work as art. Now one can recognize their need to justify their work and themselves as artists. Arnaldo Fonseca comments:

> This revue might seem too harsh, but it is justifiable. Of 52 contestants, none but one strays from the trite industrial manipulations. That is: The picture is executed more or less mechanically in the respective equipment (point… shoot… done…) followed by the development of a print, without any personal seal, and can be executed by the laziest or the most exquisite operator. (Fonseca, 1900, p. 27)

Fonseca recognizes that all the photography more technical – industrial – manipulations are there; this included retouching that was commissioned to professional retouchers. To that, his only criticism was that several of the contestants used the same retoucher and that that was noticeable in the prints, particularly those enlarged from small format negatives.

For pictorialists, like Fonseca, art photography was one that could be recognized as such when compared to other arts, particularly painting and drawing "anything that pulls it from the mechanics of the first practice." And that a simple mechanical photograph could not be art.

Arnaldo Fonseca seems to forget the propelling contributions by amateurs that he commented on a month before, as he goes on criticizing:

> And I have the right to speak without refrain as these are amateurs, that don't work on commission, in full freedom of taste, and without any impositions and having to present one picture or none the criteria elucidates of the uselessness of such exhibition. […]
> In all the exhibitions, every image was printed in the common gelatin chloride and gelatin bromide. The ones on paper only rarely were platinum prints and none, I suppose, were bichromate papers. […] To the industrial, this is not convenient, in general, as each copy in such process takes its time. But to the enthusiast, without the obligation of producing multiple prints, I don't know why it is not suitable. Just one of the enlargements received some water coloring, and again, with only one exception, no one explored purposefully the soft focus. On the contrary, there was a concern about sharpness that crushes most of the works. (Fonseca, 1900, p. 27)

The portrait in Figure 1.44d, although done in soft focus, was not exaggerated and did not completely erase the skin and hair texture in the height of pictorial blurriness.

As it turns out, these amateurs did what Fonseca expected from them and were helping propel photography further, maybe just ahead of their time.

These incidental participations and others like these would capture the aesthetics of the new century, and the publications of their work in magazines such as this would inspire and set off the latest trend. Professional photographers and artists, firstly recognized in England, would follow them in 15 to 20 years. Pictorialism and its misty sceneries would be outdated or criticized even as perversions to photography. Genuine art photography refused all the pictorialist manipulations and would be known as *straight photography*.

Portugal – Ilustração Portuguesa

The Portuguese daily news journal *O Século* launched, in 1903, the magazine *Ilustração Portugueza* [Portuguese Illustration] (*IP*). It was meant as an album of what was happening in Portugal and as a

complementary publication to the journal. It was profusely illustrated with drawings, engravings, photography, and for many of its numbers had a distinctive decorative motif design that was themed to each feature article, news, or theme section (Figure 1.45a). Photography and drawn illustrations took more space in the pages than text, which sometimes was reduced to the image's caption. The cover page followed a general design in periods that would change from time to time, but mostly including a photograph, frequently portraits, or a reproduction of a painting, drawing, or sculpture that filled most of the page.



Figure 1.45 – Pages from *Ilustração Portuguesa*: a. "35ºC in the shade," Benoliel, no. 129, Aug. 10, 1908; b."Morning light – Penafiel," Alvão, no. 694, Jun. 8, 1919; c. "Marguerite Carré in S. Carlos, P. Nadar, no. 142, Nov. 9, 1908.

The most significant and memorable issues are the ones in its second series that coincide with the collaboration of photographer Joshua Benoliel[94] between 1906 and 1918.

It is not possible, in this text, to give a full account of the diversity of articles because they are many and varied. Enough maybe to say that encompasses everything, and it is now the visual historical record of every major National and International event. It also includes feature articles on diverse cultural topics from around the world and recurrent theme sections like fashion, theater, or music. Frequently

[94] Joshua Benoliel (1873-1932) was a news photographer, among many other things. He starts his collaboration with the press, covering a football match for the Journal *O Sport.* Throughout his life, he contributed to several National publications like the ones mentioned and the *Ocident*, *Brasil-Portugal, Tiro* (a hunting magazine). He was a correspondent with the Spanish weekly *ABC* and the French weekly *L' Illustration.* His coverage of the Portuguese revolution and the republic proclamation on Oct. 5th, 1910, was published the very same day in *O Século* daily journal and then in multiple international journals. From 1906 Benoliel becomes a regular photographer for the *O Século* and the magazine *Ilustração Portuguesa* and is the "chief of photography" for the magazine between 1912-1918 (Vieira, 2009).

featured art exhibitions, including photography and individual artists. Throughout its run until 1993,[95] no number seems to include or follow the same editorial sequence, and the overall design also changed from time to time.

It was illustrated by many professional and amateur photographers, and every renowned National photographer is represented, the most recurrent being, of course, Joshua Benoliel. The photography studio of Domingos Alvão would compete for second place on cover illustration (Figure 1.45b).

The articles also include numerous international photographers and several photographs of the news agency World's Press Photo. With recurrent appearances are several French studio photographers, including the fashion photographer only known as Félix, Paul Nadar represented in at least two covers, Walery the artists' photographer[96] (Figure 1.45c,d) and Leopold Reutlinger and his photographs of French artists and society. The latter even received a feature article in the no. 249 on November 28, 1910.

Most of the photographers are identified by their name or commercial affiliation. Exceptions are, notably, the articles on one person, using images from different periods.

The *Ilustração Portuguesa* frequently published this type of story celebrating a particular person. These are photo-narrative essays, and they were ahead of its time, as noted by Pavão:

> They show that the publisher and the photographer had a modern sense of the use of photographs in the press. (Pavão, 1990, p. 36)

Similarly, other stories are written on customs and places. Usually, the images have more importance than the text, which is written by someone else, as almost a commentary on them. In rare examples the author of the text is also the photographer, notably the ones by Arnaldo Fonseca.

Today, and although not a magazine on photography, it is a visual reference for Portugal history, and its influences in photography can be traced to its many pages.

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[95] The record for *Ilustração Portuguesa* at the digital newspaper archive of Lisbon – Hemeroteca Digital de Lisboa – notices that after 1931 the magazine reduces to a few numbers each year, with few pages, for the only purpose of holding rights to the name.

[96] Walery was the commercial name for two photographers, father, and son, originally from Poland, Stanisław Julian Ostroróg (1836-1890) and the son Stanisław Julian Ignacy Ostroróg (1863-1929). First working in London, after 1900, the son moved to Paris. (biographical note Retrieved February 2021 from the National Portrait Gallery: https://www.npg.org.uk/collections/search/person/mp14017/walery). [Retrieved February 2021]

Fashion magazines

Although the history of fashion attributes the first modern fashion photography to Edward Steichen's collaboration with Paul Poiret for the *Art et Décoration* magazine, in 1911, the reproduction of French fashion, identified as "cliché Félix," in No 39 of *Ilustração Portuguesa* from 1906, disagrees (Figure 1.46).

Steichen's photography might have other artistic qualities to it, the matter of opinion, and he had some notoriety as an artist and studio photographer.

Felix worked out of a studio, and not much more is known of his work or who commission the images. Noticeable is that he would photograph for different designers. Félix's images show that models are not there to reproduce the cloths or pose only as mannequins. The models are in dramatized poses or more relaxed, suggesting an intention in giving a more natural setting, like many others that are today considered to be fashion photography.

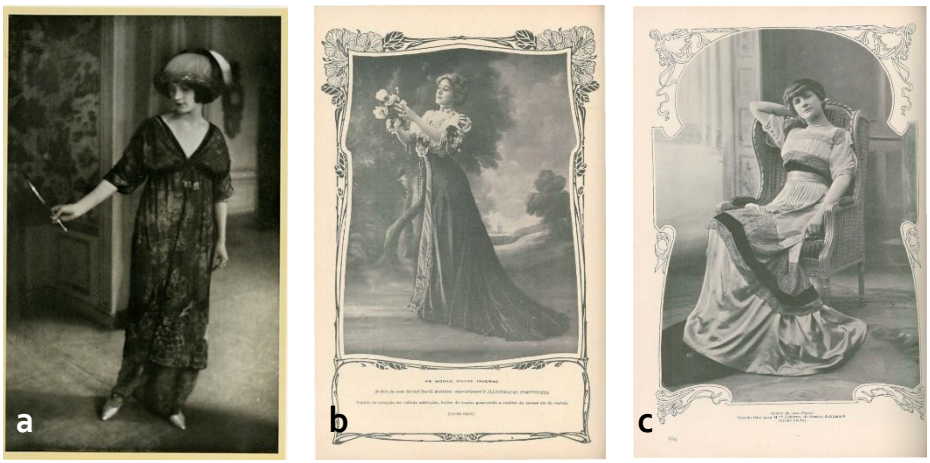


Figure 1.46 – Fashion photography a. Edward Steichen – model from Paul Poiret, *Art et!? Décoration*, 1911; Fashion pages from *Ilustração Portuguesa*, with photography by Félix: b."This winter's fashion" – model from Béchoff-David no.39, Nov. 19, 1906; c. Miss Osborne – model from Paquin, no. 196, Nov. 22, 1909.

Aside from the issue of a fixed date, fashion photography in the new century would establish a new visual source for models and aesthetics. On top of the most recognized fashion magazines are *Vanity Fair*, *Vogue*, or *Harper's Bazaar* that would promote fashion, increasingly, through photography. They hired prominent photographers that established tendencies and set influences even today, like Baron Adolf de Meyer (1868-1946), Edward Steichen (1879-1973), Man Ray (1890 - 1976), or in post-war for example, Richard Avedon (1923-2004).

Each photographer was contracted not just because of his artistic qualities but for the capacity to evolve and stand out, meaning, away from the last photographer or the last season.



Figure 1.47 – Baron Adolf de Meyer: a. Advertisement for Elisabeth Arden cosmetics, 192?; b. Still Life, 1908 (*Camera Work* no. 24, plate IV); c. The cup, 1912 (*Camera Work* no. 40, plate I)

Fashion photography has been in constant change since Steichen's straight photography replaced the de Meyer dreamy scenes. After that, the formal poses were replaced by snapshot type photography and movement, lavish sets for street photography, and then back again, in cycles.

Fashion photographers were also portraitists, news photographers, and artists that borrowed in both directions the poses, lighting, and other technical aspects of photography. No information was found, at this point, on the practice of retouching specific for fashion photography. Nevertheless, these needed to be perfect photographs, the "selling images," as Peter Turner put it (1987, p. 173), to be composed for print, with a quality that only the retouching techniques could ensure.

Adolf de Meyer is the first of these consecrated fashion photographers. His photography following the artistic tendencies of his time was done in soft-focus, but for magazines, it was not the manipulation of the print that made his work stand out. While many of his contemporaries were doing dark portraits, instead, his images are ethereal representations, transparencies, and delicate renderings of light (Figure 1.47).

Dorothy Wilding – Vanity and pride – The official portrait

> The one technical aspect of portraiture I couldn't teach myself was retouching. Retouching is one of the many keys to perfect camera portraiture. After I had got a grasp of the other keys, I soon realized that I should have to be taught this particular craft carefully and thoroughly, not only in order to reach the top of my chosen profession, but also in order to enable me to produce a portrait, as the lens of my own eye saw it, and not as the lens of the camera. In all modesty, subconsciously, I never dreamed of anything else but the tops. (Wilding, 1958, in Heron & Williams, 1996, p. 125)[97]

[97] In an excerpt included in the compilation of essays on photography, title *Illuminations*, edited by Heron and Williams, in 1996, but it was first published in *In Pursuit of Perfection*, Robert Hale, London, 1958, 24-5 and 17-18).

Forgotten in her last years and by the history books, Dorothy Wilding (1893-1976) was a British studio portraitist active between 1914-1957. She was the first woman to be appointed as the Official Royal Photographer for the 1937 Coronation of George VI of the UK.

In her time, Dorothy Wilding came to be one of Britain's most successful and influential studio portraitists.

At a young age learning, photography was her way to become independent. In 1911 Wilding started as an apprentice retoucher to photographer Ernest Chandler, established in London. She also had a brief learning period with American portraitist Marian Nielson and again as a retoucher with Richard Speight. By 1914, she opened her own studio. With a keen sense of entrepreneurship, she would also open in New York, in 1937, and succeed in whatever she did, she recalls:

> The day came, after weeks of day and night labour, when I was able to count the sum of sixty pounds. It was very little, but yet enough. I calculated, to start me off at the game – especially when I told myself reassuringly that I could manage on my stock of clothes for at least twelve months. And at the end of twelve months – well, who knows? (Wilding, cited in (Williams, 1986, p. 150).

A comparison can be made with contemporary photographer Cecil Beaton (1904-1980), also a photographer of the British Royal Family. While Beaton's portraits frequently have elaborated and romantic scenarios still using painted backdrops, Wilding's portraits stand out with simple but modern glamour.

Her portraits have the straight lines of her Deco-styled studio. Most typical are head and shoulders portraits on a white backdrop. Devoid of any other elements, Wilding's portraits are far from simple. She had the eye to capture the strength and power of a person, and especially women. Val Williams notices that "Wilding made women look as they never looked before – beautiful, starkly elegant and uncompromisingly modern." (1986, p. 152). She knew that these images needed to be perfect, and that was done by retouching, not to make the person beautiful but because it was a technical necessity and part of her process, in her words:

> The impression held by so many people that the main purpose of retouching is to make a sitter more beautiful or handsome (according to sex!) than she or he is in real life. It isn't that at all. (…) The strong artificial studio light exaggerates all the lines and folds and creases in a face. It registers them much more harshly than the naked eye. If you have seen a contact print of an untouched studio negative you will know immediately what I mean. The effect is quite grotesque, and my orders to my staff are, never to show them except to a very tiresome client - and then only when they need a very bitter pill. (Wilding, 1958, in Heron & Williams, 1996, p. 125)

She was well aware of the vanities of her clients, and she knew in turn how to photograph them and how a good portrait could give the person the best introduction. Wilding has her own vanity and pride in doing the work at the "top" of her capabilities, which was her driving force and reason for her success. In her time, photography had replaced painting in official portraiture of Kings, Presidents, high dignitaries, and also celebrities. But these were not simple studio portraits. They were precise technical constructions that joined light and pencil.

George Hurrell – Glamour Portraits

The studio retouchers applied to their work
their own aesthetics interpretation of physical perfection
(based on doctrine handed down from the Front Office, of course).
A few Hollywood photographers, among them the great Hurrell,
handle their own retouching chores,
since they were well versed in the desires of their subjects.
(Stallings & Mandelbaum, 1978, pp. 46, 49)

Remembering Hollywood's Golden Age cinema portraits is to remember George Hurrell (1904-1992). All movie stars were perfect, all portraits divine. Hurrell would set the standard.

He started as a painter with training from the Art Institute in Chicago. Working as a colorist, he moved from different photography studios until he got to work for the portrait photographer Eugene Hutchinson. Hurrell learned with Hutchinson how to retouch and other techniques such as airbrushing and hand-coloring. In 1927 he opened in Los Angeles a photography studio. In the late 1920s, he signed a contract with Metro-Goldwin-Meyer Studios (MGM), photographing every actor for two years. After that, into the 1940s, he opened a photography studio on Sunset Boulevard, California, and also contracted with Warner Brothers Studios and Columbia Pictures. For an actor having a portrait done by Hurrell was almost a guaranty to get the part (Barr & Le Grandin in Warren, 2006).

When he started with Hutchinson, the typical portrait was done with a soft-focus lens, and the sitter was illuminated, still mimicking painting aesthetics.

Hurrell's innovative technique was to cut with the soft-focus and operate the camera with a sharp focus instead, and with the entire scene in the focus range. He would also stand out from other portrait photographers for his lighting system. Instead of directing fixed lights, he used a boom light, a light on a telescopic arm that allowed more movement and creativity.



Figure 1.48 – George Hurrell: a. Joan Crawford for the film Possessed, 1931, MGM (*Cinema*, no.38, Dec. 10, 1932); c. Anna Sten for the film Nana, 1934, United Artists (*Cine*, no.2, May. 31, 1934), d. Jean Harlow, for the film Dinner at eight, 1933, MGM (source Wikimedia Commons).

He also selectively used pan- and orthochromatic negatives for its aesthetic qualities. With the latter, the skin would appear darker, giving a tanned, exotic look, that by this time, became fashionable[98] (Figure 1.48c). Also, he would ask his sitters, accustomed to wearing makeup for the movies, to pose with no makeup. Later he commented:

> I was trying to get character into my work. That's why I went sharp, because there was no reason for that thing to be fuzzy." "I always tried to get them to leave the makeup off. In those days, it wasn't easy. Because the makeup was so caked… and by the time you had retouched some wrinkles out, why, it was completely flat." "Skin has a sheen to it and soon as you put that heavy makeup on, it goes flat. (Hurrell as cited by Vieira, 1997, pp. 51-52)

> [Joan Crawford remembering the photo sessions with Hurrell] I'd scrub my skin until it shone. For him I never wore makeup. Just a scrubbed face. Hurrell loved photographing me without makeup – except for my eyes and lips, of course. (Crawford as cited by Vieira, 1997, pp. 51-52)

In the darkroom, the images were worked intensively by retouching as the sharp focus, and no makeup reproduced every blemish and wrinkle. Initially, Hurrell did his own retouching, as he considered that his technique was also his secret for the quality of his portraits. He finally needed to hire help from professional retouchers, Andrew Korf and James Sharp. The Joan Crawford portrait in Figure 1.49 was reportedly retouched over six hours by James Sharp.

Sharp retouched under Hurrell's supervision but also added novelties to Hurrell's technique by using a retouching machine (Vieira, 1997).

[98] In popular culture, the shift in the appreciation for the tanned look only came in the 1920s, when Coco Chanel returned tanned from holidays in the French Riviera. For example, her tanned look is registered in the iconic pictures, from 1929, by British photographer "Sasha" (Alexander Stewart, 1892-1953).

In the postwar, his portraits were less sought after and considered old-fashioned. Nevertheless, he continued working until the early 1990s. His portraits appear in movie posters, music album covers, and magazines all over the world, like the ones in Figure 1.48, from Portuguese magazines *Cinema*, *Cine-Jornal,* and *Cine.*

Glamour photography came as a definitive break from the typical studio portrait. Pose, composition, lighting, and darkroom techniques changed for a new era and inspire the new generation of studio photographers. Throughout the years, his work was recognized and criticized, photography albums and exhibitions were dedicated to him, and today his portraits are included in many museum collections.



Figure 1.49 – George Hurrell photography and retouching by James Sharp: a. Actress Joan Crawford, post-treatment by James Sharp: a. unretouched print; b. detail of the same print; c. Print after retouching; d. detail of the same print (Vieira & Hurrell, 1997).

Silva Nogueira – The glamour in the theatre

Joaquim da Silva Nogueira (1892-1959) was a portrait photographer at *Fotografia Brasil* Studio in Lisbon. Son of a studio photographer, he inherited the craft but not the style. He was one of the first modern Portuguese photographers. As the technical director of *Fotografia Brasil* since the 1920s, his "artistic" work was in high demand by national personalities, particularly actors[99]. Silva Nogueira worked with a combination of lights inspired probably, by stage lightings from his collaboration with the theatre and motion picture (Baptista, 2015). By 1926, following general tendency, he renovated the studio, favoring more modern, clean backdrops and the geometric forms borrowed from Art Deco. For this and the "tridimensional" poses and movement that only a person from the stage could produce,

[99] At this time, few other photographers in Lisbon had his high-quality work, except for Manuel Alves de San Payo, which had different aesthetics, more reminiscent of pictorialism.

he can be set apart, establishing a more modern aesthetic. One that also permeated the rest of his portraits and his general clientele (Figure 1.50).

Baptista suggests that Nogueira took his inspiration from Hollywood and fashion photographers. He identifies one series of photographs of actress Brunilde Júdice, from 1934, having inspiration on the known Joan Crawford portraits by Edward Steichen for Vogue magazine, from 1932 (Figure 1.50d).



Figure 1.50 – Silva Nogueira, Fotografia Brasil: a. Actor Chaby Pinheiro (*Notícias Ilustrado*, no. 39, Mar. 10, 1929); ~~b~~. "Oriental Fantasy" (*Mundo Gráfico*, no. 25, Out. 15, 1941); c. Actress Maria da Graça receives her first fan letter, on set for the film *Pôrto de Abrigo* (*Animatógrafo*, no. 7, Dec. 23, 1940); d. Actress Brunilde Júdice, 193? (MNTD, from the online exhibition *Corpos Modernos do Palco* [Modern bodies of the stage] (https://g.co/arts/VNoDF8bc38ETCLsS7);

The use of similar composition, with a model all in black standing in a minimalist set, can also be found in other portraits by Nogueira, for example, the ones for the play *Marlene*, with the actress Irene Isidro. With no challenge to this connection, it is noted some time lag between International tendencies and their inclusion in National photography. At this time, Steichen had already abandoned the compositions with horizontal and vertical lines in the background, favoring movement, the outdoors, and more relaxed poses. Also, Steichen's work followed Baron Adolf de Meyer, replacing the pictorial aesthetics with straight photography. However, the soft focus is still systematically used by Nogueira. Raising one technical question, could the soft-focus be a resistance or product of a technical limitation? Could this be because the images were accessed via reproductions when typographic advances had not yet allowed the printing of the sharp images of *straight* photography?

Also, in a quick overview of the images presented by Baptista (2015), one wonders about other sources of inspiration that might have been not so modern in photographic technique?

The inspiration might have been closer, from the actors themselves. And from Paris, which had close relations with Portugal, at that time, and was at the height of cultural activity of the 1920s, known as

Les années folles,[100] in the reconstruction after the Great War.

In Paris, in 1926/1927, Josephine Baker was in all headlines for her shows, *Revues*, at the *Folies Bergère*, which included two of her famous Charleston dances, one with feathers and the Banana dance with revealing costumes.

In 1927, Baptista mentions that the Italian actress and singer Luísa Satanela was working in Portugal and preparing a *Revista* entitled *Água-pé*,[101] which also included a Charleston dance with feathers (Baptista, 2015).

Not much of the particulars of the show were found, but the Portuguese were a more conservative audience, and at least the costume would be as much. A picture exists, by Silva Nogueira, representing the Charleston dance in the show, that was published in the Portuguese journal *O Notícias Ilustrado*, March 3, 1931 (Figure 1.51a). Satanela is in a pose that is an evident copy from Waléry[102]'s version of Josephine Baker's Feather Dance portrait (Figure 1.51b). The costume is also inspired by another of Josephine Baker's outfits for the Folies Bergère (Figure 1.51e). Copy, recreation, or inspiration? The actress clearly knew Josephine Baker's work or researched it in preparation for her own show. And, probably, that is how Silva Nogueira came to recreate the picture.



Figure 1.51 – Inspiring Silva Nogueira: a. Italian Actress/Singer Luísa Satanela, "Charleston," in *Luísa Satanela, Uma actriz que merece* [an actress who desserves it], Silva Nogueira (*O Notícias Ilustrado*, Mar. 15, 1931, courtesy Paulo Baptista); b-d. American/French Actress/Singer Josephine Baker, Folie Bergère, Walery, ca.1927; d. Detail showing a version of b. with retouched modesty bra.

[100] From the French "Crazy years".

[101] The show was a *Revista*, Portuguese equivalent to the French *Revue*, a theatrical show with music and dances divided into sketches, like the ones presented by Josephine Baker. The name *Água-pé* relates to Piquette wine, from the French, a watered-down alcoholic wine derived.

[102] See above.

A curious note on the two known versions of Josephine Baker's photographs[103]: in one, she is bare-breasted, showing how her costume actually looked like during the show, and in the other, she is retouched for modesty's sake. The alternative feather portrait presented also has a retouched feather bra (Figure 1.51c-e). The same modesty retouching is also found in other Josephine Baker's portraits by Walery, namely, with the banana costume, which was also worn bare-breasted but commonly shown with a retouched beading bra.



Figure 1.52 – Silva Nogueira, digital positives from original negatives: a. Actress Corina Freire, 1934; b Actress Maria Helena Matos 193? (MNTD, from the online exhibition *Corpos Modernos do Palco* [Modern bodies of the stage] (https://g.co/arts/VNoDF8bc38ETCLsS7); c. Fado Singer Maria Tereza de Noronha, her first studio portrait (*Animatógrafo*, no.14, Feb. 10, 1941); d-g. details showing retouching: d. hair; e. Cigarette smoke; f. Finger; g. eyelashes.

Nogueira's work was probably as mutable as the aesthetics of the already visual culture of fashion, theatre, and other visual arts.

Other of Nogueira's work shows more modern compositions, and only the soft-focus remained, and

[103] Josephine baker raise to a celebrity status and her portraits were sold as collectibles, a remnant trend from Disderi's *carte-the-visite*.

the retouching, of course, for the perfection that these images demanded. There is not enough information about Nogueira and the studio *Fotografia Brasil* to identify who the retoucher was if Nogueira himself. However, the digital images obtained from the original negatives rarely hide the retouching work like a print. General retouching methodology is easily identified in the online images if one is looking for it. Besides the overall softening of the skin, some retouchings were done to correct strayed features and to define lines and add details like smoke, eyelashes, or to reduce a fat finger (Figure 1.52).

Silva Nogueira joined, or lead, the tendency, and photography permanently became a visual tool and the preferred vehicle for the dissemination of the visual arts in Portugal.

San Payo – Psychological portraits

In Lisbon, one photographer would define his version of pictorialism for professional studio portraiture. Others did not dare it and would repeat the more standard compositions inside the studio despite having artistic aspirations.

Manuel Joaquim Alves (1890-1974), who professionally signed work as *San Payo*, first started as a retoucher in Brazil at nineteen. After that, he became a studio operator. He took classes on drawing and painting and photographed in his spare time. San Payo returns to Portugal in 1921 and rents out the studio from the firm of Julio Worm[104]. In the following years, he secured a distinguished clientele in high society in Portugal, and while he pondered returning to Brazil, he never did. He did, however, closed his old studio and opened a modern one decorated in the *Deco* style in 1929, accompanying the international trend (San Payo & Museu do Chiado, 1995).

He participated in several exhibitions throughout his life, including the Paris *Salon* in 1930 and Chicago the year after. He also wrote on photography and collaborated with several periodicals with articles and images, such as *Objectiva*, *Ilustração*, *Cine,* or *Cine-Jornal.* (Figure 1.53).

From a modest background and with no known connections, he excels in society, and not even other professional photographers would criticize him, as noted by Mesquita and Pessoa:

> Positively is that San Payo stands as artist-photographer, reaching such a status that allowed him to manipulate his models, as he saw fit and to the whim of the artist. Even going outside the conventional poses that were permitted by social mores. (Mesquita & Pessoa in San Payo & Museu do Chiado, 1995)

[104] Julio Worm was a photographer and one of the Worm & Rosa store owners, previously mentioned, publishers of the *Boletim Photographico* magazine.

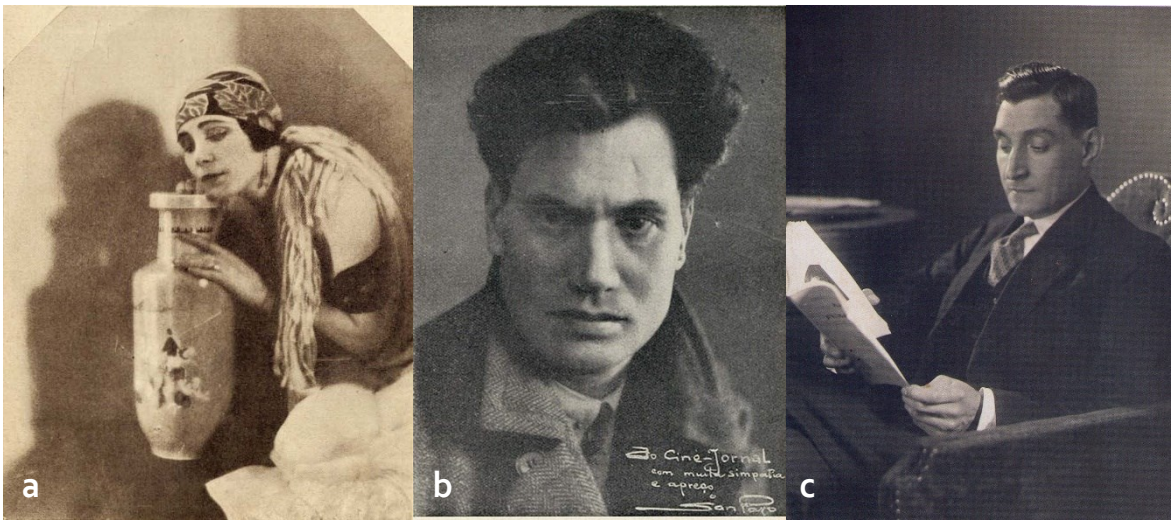


Figure 1.53 – San Payo: a. [Woman with vase] 1929 (*Cine* no.16, Dec. 1929); b. Self-portrait illustrating his article, 1935 (*Cine-Jornal* no.8, Dec. 9, 1935); c. Portrait of António de Oliveira Salazar, 1930s (source, Wikimedia Commons).

Artists are also a common subject in San Payo's photography, and they bring movement to his images and allow him to explore composition and art photography even further.

He would photograph the Estado Novo's political figures from the Portuguese Second Republic (1933-1974), but not as "the photographer of the regime," as some characterized him. San Payo admired Oliveira Salazar, the head figure of Estado Novo, and San Payo was the most recognized photographer, so it was more of a natural choice rather than political (Figure 1.53c). These are formal official portraits that clash with his other more artistic work. These portraits granted him some criticism and less recognition later in life. He collaborated with other photographers, including Cecil Beaton, a distinguished English photographer, on his trip to Portugal in July of 1942.

By 1925 he would photograph only an average of 10 clients a month all high society. Despite the reduced number of clientele, San Payo manages to make a living and be recognized by his studio portraits alone.[105]

For him, photography is art, including his studio portraits. He used it as an expression of himself and an expression of beauty (Mesquita & Pessoa in San Payo & Museu do Chiado, 1995).

San Payo photography was highly technical. He dominated photography with mastery and artistry. Through darkroom processing and manipulations, including retouching, he learned early in his life, and alternative print processes, particularly the bromoil process.

[105] Other photographers have recognition in his time but primarily for their work outside the studio. That is the case of Domingos Alvão which is acknowledged as a pictorial artist for his landscapes and genre photography. However, Alvão is conservative inside the studio and follows his time's general style and standard compositions. The archive from Domingos Alvão's photography studio is one of the selected collections in this research.

He retouches the negatives to make them beautiful – *alindar*[106] – he did not retouch to please the client but to please himself as an expression of his art. He excels in making portraiture an art – he called it *psychological portraits.*

San Payo's work and other Portuguese photographers have recognized time lag compared with other countries in Europe and the US, which might explain San Payo's resistance in leaving is Pictorialist aesthetics, even after World War II. Like Silva Nogueira, his studio improved, his composition evolved to a modern style, but the alternate printing processes and the soft-focus would perdure.

As a cataloguer of faces and personalities, his place in history is assured. However, for his artistic qualities and to understand further his work, San Payo deserves an in-depth study of his photographic techniques, in general, and retouching in particular, as he should be established, definitively, as a landmark in Portuguese portrait aesthetics.

Straight Photography

> *I decided to put a sign in my showcase, similar to the one on my wall – "no retouching..".. Now I will change my sign on Ocean Avenue to read "E. W. Photographer – unretouched portraits." (Weston, 1975, p. 39)*

Edward Weston's quote, or others similar, is often used to demonstrate that straight photography's trademark was unretouched photography, but that might be said to be a simplification, or more plainly, not true.

The perception that straight photography is untouched, meaning not retouched, is challenged in the following examples and subsequent titles.

Edward Weston (1886-1958), an American photographer, frequently wrote in the form of a diary, and his texts were later published in two volumes, the *Daybooks*, first published in 1960. In these, several entries refer to retouching. Mostly he complains that he does not enjoy the retouching work and that he cannot please his clients, which might be more indicative of a lack of will or aptitude to retouching portraits than to exclude completely retouching:

> (December 7, 1923) My days pass monotonously enough, trying to make an ancient American woman, dressed in black mantilla, look like a Spanish señorita, retouching hours at a time. – bah! For professional portraiture! (Mexico - Weston, 1973, p. 36)

[106] *Alindar*, in Portuguese, can be defined as to make something beautiful, beautifying perhaps. It is sometimes used to explain, or justify, the retouching of negatives and prints.

> (August 26, 1924, Mx) Another conserver of strength and saver of time has been the retouching of all my professional sittings by a paid retoucher. (Weston, 1973, p. 91)

About his known work, *Excusado* (1925), Weston debated retouching after realizing that the dark cover was visible in the upper part of the image. Again his diaries illustrate how he convinced himself not to retouch:

> (November 4, Mx) But I have one sorrow, all due to my haste, carelessness, stupidity, and I kick myself with pleasure. The wooden cover shows at the top, only a quartes inch, but distracting enough. (…) such a simple act as unscrewing the cover did not occur to me. (…)
> Now shall I retouch the cover away – difficult to do – being black, or go to the effort and expense of doing my "sitting" over? (…) to do the thing over means a half day's work and confusion plus expensive panchromatic films (…)
> Afternoon – Now that I am "nicely" stewed from beer (…), I see with more clarity. To take off the toilet's cover, either by unscrewing or retouching, would make it less a toilet, and I should want it more toilet rather than less. Photography is realism – why make excuses? (Weston, The daybooks of Edward Weston: Mexico, 1973, p. 135)

These entries show that he would not exclude all retouchings and would do it when otherwise necessary for composition or technical perfection. On an entry about his experiments with glossy paper, it is evident that he considers retouching a common need:

> (April 28, 1930 – Carmel, Mx) Besides giving me all possible quality from a given negative, glossy paper deprives me of a chance to spot – repair – a print from a damaged or carelessly seen negative. Everything is revealed – retouching on the negative or spotting on the print. One is faced with the real issue, significant presentation of the *Thing Itself* without photographic quality (Weston, 1975, p. 39)

Weston clearly makes a difference, and a limit, between retouching to achieve photographic quality and the retouching that changes an image to a way that stops being the representation of the "thing itself." Either his artistic work or in his professional photography. He disliked when asked to alter the likeness significantly. Ansel Adams, in his book, the Print (2006), comments on Weston's technique several times, indicating that he would manipulate his images with burning and dodging techniques[107] and even gives Weston's recipe for spotting ink (2006, p. 68 / 196).

Retaining photographic qualities is the mark of straight photography, and they would no longer print using a process such as bromoil carbon or gum bichromate. Conscious that images could alter in time and fade, they would prefer to print in platinum or palladium processes. More suitable to art, as the prints have a more permanent image while retaining the photographic characteristics.

Weston, Paul Strand, and Ansel Adams would be, among others, the ones representing straight

[107] See Introduction.

photography in the US. In Europe, between the wars, Germany would stand out with a modern way of photography. The Head figures for the new aesthetics were Albert Renger-Patzsch (1897-1966), the most celebrated representative of the Neuen Sachlichkeit [New Objectivity], and Lazló Moholy-Nagy (1895-1946), born Hungarian, would teach at both the Bauhaus in Germany and later founder of its counterpart in Chicago (Warren, 2006).

Research into each author's photographic process would be needed to demonstrate the use of retouching in straight photography. Prints sometimes hold some clues, but the study of the negatives is essential, when they still exist, and if not cleaned in any conservation treatment. A comparison between prints and negatives would also demonstrate that non-permanent retouching techniques and masks were probably used.

Camera Work and the transition to straight photography

Of the many magazines dedicated to art photography, stands out *Camera Work*, published in the US, between 1903-1917. Its characteristics are quality from design to printing, the opinion articles which reunited the most prominent artists, including many women photographers. All of the most iconic images of this period were published in its numerous illustrations.

Created and edited by Alfred Stieglitz was where pictorialists, particularly Photo-secessionists,[108] could share and comment on each other's works. It also presented works by painters and sculptors, including reproductions of Picasso and Matisse's works or drawings by Rodin.

It exchanged correspondence with other photography magazines from Europe, frequently published opinion articles, and promoted discussion from readers, particularly other pictorialists. Like the Portuguese example of *Boletim Phootgraphico* discussed before and other magazines and their contributors, *Camera Work* struggled to define art photography. Despite all experimentation, it had not yet established a definition of art photography, and many were the articles published about it.

They are interesting to read in parallel as the opinion in one may have complete opposition in another. One example was a discussion in *Camera Work* issue 18, from 1907, a reproduction of a text from the *Amateur Photographer*, a British magazine, an opinion article reacting to the French pictorialist Robert Demachy's views. To this article, some responses were added from Demachy himself and three others: George Bernard Shaw, critic and writer, Frederick H. Evans, and Francis Meadow Sutcliffe, British

[108] Photo-Secession was a group also founded by Alfred Stieglitz in 1902. Like other secessionist groups intended to break with old aesthetics and lead art in general into the modern age, particularly photography, definitely defined as an art.

photographers. Some of the passages, which start:

> Let us be honest. If photography is a mechanical pursuit, its limits can be clearly defined; but if it has ambitions also in the direction of art, it can not be run on lines which are fixed within such limits. […] Very telling indeed and bravely said, perhaps for the first time, is the concluding paragraph but one of this article: "The photographic character"— that is, a photograph which is nothing more than a photograph— is," and has always been, an anti-artistic character." [in quotes passages from Dimachy´s original text] – signed A. M.

Demachy's response cites several opinions against pictorialist that now seem coherent, but that he quotes them to show how wrong they were:

> "There is no merit in proving that photography can do as well as is done by other processes; on the contrary, progress consists in showing the power of photography in directions which no other medium can reach." […] Elsewhere we have this appreciation of a landscape by M. Puyo: "The evidences of brush-work visible on the proof are to be regretted, insomuch as they would lead us to imagine that the artist's medium is incapable, without assistance, of giving the effect in question." […] When, then, the critics—our neighbors—accuse M. Puyo of betraying the qualities of his medium because he has left on his print traces of the instrument necessary to develop it, they deceive themselves and lead their readers astray. A print developed with a brush which resembles a print developed with a brush betrays nothing at all; it is consistent with itself. […] Let us entertain no illusions with regard to the movement now being organized in England. It is bringing us straight back to the mechanical system against which we have so persistently fought.

To that, the English responded:

> […] Let the eyes judge, as M. Demachy insists. If the result is wrong, the process is wrong. If brush marks are so partial and so insistent as to obviously distract one's attention, they are wrong. If […] everything photographic has been wiped off it; why call it a photograph? With any other name would smell as sweet! […] If the desire of that "artist" is to so remove all trace of the camera's aid, […] —why should he want to be included in a photographic exhibition? – by Evans
>
> The merit of clean workmanship were called inartistic because the school with which they were associated was inartistic. There are still people who think that platinotype is artistic, and albumenized paper inartistic. – by Bernard Shaw
>
> Another reason why "Pure photography" may be the cry is because of the optician. He doubtless asks in an injured tone of voice when he sees a gum print, "Where do I come in?" After he has been at such pains to enable us to get such marvelous definition it seems rather too bad to throw his kindness in his face. – by Sutcliffe

Because some pictorialists' works were so strongly manipulated in the print, in this argument by the French Dimachy and Puyo, they argued that they should not be considered photographs anymore, despite recognizing their artistic qualities.[109]

[109] Not a response to this particularly, but applicable, is Mary Warner Marien's remark: "A painting with photographs glued to its surface has remained, somehow, a painting." (Marien in Heron & Williams, 1996: 215).

However, these were not painters that learned how to make art in Fine Art academies and now wanted to break with the norm. There were no academic teachings on photography to break from, for photography and their contributors, art was being defined by experimentation and, in today's perspective, ironically, by imitating academic art. Although they were all generally included in the Pictorialism group, their views on art were personal and varied.

Many artists in this magazine would later transition from the misty pictorial photographs to *straight* photography, including Stieglitz himself. And maybe in some act of remission to a recognized narrow approach to art, Camera Work would dedicate the two final issues to Paul Strand that would lead the new aesthetics.

Paul Strand - The art motive in photography

Paul Strand (1890-1976) was an American photographer, recognized as one of the first to break out from the pictorialists into *Straight* photography. He explored social themes, the city, nature, people, or manmade constructions. (Rosenblum in Warren, 2006, pp. 1500-1502). The classical compositions were abandoned in favor of a realistic depiction of subjects. New angles and viewpoints were explored to achieve abstraction and decontextualization from the real.

In 1923 Paul Strand wrote a comment that appears to be a response to the review by Arnaldo Fonseca mentioned above. Not like the direct criticism of the discussion in *Camera Work*, also mentioned before, but more of a moderate opinion excusing the former photographers and their pictorial views. From the text *The art motive in photography*[110]:

> Gums, oils, soft-focus lenses, these are the worst enemies, not of photography, which can vindicate itself easily and naturally, but of photographers. The whole photographic past and present, with few exceptions, has been weakened and sterilized by the use of these things. Between the past and the present, however, remember that there is this distinction—that in the past these extrinsic methods were perhaps necessary as a part of photographic experimentation and clarification. But there is no such excuse for their continued use today. (Strand, 1923 in Goldberg, 1981, p. 280)

In a way, he recognizes that the aim of straight photography is the same as the pictorialists. To guide photography to be recognized as an art. After enough experimentation, photography could now aspire to be art by being photography. Straight, meaning direct, honest, just photography for its intrinsic photographic qualities alone. And its product would no longer resemble painting or anything else but photography.

Still, the question was the same, if anyone can do it, is it art? Art needed to be an opposition to the

[110] First published in 1923 by *The British Journal of Photography*, Vol.70, pp. 612-15.

amateurs, *Kodakists,* that just press the button. Art photographers needed to excel in all photographic procedures – *manipulations.*

Retouching was not considered "manipulation," as now this word is understood. Manipulation meant handling; it meant all the steps necessary from before the camera until the finalized print. And retouching was just one of the steps. When required and without exaggeration, for finishing the image, for composition sake, and still to overcome some technical difficulties, this also included retouching the negatives - and chemical retouching and toning, manual retouching of the prints, and other non-permanent retouching techniques.

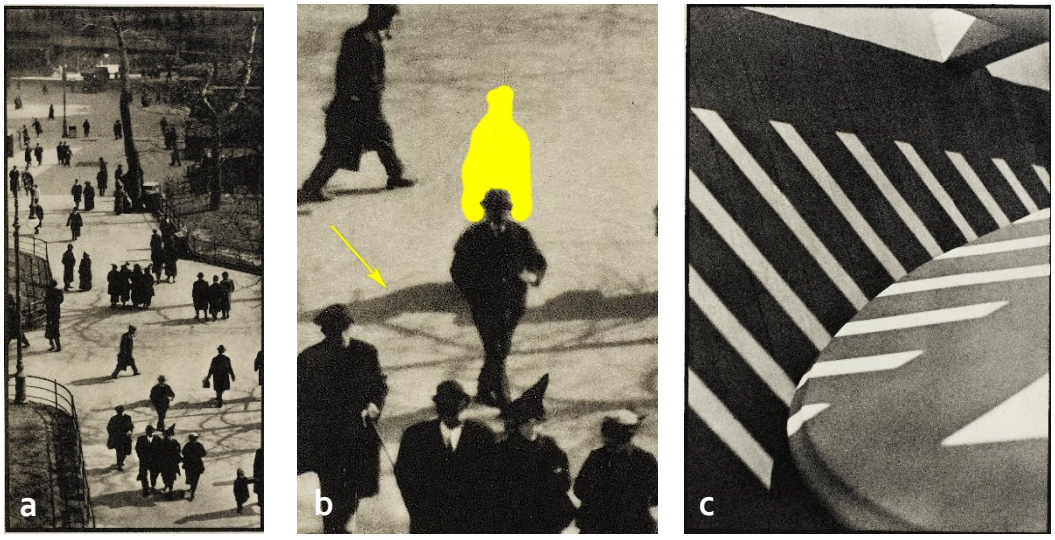


Figure 1.54 – Paul strand: a. City Hall Park, New York, photogravure, 1916 (original from, Camera Work no. 48, Plate VI); b. detail showing highlighted the retouched area, and forgotten shadow; c. Abstraction, Twin Lakes, Connecticut, photogravure, 1917 (Camera Work no. 49/50, Plate X).

Straight photography would produce highly technical images. Its best artists would be the ones that could perfect photography *manipulation* to a new level of mastery. Paul Strand would be one of them. One example of Strand's photographs where the retouching was noticeably done is the New York photograph referred to as the *City Hall Park*, published as plate VI in no. 48 of *Camera Work* of 1916 (Figure 1.54a). Here Strand did not retouch only to ameliorate technical defects that might have been invisible. He eliminates a person from the scene to arrange a composition.[111] Strand is betrayed in his retouching, as he forgot to erase the men's shadow (Figure 1.54b).

[111] It is a remembrance of the first surviving example of a retouched photograph, mentioned above, the Malta Capuchin monks by Calvert Richard Jones in 1846.

He also retouched the prints.[112] Print retouchings were usually done with pencils or dyes matching in tone the surrounding area of the photograph, making them invisible. These retouchings are very stable and do not fade with light but sometimes become visible in time, as the prints fade.

The research by photography conservator Lisa Barro of Strand's photographs on satista paper from The Metropolitan Museum of Art reveals print retouchings. Barro also identifies Paul Strand as the retoucher (Barro, 2003). The retouching is visible as the prints present some fading. Barro mentions, from an oral communication by Richard Benson, that Strand himself notice this, meaning that the prints started to fade in Strand's lifetime. One of the images studied was the *Abstraction*, also called *Twin Lakes,* printed in 1916 (Figure 1.54c). The problem was that Strand had used a special paper that supposedly had the properties of platinum paper, but was in fact, a mix of silver and platinum. While the platinum is stable to light, the content in silver was responsible for the fading (Barro, 2003).

Ansel Adams' pure photography – Landscapes

Ansel Adams (1902-1984) was an American landscape photographer influential as a photography teacher and active participation in environmental and photography organizations. He is also recognized for his written books, texts on his photographic work but also his comprehensive photography manuals: *The Camera*, *The Negative,* and *The Print*[113]. Early photography by Adams would follow the pictorialism movement reproducing emotions by various processing methods and the dramatic use of light. Later, he was influenced by the direct approach and straight photography of Paul Strand.

In the 1930s, he co-founded the *Group f/64*, an anti-pictorialism group, and he turned to the direct photography and sharp focus images with high technical quality to which he is best known.

The *Group f/64* was dedicated to *Pure Photography*; again, "pure" did not mean that they would not resort, when necessary, to retouching or other manipulations. Pure photography is related to establishing photography as an art *per se.* The difference from straight photography was that they limited the subjects of their photographs, avoiding the studio, arranged compositions, poses, and

[112] Retouching of the print was considered complementary to the retouching of negatives. It was done to eliminate pinholes produced during the printing process, sometimes referred separately to retouching as spotting. It was also done to enhance lines, and other features when not identified and corrected in the negative or blurred lines resulted from light and lens aberrations or in the transition between high- and low-density areas. Not be confused with overpainting and coloring of the print.

[113] Although he also mentions color photography in his books, they focus, like his work, mostly on black-and-white photography.

lighting systems. They aimed to reveal the natural qualities and form of nature, man (mostly in natural settings), and natural and manmade objects.

Although many of Adams' photographs seem to capture a fortuitous moment, as the above quote suggests, Adams would take long preparations for every picture. In his texts, Adams reveals his laborious process that included several forms of negative and print manipulations. Again, contrary to some descriptions found about his work, that seem to confuse pure photography with untouched images and seem to ignore all darkroom processing.[114]

Adams worked initially by trial and error and then his considerable experience. With Fred Archer, he developed the zone system that assists the exposure, the developing, and printing processes. Although the zone system was thought to help predict results and camera adjustments, these come from observing preliminary experiments and test prints or using black and white Polaroids.[115] Only when satisfied he would select the camera adjustments. After the capture, he would also intensively work his image in the darkroom both in the negative and in the print to achieve technical perfection (Adams, 2005, 47-98).

Although he photographed in medium and large format, he describes only a few of the negative retouching techniques focusing more on the print retouching. For reproductions, he recommends giving the work to a professional retoucher (Adams A. , 2006, p. 188).

There are several reasons for this. One, while Adams was a commercial photographer, and he did commission work, besides his more artistic personal photography. Still, he produced his images as single prints and not directly for reproduction in publications. His famous *Moonrise*, Hernandez, New Mexico (1941), was printed by Adams more around 1000 times, with recognized variations. The printing process manipulations were non-permanent and had to be repeated each time, resulting in slightly different images.

A second reason was that he was mainly a landscape photographer. He did not need other permanent manipulation methods more commonly practiced in publishing, advertising, or portraiture.

And a third reason was that he writes to people already using the 35mm negative, which precluded muck of the manual retouching in the negative.

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[114] For example, In *Photography a Cultural History*, by Mary Warren Marien can be read: "the main work of picture-making took place, not in the darkroom, but before the film was exposed" (2015, p. 271). Although in later texts, it is noticeable that she has changed this perception as she writes: "Despite the name, straight photography actually involved an array of techniques and tricks," a "Philosophy of art backed up with an authorized complement of techniques" (2020, p. 143).

[115] The Polaroid camera and the Polaroid prints are discussed further up.

Nonetheless, he teaches several ways to alter the image, mostly chemically, by using different developers, reducers, and intensifiers[116]. He also altered his images by using filters in the camera or by the techniques of dodging and burning[117], non-permanent masking techniques, during printing. On manual retouchings, he centers on two primary techniques, spotting and etching, that he gives a full explanation in is *The Print* book (Adams, 2006, pp. 157-161).

The retouching machine

At the turn of the century, advertisements in photography manuals and magazines mention all sorts of retouching aids, among them self-retouching frames and mechanic retouching pencils. The retouching frame had a screen that diffused light while printing creating a slight blurring effect and erasing details, similarly to the action of the soft-focus lenses (Figure 1.55).



Figure 1.55 – Advertisement to "Chassis Auto Retocador" [Self retouching frame] by L. Joux (*Echo Photographico*, no.3)

The negative was always set in similar support, the most common, a tabletop retouching desks as seen in different figures throughout the text, to be used with natural light or with a lamp for night work. The improvement that was missing was to attach an electrical source to the retouching desk. A quick search, only in American patents, returns many results for electrical machines. But one of the firsts, and if not the first, at least the one that was the first commercial success, was the Adams Retouching Machine, with a patent registered in 1947 (Figure 1.56a). This machine joined both ambitions of an

[116] These were various chemicals that, as the name says, would reduce or intensify tone values. They could be applied in the entire negative, as a bath, or with a brush or cotton swab in selected spots or areas.

[117] Dodging and burning are complementary techniques done when printing. Like other retouching techniques, they alter tone values in the print, but the process is not permanent. The original negative remains the same, and for a second print, the process needs to be repeated. Dodging and burning are done using paper masks, other materials, or just the operator's hand. As described by Ansel Adams: "dodging and burning are methods of changing the exposure of local areas within the print without affecting the overall exposure. During the main print exposure, light can be held back from certain areas by physically blocking part of the light exposing the paper. This dodging reduces the exposure, thus making the affected areas lighter in the final print. Then, after completing the main exposure, additional burning-in time can be given to specific areas that need more exposure. Although the principle is quite simple, often a rather complex sequence of burning and dodging steps is required to achieve just the right balance of values" (Adams, 2006: 102). See also the Introduction.

electrical light source and the vibrational movement (Figure 1.56b) that alleviated the retoucher's hands. From the patent:

> This invention relates to a device for use in retouching photographs. […] The principal object of this invention is to provide means for automatically forming these small, microscopic check marks so that retouching will require less skill and less time. (Adams, 1947)

One of such machines might have been used by James Sharp, one of George Hurrell's staff retouchers. The manuals on retouching authored by Wayne Floyd (1968), Jan Miller (1986), and Veronica Weiss (1986), to name a few, include descriptions and images of the Adams retouching machine, the latter dedicating an entire chapter to it. Contrary to what Ansel Adams' books and catalogs might suggest, these illustrate that retouching for portraiture and publishing was a very active profession.

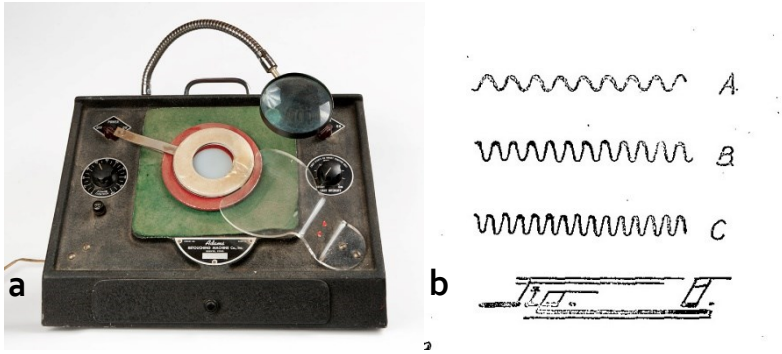


Figure 1.56 – a. Adam's Retouching machine, 1947; b. pattern of movement of Adams' retouching machine from the patent application (Harry Le Roy Adams, assignor to Adams Retouching Machine Company, Colorado: patent US2422174, Photographic retouching device, June 17, 1947).

Only a small note on color photography

In this small historical review of retouching practices, the subject of color photography goes far beyond the purpose of this research. Still, it would be incomplete without a few remarks.

Of all initial progress in photography, color was the most elusive one.

The first inventors believed that the black and white silver processes and principles only needed to be worked a little to achieve the same results in color. As early as 1861, photography met the earliest known successful image in color, by James Clerk Maxwell, of a tartan ribbon. It was made by combining three black and white images obtained with different filters in what is called subtractive color mixing. This three-layer image needed to be projected for observation, as transparencies with red, green, and blue filters, that when put together, reproduced the original colors (Hirsch, 2015). Not a practical

photography, and envious of its black and white cousin, that although laborious could be replicated more straightforwardly.

Contrary to initial expectations, color photography did not leave the laboratory until the twentieth century and was only a wide commercial success a century after photography was first invented.

All of the color processes would follow the additive or subtractive color methods. That is, the image is produced in separate colors that, when combined, reproduced the full color. Additive methods work with light and need to be observed in transparency, like the method used by Maxwell. The subtractive methods also meant the juxtaposition of colored layers but did not need to be projected for observation, and it is the basis for the dye transfer printing method.

The Lumière brothers would be the first to produce a commercially viable color process, the *Autochrome*. Introduced in 1907, it would remain in production, with little competition, until 1935. They were made using a single plate that could be operated with conventional cameras (Hirsch, 2015). Autochrome images need to be observed in transparency with strong light as the images are formed on tiny potato starch particles that absorb most of the light (Figure 1.57a). Its soft grainy images appealed to the pictorialists (Figure 1.57b).

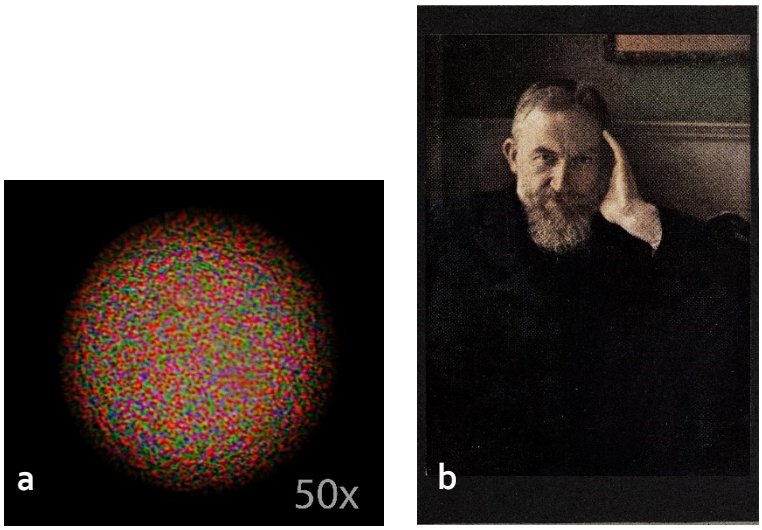


Figure 1.57 – Color Photography: a. Autochrome, 50x magnification; b. G. Bernard Shaw, four-color half-tone reproduction of original Lumière Autochrome, by Edward Steichen, 1908 (Camera Work no. 22, plate I).

No reproduction can fully replicate the experience of observing an autochrome directly, much like its old black and white counterpart, the daguerreotype. The process itself and viewing limitations also reduce detail reproduction and perception, and images are not retouched.

Widespread use of color would only be achieved when Eastman Kodak developed the Kodachrome in

1935, out of the research of Leopold Godowsky and Leopold Mannes. The Kodachrome was a tri-pack subtractive color reversal film, and this means a multilayer structure sensitive to blue, green, and red that needed only one exposure to record a latent image in each of the primary colors. As practical and reliable, this process was for the final user; the Kodachrome could only be processed by professionals. Hirsch summarizes the process to the final product:

> Kodachrome was first developed into a negative and then, through reversal processing, into a positive. During the second development, the colors of the original subject were transformed into the complementary dyes of cyan, magenta, and yellow, which formed the final color image. Then the positive silver images were bleached away and the emulsion was fixed and washed. This left a positive color image that was made up of only subtractive colored dyes, with no silver. (Hirsch, 2015, p. 32)

Kodachrome was imagined for the movie industry but also quickly adopted for still photography in the 35mm format. Each image still needed to be observed using a projector and was a singular object not meant for reproduction. Although, for a short period, it was also released a printing process on plastic. Later, in 1942, Eastman Kodak released the Kodacolor, meant as a color negative that could be printed on paper in a more manageable process, later named Ektachrome. Other companies competed in these processes, for example, Agfa with Agfacolor.

These were transparency processes, and when reproduced on paper, they followed the dye transfer process. That is, the original film was separated into three dye matrices, using filters in their subtractive primary colors, as the red layer being translated into a cyan dye; the blue into yellow, and the green into magenta. The dyes were then transferred in order of cyan, magenta, and yellow. The photographer would work in normal light that allowed color control over the resulting print (Hirsch, 2015).

The dyes used are very stable and lightfast. Any retouching is done on the print by using the same dye materials of the print, sold by the same manufacturers. Using the same material is important because the retouching can be made completely invisible, whereas using different dyes, even if in the same tone, would result in different transparency properties and noticeable when projected.

An alternative color process that did not follow the same as other photographic methods was introduced by Edwin Land and his Polaroid Corporation. Polaroid started producing polarized films meant for glasses and other viewing devices. After the Second World War, Land first marketed a black and white Polaroid process to be used with the *Land Camera*, named after its inventor. In 1963, a full peel-apart color process was marketed. These were "instant processes" that made the darkroom unnecessary as the film developed itself. The film contains both negative and print.

The Polaroid, as it is commonly called, is a *diffusion-transfer process*. The image develops itself in

daylight and takes about one minute. The necessary reagents are included in the film and are released when the film is pushed between rollers as it comes out of the camera. (Hirsch, 2015).

This process had great success with amateurs for its instant results. But also with professionals that would use the *Polaroid* as a preview for their photographic process as seen, for example, by Ansel Adams. Its instant qualities were not to be retouched or reproduced, as each image is unique.

Aside from pictorial experiments with the autochrome, many artists and other professional photographers would resist color, preferring to work with the traditional black and white.

Color photography was firstly accepted by the amateur practitioners that did not need or want to process their films and prints. The prints obtained from 35mm film were usually done in a postcard size of 10x15 cm that was not retouched.

Professionally, the color was rapidly adopted by the publishing and advertisement industries. Retouching, and image manipulation, became an entirely different process to that seen so far and was done to the print. Only later was the color gradually adopted by general professional photographers as the public started to expect the color image.

The exceptions were themselves extraordinary, among which Madame Yevonde. Recognized in her time and acclaimed to this day, she was a portraitist that innovated in her daring work with color photography.[118] She used the process Vivex, a subtractive process that uses three negatives, which needed to be printed simultaneously, all by hand. With all the inconveniences of a tri-negative process, Yevonde knew how to get the best in color manipulation, and her pictures have bright tones of colors not seen anywhere else. As she stated:

> If we are going to have color photographs, for heaven's sake let's have a riot of color, none of your wishy-washy hand tinted effects! (Madame Yevonde, as cited in Ang, 2014, p. 236)

She photographed celebrities in color. A suggestion is to compare her Vivex portrait of playwright George Bernard Shaw, from 1937, with the autochrome in Figure 1.57b to appreciate her words on color photographs.[119] She is most famous for her Vivex *Goddesses* compositions, highly manipulated portraits before and after the camera, which have no equal to this day.

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[118] She also photographed in black and white, and in the 1950s and early 1960s, experimented with solarization, a print manipulation technique developed as an artistic expression by Man Ray (1890-1976) in the 1930s. Solarization, also known as the Sabatier effect, is a tone reversal effect. It is a photographic technique that renders part of an image negative – tone reversal – and part positive by exposing a partially developed print to light before continuing the process.

[119] The image can be accessed at the online National Portrait Gallery, UK, with accession no. NPG P871(5), at: https://www.npg.org.uk/collections/search/portrait/mw16600/George-Bernard-Shaw [Retrieved February 2021]

The candid-camera and the photographer's eye

The twentieth century is marked by two world wars that changed forever and, in countless ways, the society and the view of themselves as individuals and groups. Photography helped illustrate every event as never before. In the second half of the century, the same photographers who recorded World War II would help shape photography.

The title was borrowed from Lincoln Kirstein and the catalog *Walker Evans American photographs,* the exhibition held at the Modern Art Museum of New York (MoMA) in 1938. After "the candid-camera" subtitle, the text goes as follows:

> Recently we have not been greatly troubled by the old-fashioned 'artistic' soft-focus photographer. We all agree to laugh him out of magazines and exhibitions ten years ago. But new kinds of eye-corruptors have arrived. […] The new confusers are the candid-camera men. The candid camera is the greatest liar in the photographic family, shaming the patient hand-retoucher as an innocent fibber. The candid-camera with its great pretensions to accuracy, its promise of sensational truth, its visions of clipped disaster, presents an inversion of truth, a kind of accidental revelation which does far more to hide the real fact of what is going on than to explode it. (Evans & Kirstein, 1938, p. 191)

Kirstein continues categorizing Walker Evans as an anti-art-photographer – or not a photographer at all – and his candid-photos are exhibited as social documents rather than art or photography (Evans & Kirstein, 1938, p. 191).

Walker Evans (1903-1975) in the US, and from the same era, Henri Cartier-Bresson (1908-2004) in France would be recognized in history for their documentary photography, street photography, and photojournalism. They are successful examples of professional photographers that sprung out the "You Press the Button" idea, and they would set the standards to those that followed them.

One name repeated yet again is Edward Steichen. As director of the photography department of the Modern Museum of Art in New York, he wrote various times on his views for the future of photography in America:

> Modern photography is puzzling and contradictory, for our best photographers are attracted to the medium because it is young, elastic, and has elbowroom to grow in – lots of elbowroom! (Steichen, 1952 in Petruck, 1979, p. 2)

Steichen received his fair share of criticism for his work, but also as a Director at MoMA. Despite his work as an artist and recognition of the "elbowroom" in photography, as a director, his choices left out essential approaches to photography in favor of one more connected to social commentaries.

His most famous exhibition at MoMA, *The Family of Man*, was prepared with a collection of images reunited in a narrative designed by Steichen and was announced as "The greatest photographic

exhibition of all time." It presented 503 images collected from Journals, magazines, and photojournalist groups presented as reproductions, some enlarged others not. In the catalog, the words he uses to describe the exhibition are revealing:

> The exhibition, now permanently presented on the pages of this book, demonstrates that the art of photography is a dynamic process of giving form to ideas and of explaining man to man. It was conceived as a mirror of the universal elements and emotions in the everydayness of life —as a mirror of the essential oneness of mankind throughout the world. (Steichen, 1955)

While categorizing photography as an art, the exhibition does not present any image as an art object. Even if one can recognize the images' artistic qualities, in some of them, they are all presented as social commentaries put together in a narrative imposed by Steichen. The image was valued for the image's content alone without recognizing the photographer's name, production, the original medium, or original context.

Later Steichen, Evans, Cartier-Bresson, and Eugène Atget, another father of documentary photography, among others, in a group of 105, would again be featured at MoMA in *The Photographer's Eye* exhibition in 1964.

Before, these images were documents, but now the same museum praised these and other photographers for their work not as art, nor science, nor document, but recognizing and exhibiting them as photographs.

In the catalog, an essay by Szarkowski underlines the unaltered practice of photography independent of any other medium, art, or not. The catalog is divided into small texts with suggesting titles: "The thing itself," "the detail," "the frame," "time," and "vantage point." In each one, he highlights that photography is not posed; the photographer does not conceive but only selects, despite featuring several studio portraits and composed images. In a shortsighted view of photography, he differentiates it from painting with the refrain of photography as *picture taking, instead of making*. And casually, he ignores the importance and evolution of all the technical aspects of photography since its invention.

> These pictures are unmistakably photographs […] Those who invented photography were scientists and painters, but its professional practitioners were a very different lot. […] The enormous popularity of the new medium produced professionals by the thousands—converted silversmiths, tinkers, druggists, blacksmiths and printers. If photography was a new artistic problem, such men had the advantage of having nothing to unlearn. (Szarkowski, 1966, p. 6)

Szarkowski also seems to ignore that Cartier-Bresson, Steichen, and others included in the exhibition started as painters.

Like other texts mentioned before, these need to be interpreted considering the period and its prevalent contemporaneous tendencies in photography, particularly how photography was being valued for the image alone. From the same period are the History texts from Beaumont Newhall and Alison and Helmut Gernsheim that suffer from the same myopic tendency to ignore or criticize any photographic manipulation, either in its historical or updated uses.

Another step was taken in photography history. Photojournalism and documentary photography had entered the museum. Despite any theoretical views on photography, retouching is more and more a necessity. These were still professional photographs. As seen above, retouching had permanently been established as part of the process, even if reduced to a minimum.

Exploring art photography and photomontage

At the same time that some made their efforts to define art photography as pure or straight, others "during the 1920s and into the 1930s (…) experimented with ways of distancing the photographic image from its inevitable referent," as described by Michel Frizot (1998, p. 449).

Since the Impressionists, painters and photographers influenced one another, and all the *isms* in modernism would have representation in painting and photography. Not by imitation like it was for the pictorialists but as an alternative medium to be explored.

Toulouse-Lautrec's well-known double portrait is a photomontage by double exposure, as explained in manuals of the time.[120] It was done by his friend Maurice Guibert and is one of the many examples of the close relationship between photographers and painters (Figure 1.58a). Marcel Duchamp's *Nude Descending a Staircase no. 2*, from 1912, is one of the most cited examples of photography influencing painting. But many artists would experiment in both mediums. Man Ray, already mentioned for his contributions to fashion photography, is one example, experimenting with the avant-gardes like Dada and Surrealism both in painting and photography and more. Salvador Dali (1904-1989), another surrealist, would also experiment with photography, painting, sculpture, and other mediums.

Nevertheless, these artists would explore each medium for their own characteristics; they were photographs that looked like photographs despite any manipulations. Or, in mixed media, the part that was a photograph was used for its photographic qualities. As artists explore other ways to express their art, retouching will again be used freely, not only as a technical part of the photographic process but

[120] See above, *Oscar Gustav Rejlander – Art and* reality and Figure 1.26d.

once more to aid the artist in their experimentations, particularly with photomontage.



Figure 1.58 – a. Mr. Toulouse paints Mr. Lautrec, Maurice Guibert, ca.1891 (source Wikimedia Commons); b. The Constructor, self-portrait, gelatin silver print, El Lissitzky, 1924, (V&A, PH142-1985)

As an artistic expression, and in the twentieth century, the photomontage, like Robison and Rejelander did before that, was now explored beyond the boundaries of reality and with much more presence and experimentation.

It is not easy to choose examples as they are many. Figure 1.58b shows a known photomontage by El Lissitzky (born Lazar Markovich Lissitzky, 1890-1941).[121] His work does not use only photographs; it combines photography with other media, in a collage of lithographic material and drawn elements added to Lissitzky's self-portrait, superimposed by his hand.

Women photographers also made essential contributions. For example, Wanda Wulz (1903-1984), in Italy, follows Futurism's tendencies in her most recognized photomontage self-portrait *Io + gatto*, from 1932. The photomontage was achieved by superimposing two negatives, one with a self-portrait and another with a cat. Or, Grete Stern (1904-1999), a German-Argentine photographer. In Germany, she started working in design, before the war, with her friend Ellen Auerbach (Warren, 2006). This experience in design would later influence her work. In Argentina, after 1935, she worked for a women's magazine. Inspired by readers' letters, Stern contributed to the magazine a series of surrealistic compositions, collected as *Los sueños* [The dreams] (Fineman, 2013). The methodology was similar to that of Rejlander or Robinson, and the composition was arranged using several negatives.

Not all photomontage is done by photographers or done by photographic processes. John Heartfield

[121] This artist was chosen for the simple fact that his work is already in the public domain and can be reproduced freely.

(born Helmut Herzfeld, 1891-1968) is famous for his politically charged photomontages. However, he was not a photographer. Instead, he "borrowed" materials from different publications and made them his own through the process better described as *photo-collage*. He had collaborators that would retouch the composition, eliminate the collage look, and photograph the result for publication, which was usually done by the rotogravure method (Bañuelos Capistrán, 2008).

Photomontage includes a variety of processes. It is a general term used to describe the combination of images that do not need to be all photographs. It may be done all in the camera by multiple exposures or combining two or more negatives, prints, or other media.

Studio photographers would still print postcards as collectibles with imagined compositions like Figure 1.59a *A Car Load of Texas Corn*, by George B. Cornish. Or use photomontage to produce a group portrait from existing separate prints Figure 1.59b, or just to introduce design features like a decorative border to a portrait, like in Figure 1.59c.

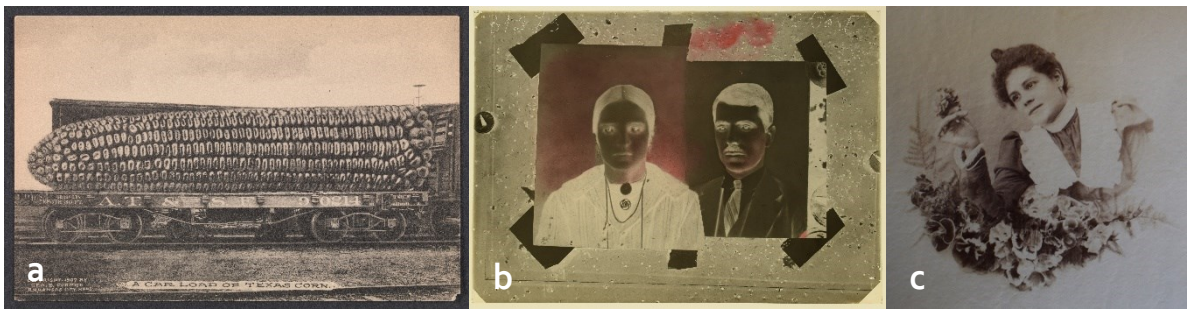


Figure 1.59 – a. A Car Load of Texas Corn, gelatin silver print, George B. Cornish, ca. 1910, (The MET, 2007.460.15); b. Double portrait photomontage, dry plate negative, Foto-Carvalho (Estúdios Correia); c. Actress Cecília Machado composition with garland, half of stereographic test print, Aurélio da Paz dos Reis, 190? (CPF, test print from negative APR, 007195)

The photomontage is not a retouching technique, but retouching is used to complement it, mainly to disguise the union of the different elements and aid the illusion of a unified image.

Figure 1.59b shows how red colorant was used over one part of the image to correct tone and achieve a homogeneous background, and finally to create the illusion of both persons being photographed at the same time.

Many of the manipulations were done before the final print in a laborious process. The photographer could start with prints, like in the example in Figure 1.59b, or he could produce original images and then do a workflow – a sequence of actions – that might include the following:

- The original image is created
- The negative is then retouched as required

- A print is done from the retouched negative
- This print is worked over, retouched, cut, and other manipulations to achieve the desired composition – the photomontage.
- The photomontage is photographed, and a second negative is obtained.
- This negative is again retouched as needed.
- A final print is produced.
- And finally, the artist could do some retouchings or over-paint and color the print.

Design and advertising would explore the photomontage technique creatively. Especially for the published image, photomontage became commonly used in all areas of photography, even photojournalism.

Teófilo Rego – architectural photography and photomontage

Teófilo Rego (1913/4?-1993) was a Portuguese studio photographer in the city of Porto. He started his apprenticeship at the Marques de Abreu printing and engraving studios from the age of 14 until 31. Marques de Abreu was himself a photographer. There Teófilo Rego learned engraving and typography, but also photography and photogravure. He starts working independently after 1947 and opens a studio, *Foto-Comercial*, where he did mostly portraits and other commission work. Manuel Leão Foundation now owns his archive, and it is housed at the Museum *Casa da Imagem*. There are not many studies about Teofilo Rego, but the variety and quantity of preserved images in this archive make it a valuable resource.

His commercial work includes, besides portraiture, photojournalism, advertising, architectural and industrial photography. Most interesting are the commission works, between the 1940s and the 1960s, that he did for several architects, namely Rogério de Azevedo, Januário Godinho, João Andresen, or Alfredo Viana Lima, among others.

For these architects, Teófilo Rego photographed the architectural models and the finished project but also the place where the projects were to be implemented (Barradas, 2015; Trevisan, 2015). The archive holds mostly negatives, and the final use for these images was not yet completely identified. Probably, most of them were published or used to illustrate the architects' projects, and some might have been used just to aid the architects in their process.

However, it is possible to infer that much of the images were used in photomontages. The architectural

models are photographed in perspective and then composed as aerial or street views.

Many of the images are retouched, mainly using red translucent ink masks that acted as filters to alter brightness and contrast (Figure 1.60a). Some examples of photomontage used several negatives. Others are secondary negatives produced after a first print was combined with others to compose the final image (Figure 1.60c). The secondary negative is then retouched to disguise intersections from different parts of the photomontage and achieve the final intended effect.



Figure 1.60 – Photography by Teofilo Rego: a. Factory by Architect Teixeira Lopes, 1947-1970, dry plate negative (MCI, FML PT-FML-TR-COM-54-11); b. model for the monument to the Infante D. Henrique, by Architect Nadir Afonso, cellulose acetate negative, ca.1955 (MCI, FML PT-FML-TR-COM-529-4); c. secondary negative with photomontage with water and clouds, model for the monument to the Infante D. Henrique, by Architect Nadir Afonso, cellulose acetate negative, ca.1955 (MCI, FML PT-FML-TR-COM-529-3)

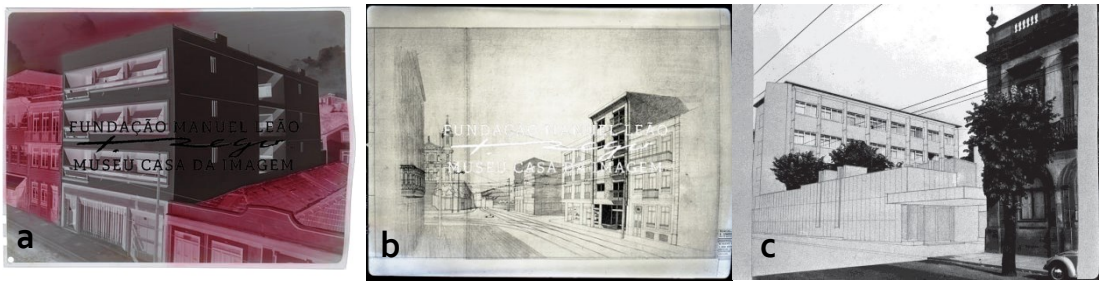


Figure 1.61 – Photography by Teofilo Rego: a. building with awnings and balconies, by Architect Teixeira Lopes, 1947-1970 (MCI, FML PT-FML-TR-COM-54-1); b. group with highlighted structure, reproduction of a drawing, by Architect Sena Esteves, 1947-1970 (MCI, FML PT-FML-TR-COM-544-7); c. project from Escola Superior de Belas Artes do Porto, silver gelatin print, 195? (MCI, FML PT-FML-TR-COM-71-1)

Other negatives are retouched to highlight the final construction, like Figure 1.61a, which was retouched to give a similar effect of a context drawing, as shown in Figure 1.61b. The image may be printed like it is or further worked on and prepared in a photomontage with mixed media like the example in Figure 1.61c.

The final compositions are missing from the collection and much left to interpretation. In-depth research on this collection is needed. Rediscovering Teofilo Rego's process could give valuable insight into the intricacies of the technical process of photomontage that is at risk of being forgotten with the coming of the digital age.

The retouching of prints

The retouching of prints is only addressed at this point but probably existed since the beginning and for the same reasons. As negatives became reduced in size, detailed retouching could only be achieved in the enlarged prints. In the second half of the twentieth century, it had replaced the retouching of negatives.[122] As explained in the introduction, it is not considered retouching when the intention is to alter the photographic qualities such as coloring black and white photographs or overpainting with oil colors. However, when color photography is a reality, the coloring of prints may be included in the category of retouching.

In many ways, the retouching of prints is similar to what was done with the negatives, and the purpose was initially to erase small defects, but it could be used to alter features completely. The one requirement is that the materials used needed to be similar to the tone of the print to be invisible.

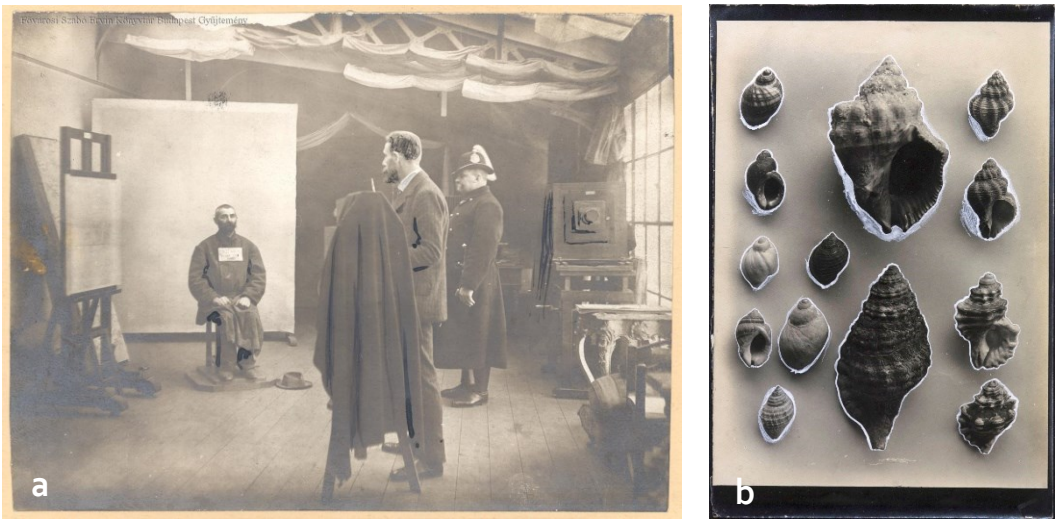


Figure 1.62 – Positive retouching, visible on a slightly fade print: "Taking a photograph of a suspect in a room of the [Budapest] police headquarters"; print, mounted on cardboard; 18 x 24 cm; unidentified author, 1905 Hungary (Metropolitan Ervin Szabó Library, Budapest, FSZEC 021303); b. Marine mollusks, silver gelatin print, Augusto Nobre, 1932 (MHNCUP-FCUP-IZ-AF-46).

As mentioned above, with the example of Paul Strand prints,[123] when prints fade, sometimes denounce the retouching work done with more stable materials. Figure 1.62 shows a slightly faded print where the original retouching, which initially was unnoticeable, is now clearly visible. It was retouched with a brush using a dark colorant to intensify shadows and define dark lines.

[122] Some general retouchings to the negatives can still be found, but with less use, because the enlargement process denounces the more detailed retouching.

[123] See above an example about some of Paul Strand prints (Figure 1.54).

Positive retouching kits were sold with pencils and water-color cakes specific for color and black and white photography, including sepia and other types of toned prints (Figure 1.63).

A key difference in the retouching of prints is the airbrush, and *airbrushing* is frequently a synonym for retouching. Using opaque colors, airbrushing could be used, for example, to remove an unwanted background altogether and replace it with a solid color or other effects.



Figure 1.63 – Positive retouching kits: a. for black and white photography by Farben (mother company to Agfa), color cakes above warm grays, below cold grays, and a tube of white pigment; b. for color photography by Kodak with eight colors, a "neutral" blackish tint, and one reducer.

For more dramatic manipulations or to hide the retouching process and materials, the retouched print could be again photographed and printed. This process could be repeated and retouched in between each step until reaching the final intended result, similarly to what was described for photomontage. Airbrushing and other positive retouching techniques would dominate retouching in the second part of the twentieth century.

Ramon de Baños – Retouching industrial photography

There are not many studies on individual photographers that focus on the materials used and the most technical and practical aspects of production. One of the exceptions is a research on industrial photography by Ramon de Baños, *La belleza de la máquina* [The machine's beauty] (Fors, Tatjer, & Tomàs, 2014).

Ramon de Baños (1890-1980) was a Spanish photographer mostly recognized as one of the first Spanish film directors and producers. In photography and film, he collaborated with his brothers Francisco and Ricardo. For a while, he also tried a business specialized in the enlargement of portraits and retouching. He did not have great success, and the known descriptions from Baños himself leave some doubt about

the extent of retouching used. On the one hand, he writes, "the portraits done as the original photography are best." Still, he also writes, "It is our conviction that the enlarged portrait done with art is always far superior to the photograph" (Baño as cited by Fors, Tatjer & Tomás, 2014, pp. 41, 42). These enlargements were meant to be printed in carbon and oil print, further changing the image.

The research object was an album, *Álbum de 1947*, produced for the Catalana de Gas y Electricidad company, Barcelona, Spain, in the archive presently owned by the Gas Natural Fenosa Foundation.

The images in the album show buildings and machine rooms of the Catalana de Gas y Electricidad company. It gives a not frequently insight into the process of retouching for industrial photography and advertising.

The researchers had access to the prints and original negatives and were able to reconstruct the photographer's retouching process, similar to what was described above:

1 The initial image was captured,

2 The negative was retouched,

3 Produced a paper print,

4 The print is retouched by several methods, using pencil, brush, and airbrush,

5 A second negative is obtained from the retouched positive image and it is again retouched,

6 A final print is obtained from the second negative and receives final retouching.

The result was the definition of all lines, the level of highlights and shadows, and all surfaces appear clean and simplified. Some examples are visibly over-retouched and drawing-like.

The album was intended as an advertising tool for the company, which means that the images were possibly manipulated again for photomontage and publishing (Fors, Tatjer & Tomás, 2014, pp. 114-121).

The researchers were able to identify and characterize Baños' entire production process, which gives value to the archive, composed of original and secondary negatives and prints.

Digital Age

Digital photography

Steve Sasson, an electrical engineer, working at Eastman Kodak, developed the first portable digital camera in 1975 that could capture a black and white 1000 pixel image to a cassette tape. His work was more an exercise than a commercial pursuit, and the device was patented in 1978 but undisclosed. Separately Sony and Cannon were also be developing hand-held cameras in the 1980s. Sony released

first, followed by Cannon, portable cameras that still recorded the image in a tape. In ten years, and following constant advances in digital technology, the digital camera was generally available to the public. These second type of cameras would record the image that could then be transferred to a computer instead of the initial analog tape.

The practice of photography would never be the same as chemicals and darkrooms became obsolete (Ang, 2014; Hirsch, 2015). However, the most significant impact may have been the social use of photography. Amateurs and virtually anyone with a computer could now creatively use photography. Still, many of the digital processes follow the footsteps of the old analog process. Much manipulation, retouching, and even understanding of what photography is, still comes from past photography.

Photoshop

Photoshop, introduced in 1990, was not the first graphics program, but it is the one most recognized (Hirch, 2015, p. 42). Despite some expressed displease by Adobe Systems Inc., its mother company, Photoshop, a trade name, became a common word, a noun or verb, to describe photo editing and photo manipulation. And an image that has been *photoshopped* is generally understood as retouched or manipulated.

Some learning is necessary to take advantage of the full capabilities of a graphics editing software, such as this. And one needs a comprehensive understanding of both the characteristics of the digital image and traditional photography. However, the basics are often easy to learn by the curious user. And the medium level of knowledge and practice may bring anyone to use any of these digital tools successfully. Rejlander's photomontage of *The two ways of life* would have been done quickly, more efficiently, and permitted infinite copies with digital technology. All the work of cutting and mounting images that do not allow any mistake in negatives and prints can be tested and retested on its digital counterparts. If the result is not satisfactory, the *undo* is a convenient resource that traditional photographers did not have.

While some photographers would make more than one negative of its subject as a safeguard measure still, they would be limited, and some differences would exist in each image. However, slight they could be. A mistake or a change of mind would mean restart the work.

It is interesting to realize that in the face of all advances in technology the retouching, as studied in this research, is comparable to what is done today. It is only adapted to the contemporary social and cultural aesthetics and, of course, to digital technology. If one looks for some of the traditional retouching tools

and techniques, they are still found for the same purpose in the graphics editor, like mask, pencil, brush, crop, blur, dodge, burn, contrast, filter, and others. Most, if not all, manipulations possible with the digital tools were also done chemically, by hand, and by many other possibilities and combinations performed in the darkroom, in the negative, and in the print.

The digital studio

Those studios in operation by the end of the twentieth century that mostly provided services to amateur photographers did not survive digital photography. Those who did survive managed by adapting to a new reality and by relearning photography.

The new truth was that people valued the image, but not the object. The rush and need to have the last vacation photos developed as soon as possible was fueled by a feeling of expectation and not possession. The amateur photographer paid to have satisfied his curiosity. After that, pictures pilled inside drawers in every household and recalled only when a new batch was added, or never again.

Today that need is satisfied instantly in small screens, and there is no need to see them in any other format. For the amateur photographer, the studio became obsolete. The few of those that still print their images just bought a better printer or use a copy and print store. There is no need for the help of a professional photographer anymore. And most of the images are simply forgotten in digital folders as they were before in drawers.

Paulo Correia[124] is a Portuguese small-town studio photographer. He inherited the vocation from his father that taught him all about photography, the darkroom techniques, and manual retouching. Now Paulo Correia keeps his old analog cameras as mementos together with other materials that were collected by him and his father, from gifts or bought in the flea market that gathers every Saturday in the square in front of his studio. Today, he is one of those that converted and is a fully digital photographer.

For him, every day is a struggle to reinvent photography and to keep working in competition with the mobile camera that each of his clients have on their phone.

The recent mothers, young children, and weddings are the bulk of his work, and such special portraits

[124] Paulo Correia is a Portuguese photographer and co-owner with his sister of the Correia studio in Estremoz. He is the owner of one of the dry plate collections included in this research, the archive of the extinct Foto-Carvalho studio that existed in the same town until the year 2000. Paulo Correia further collaborated with this research providing practical and historical information from informal interviews and preparing an exhibition of studio portraits from his archive held in Estremoz in 2018.

need to be perfect. After a photo session, he spends countless hours editing his images. Preparing workflows – sequences of steps that allow some automatization – are necessary to speed the process and make it profitable. Some uniqueness to each photo is essential, balancing retouching imperfections without exaggeration but changing enough so that the client can recognize a professional work. The clients need to see a difference between ordinary photographs and other photographers. They need to find the work innovative so that they are willing to pay for it.

The studio photographer cannot have a profitable business dividing his work with a professional retoucher. Still, some retouchers manage to work, but now the best retouching is not as invisible. The successful portrait retoucher is the one that changes any poor image into an artistic portrait, whatever that means to the client. The same digital tools are used by the retoucher and other professionals. Most retouchers are now merged as specialized graphic designers and work with publishing and advertising companies.

Selfies and face filters

With a camera on the mobile phone, everyone is a photographer in a social and historical magnitude only rivaled by the first Kodak cameras. Images are shared via phone, Instant messaging, and pictures sharing apps,[125] visual communication of every moment of the day. Nevertheless, people are not less self-conscious, they still want a better version of themselves, and app companies profit by supplying easy and cheap solutions of digital editing tools (Figure 1.64). These include photo filters to give the old look of a faded photo and add some blurriness to hide faults or the immortal vignetting effect. Also, face filters where portraits, photos or video, can be manipulated, enhanced, or added with bunny ears or funky glasses. These images recover the question of truth and perception. Particularly when excessively and deceptively used to change looks of otherwise less attractive or less perfect images. Many are the examples that can be found online of exposed frauds or confessed users.

[125] Instant messaging is a form of information transmission in real-time using the internet. App is short for application, which is essentially software but thought out for the end-users, meaning non-necessary for the computer, or phone, to function. Examples are photo editing software or text editors, or email readers, among many others.

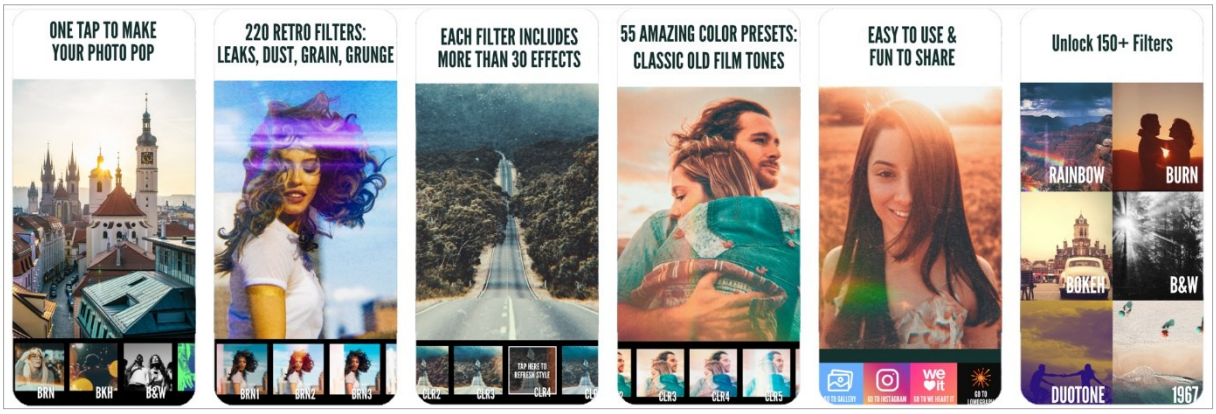


Figure 1.64 - Advertisement by Apple Inc. of photo filters app available for the iPhone: "1967 Retro Filters & Effects"; https://apps.apple.com/us/app/1967-retro-filters-effects/id916195181.



Figure 1.65 – Clips from the original video and Justin Hinton's comment on his social media page, Feb. 2020.

Memorable in February 2020, but in a funny way and less controversial, was when a WLOS ABC 13 tv channel anchor Justin Hinton did a live report on weather conditions in North Carolina in the United States. He was unaware that he had the face filter option active on his mobile phone camera the entire time he was giving the weather information. The result was a viral video[126] for this unintended image manipulation. Finally, some of the images on the video were shared by Justin Hinton himself in good humor on his social media page (Figure 1.65).

Each year technology advances and mobile phone cameras are improved. They are no longer only for amateur photography. Artists are using their phones, and even movies are being filmed entirely with mobile phones, including Oscar winners.

[126] Viral is used to describe a video or image shared an enormous amount of times, in a short period, by people worldwide through social media (communication through computer technology) and sharing apps.

Art Photography in the digital age

Digital cameras, computers, and graphic editors allow anyone with an imagination to aspire to become an artist-photographer. Some artists choose to use alternative photography rediscovering the historical processes, others still do analog, but many converted to the digital.

The art of Sebastião Salgado

I don't want anyone to appreciate the light or the palette of tones.
I want my pictures to inform, to provoke discussion - and to raise money.
Sebastião Salgado —[127]

Sebastião Salgado, born in 1944, is a contemporary Brazilian photographer with worldwide recognition for his social picture essays. He started with analog photography but has, in recent years, adopted the digital cameras, merging them in a digital-chemical technique. Salgado's cameras are digital, but he is famous for not reviewing the images on the screen. Only later in the computer, he selects the images and makes his manipulations[128]; this may be to have a detached view of the result, or just a habit, a remembrance of the analog system. In his resistance to digital, he recognized the quality but missed the grain of the film. For him, "the digital was too flat" and needed texture. So, he digitally adds the grain, reproducing a similar texture to the film he used. He believes that black and white photography allows for continuity in his work, which would be interrupted by color if he tried to join particular photographs from different sessions. The images are all digitally converted to black and white. He also prefers the feel of the silver print compared to the inkjet print. So, he produces a digital negative, called internegative, that he can then print by the analog process in the darkroom to a silver gelatin paper. As a final product, he has the original digital file (raw file); the physical black and white film negative, from which he can make as many copies he likes, and the print that is done with *all* darkroom processing techniques[129] (Salgado, 2015; Ang, 2014, p. 372).

Would the critics that condemned those that added color to the daguerreotypes so long ago now disapprove of Salgado's work for removing it?

When one starts with digital and converts into analog and when there is color and is removed, is that

[127] Quote attributed to Sebastão Salgado, but not from any known publication.
[128] Manipulations, not meaning retouchings, but the entire process from camera to print.
[129] From online interview by Canon with Sebastião Salgado, in 2015: https://www.youtube.com/watch?v=IqUWFUPEC0w. Entrevista NoOlhar TV https://www.youtube.com/watch?v=MDWiqU_bXfQ [Retrieved February 2021]

still considered the truth?

Would those that called retouching a bastardization of photography for introducing nonphotographic media into the image now accept retouching? Now that they are both only digital information?

A review of the review

In some ways, undertaking a history of photography today is rather like being a writer: seeking out information, collecting images, and writing a kind of adventure story – the life of photographs – creating reality while avoiding historical blunders
(Frizot, 1998, p. 9)

A lot is left unsaid, and many examples were not included, but not because they were less representative than those presented, and many of the subjects addressed deserved a more in-depth analysis.

To write this short review on the retouching practice in photography, many were the sources cited. Still, the choice to use some and not others was to follow the general chronological guideline found in the generalist history books, even if some jumps and overlaps in history were sometimes necessary.

Recognizably, this small text is done from this conservator's point of view with all its implications. Facts and sources were, unavoidably and recognizably, presented to illustrate this author's point of view.

This historical review was not intended to be an exhaustive account of all retouchings; that would undoubtedly be (even more) repetitive. Although some repetition had a purpose, it highlighted that retouching was not restricted to a period or a group.

The intention was to show that photography was retouched in all times of history, even if that does not mean all photography. It was also to show that most voices against retouching were reactions to bad examples, and on the contrary, there were always reasons to retouch.

It was found that it is normal for histories to get infused with its authors' personal views and that those are the fruit of its cultural surroundings. As seen in some of the examples already cited, the texts must be understood in a temporal perspective, as authors, this one included, suffer a myopic effect of their views on history, contemporary artists, and contemporary photography.

For example, Josef Maria Eder's version of the history of photography is more technical, which is easily explained as his background is in mathematics and chemistry. Not only that, as he witnessed photography's technological progress, he also contributed to it.

On the contrary, the Gernsheims and Newall's histories casually avoid the more technical aspects of photography and sometimes even express open criticism; some of these aspects were already

commented on in this text. The most noticeable in these histories is that they are limited to a western culture view. Moreover, an incomplete review on social photography, one that does not include photography done by the masses or professionals, like photojournalists or studio photographers. Except when its influence is marked for its first uses. Studio photographers appear to exist only in Disdéri and Nadar, and war photography seems to exist only with Roger Fenton and Mathew Brody.

Mary Warner Marien notices this in a text in 1984[130] and mentions Naomi Rosenblum as an alternative example for her attention to this fault in the early approaches, and includes a broader geographical view. As a drawback, she describes Rosenbulm's approach to have "broken the presumptive continuity of photography's history." Rosenblum's text breaks into themed chapters that end up in some necessary overlapping, although following a general chronological order. The technological aspects of photography history are limited and reviewed as an almost separate text divided into three chapters in the book, without really relating to the other sections' sequence.

Marien herself then wrote a version of photography's history (first published in 2002). Her approach includes the more social aspects of photography and how society and photography influence one another. She also breaks the book into thematic sections by chronological order and avoids the overlap problem by not closing the subjects. For example, there is an entire chapter on war photography in the beginning, with Fenton and Brady. However, the topic is revisited for World War II and then again at the turn of the twentieth-first century wars. Marien includes "portrait" entries for selected individuals with a short biography in an encyclopedic form. For example, photographers like Edward Steichen, whose work and influence span almost a century, are mentioned in several chapters.

Another cited author, Peter Turner, also wrote his version in 1987. It is a condensed form dividing history into 11 thematic chapters, again with necessary chronological overlap. For example, color photography is mentioned in the very first one about the beginnings of photography and before, well, everything else. Turner unapologetically excludes some subjects but still covers the main themes of photography history. What is noticeably missing are the biography notes repeated in other books, and because of that not missed here. Overall, the text is not told from the technical point of view, and mentions of "darkroom" are included only to illustrate the difficulties Roger Fenton had photographing with collodion in a war setting.

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[130] Marien, M. W. (1996). What shall we tell the children? Photography and its text (books) - first published in afterimage, 1984. In L. Heron, & V. Williams (Eds.), Illuminations: Women writing on photography from the 1850s to the present (pp. 207-222). London: L. B. TaurisPublishers. https://archive.org/details/illuminationswom0000unse [Retrieved February 2021].

Michel Frizot gives a modern non-English take with *A New History of Photography*, first edition in French from 1994.[131] Instead of one author, the book includes more than 30 collaborators, including a photography conservator, Anne Cartier Bresson, that summarizes photographic prints' producing methods. It differs from others also for presenting a history of photographs – the images – as Frizot puts it, "an examination of a combination of factors, the short-term reasons for the creation of the images and their eventual fate" (Frizot, 1998, p. 12). Arguably, this research attempted the same objective, but changing the word "image" with "photographic object." Frizot's history differs from all others for a departure from the artistic perspective and includes social uses such as the photo album or the printed image and other "neglected sectors." Unlike any other, his descriptions include the texture and tone of the image, not just the subject. However, the production process is almost absent in favor of the before and after. It serves well those wanting to learn more about the social aspects of photography.

António Sena wrote *Uma História da Fotografia* [One history of photography] (1991), a Portuguese take, and an honorable attempt when there was none from where to start. Sena writes on the circumstances that made possible the invention and evolutions after that and explores reactions and protagonists from written sources instead of images. He gathers lengthy quotes from journals, magazines, technical books, and catalogs. From this, he escapes the art history approach and recovers the point of view and opinions of those living in the moments when events took place. Later, Sena does an augmented text that he calls *Historia da Imagem fotográfica em Portugal: 1839-1997* [History of the photographic image in Portugal] (1998). However, what he adds to the previous text are not photographic images from where to tell history. Sena presents images, many from private collections, probably his own, collected through the years as he did the texts he cites. To this, he also adds opinion articles on exhibitions and other events from the contemporary period. They are academic books that do not explain the history of photography, as others mentioned but are useful resources to other research in the various subjects of photography.

As photography is such a broad theme, it is increasingly challenging to make a history of photography that encompasses everything. Later publications show more and more an interesting thematic focus. They are still historical approaches to photography, but from a particular point of view or application, some are more narrow-sighted than others.

[131] References and quotes from Michel Frizot are given from its American Editions, 1998.

In some texts with the more theoretical approaches, for example, on the social uses of photography, the image still has predominance over the physical object. Frequently, when mentioning the more technical aspects, these authors seem to use the older history books uncritically – like the example of misrepresentation of the retouching practices in straight photography, already discussed.

However, others do pay attention to the practice of photography. For example, Bridget and Heinz Henisch produced interesting themed histories like *The Photographic Experience, 1839-1914: Images and Attitudes* (1993), about studio portraiture or the self-explanatory, *The Painted Photograph, 1839-1914: Origins, Techniques, Aspirations* (1996). The starting point for these books was their private collection; still, they manage to give a broad temporal and geographical overview of these particular aspects of photography's history.

The photomontage has been the focus of several monographic works like the ones by Dawn Ades (1976) or Jacob Bañuelos Capistrán (2008). Not written in chronological order, they still do a historical review and give insight into the process and its many uses in art.

With digital photography, the question of the practice of photography is almost ignored. Moreover, photography is valued almost exclusively for its image alone. Even from the conservator's point of view, with exceptions mostly for art photography, there is no object to preserve, just data. Perhaps, because now the practice of photography is devoid of all chemical and other darkroom manipulations, the perspective has shifted a little.

Recent research seems to value and recognize more the practical knowledge that many of these photographers had and their efforts to develop photography in each step.

The practical, chemical, and technical aspects are again considered in general histories, and not limited to the nineteenth century, for example, with Tom Ang's *Photography: the definitive visual history* (2014). He highlights several artists throughout history in "profiles" that are similar to Marien's "portraits." He introduces sections "on focus" on a particular image that he uses to illustrate the period and the artist, but also including its technical aspects. A technological evolution of photography, processes, and equipment is told chronologically, highlighting its influences and uses in the general context. It also includes the names repeated in other history books and other personalities that changed photography for their technical contributions and not just for their photographic images.

Because this research object is the retouching practice in Portuguese photographic collections, this "history" is also limited to a western cultural view. Nevertheless, at least in portrait photography, it is possible to extrapolate that retouching is most likely present in every culture. And in turn, each culture

contributes and influences a variation in methodology and aesthetics.

This research hopes to contribute to this review and inspire others to consider the photographic object and the practice of retouching in their historical and social approaches beyond the photographic image.

Chapter overview

This chapter made a journey through the history of photography, highlighting the more relevant technical aspects related to the needs and reasons for retouching. Of all types, portraiture was in focus as it was previously ascertained that negatives are more frequently retouched when they depict portraits and, of these, studio photography.

From the discussion of photography as a document or art, retouching has been a central issue. It was explored how both sides argued the legitimacy of retouching as a principle and to what extent was acceptable. It was clear that the positions manifested by inventors, scientists, artists, and historians were always personal and influenced by their attitude towards photography, background, and by their visual culture. Although debated at every moment in time, it was forgotten or misrepresented in history books. The discussion itself was set aside from the practice, particularly by professional photographers, where it was demonstrated to be always present. This text evoked key moments to weave the historical perspective of retouching in the general history of photography, giving a framework to the practice of retouching to be explored in the following chapters.

2. Why and how to retouch

This chapter is divided into four sections addressing several aspects relating to the practice of conservation. It starts by exploring reasons for criticism and legitimacy and arguing that despite it and from a conservation standpoint, retouching is now part of the object. Second, it presents a review of technical manuals and other texts on opinions, motivations, and differences between authors with different backgrounds and different countries. The third part explores selected technical topics that governed the retouching of dry plate negatives. The last section explains materials and main retouching techniques described in manuals giving some examples from Portuguese collections.

2.1. Intention, truth, and deceit – the limits of retouching

[Retouching] is an art because it is not a blind
inattentive intervention, but on the contrary,
it is intelligent and thoughtful. It is not abusing but using.[132]
(Cánovas, 1921, 114)

Back in 2009, when the first research on retouching began, the topic of its legitimacy was being discussed, yet again. This time around, an online feature story for the daily newspaper *The New York Times* (the NYT), *Ruins of the Second Gilded Age*. It was a photo essay by the Portuguese photographer Edgar Martins on how the financial crisis had halted many construction projects in the United States. The NYT web page presented a gallery with images by Martins with a description stating that they were obtained with long exposures to erase human presence, "absence of life," and no digital manipulation. However, some more observant readers soon point out evidence of just that.

As a response, Martins stated that the manipulation was not merely for aesthetic reasons and that he knew he was exploring the "photojournalism's boundaries" and appealed to his right to artistic license. Initially, the debate included the question of truth and the manipulated images on a news publication and the legitimacy of manipulation in photojournalism in general. However, Martins' response did not

[132] Author's translation.

convince readers, as his previous "no digital manipulation" in the caption of the images contradicted him. The question became about truth and artistic license. The issue was no longer the NYT's reputation as a news source but Martins' false representation as an artist. And despite any question of if the NYT should or not publish manipulated images in photojournalism, some readers felt that Martins' photos might have been better accepted if not for the original statement.

On his online page, Edgar Martins shows this work titled *This is not a house*. At least some of the images offer different versions of the originally published by the NYT but still visibly manipulated[133].

Another publication of his works, *Topologies*, published by Aperture in 2008, had an abstract that used to say: "With artful composition and controlled framing – but no digital manipulation – Edgar Martins creates sublimely beautiful views of often unbeautiful sites." Since 2009 and the questions about his digital manipulations, the "but no digital manipulation" was dropped in the Aperture web page. The original description can be found to this date, however, on other retailers' websites.

Also, since then, the NYT released a memo to all its freelance photographers that read, "[all submitted photos] will be original and unaltered (unless it is a photo illustration, pre-approved by your editor and fully disclosed in caption information materials)." The NYT's webpage was also changed, and since July 8, 2009, no longer shows the photo gallery, but a note on why it was removed[134].

A quick search online returns plenty of other controversial examples:

Of more misrepresentation in Photojournalism. A similar story with a similar outcome. For example, in August 2006, freelancer Adnan Hajj saw his contract with *Reuters* terminated after a reader identified signs of manipulation on one image showing Beirut after Israeli military action. Hajj had digitally added smoke and darkened the image. For *Reuters*, the outcome was a "tightened editing procedures" and a revision of the code of conduct[135].

Going back a few years, in 1982, the center of the controversy was the magazine *National Geographic,* when the art department rearranged a photo by Gordon Gahan with the pyramids at Giza to adapt the original horizontal composition to the vertical layout of the magazine cover. The *National Geographic*

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[133] Martins, E. (2008). *This is not a house.* http://www.edgarmartins.com/work/this-is-not-a-house/?show=photographs. [Retrieved February 2021]

[134] The New York Times. (2009). Magazine, *Ruins of the second gilded age.* https://archive.nytimes.com/www.nytimes.com/slideshow/2009/07/05/magazine/20090705-gilded-slideshow_index.html. [Retrieved February 2021]

[135] Reuters. (2007). *Reuters toughens rules after altered photo affair.* https://www.reuters.com/article/idUSL18678707. [Retrieved February 2021]

page now reads, "We learned our lesson."[136]

In 2015, *World Press Photo* disqualified 20% of the finalists for photography manipulation and revoked a prize for misrepresenting location[137] (Donadio, 2015). The contest referred to their code of ethics that states that images cannot be altered, by adding or removing content or being staged or misrepresented, for example, wrongly identifying the photo's location[138].

Other examples refer to changing aesthetics. Another common source of controversy is people's images and overzealous ideals of beauty. For example, the changing of skin tone, Beyoncé's advertisement for *L'Oreal* in 2008, resulted in coining the term "bleached out." On the contrary, O.J. Simpson's cover of *Time Magazine* in 1994, when he was on trial for murder, was visibly darkened, supposedly for a dramatic effect, but ended up raising voices on racial issues.

Or when dramatically changing the body. Several actresses and other personalities saw their images changed in the media beyond reasonable. For example, on the *GQ* cover of February 2003, actress Kate Winslet's legs were visibly slender and stretched, the actress herself complained to the media. Other examples are found in movie posters. Actresses Emma Watson had her breast reduced in one of the posters for the movie *Harry Potter and the Order of the Phoenix* (2007). This was done apparently to de-sexualize the actress, as the movie was intended for a younger audience. Opposite, actress Keira Knightley, for the poster of the movie *King Arthur* (2004), had her breasts augmented. The actress would protest other attempts to change her breast size again, for example, for the poster of the movie *The Duchess* (2008) and, in 2014, posed topless as a protest for the November issue of the *Interview* magazine.

Several countries now have guidelines or laws on images that show retouched bodies because of situations such as these. The concern was that these images set an unrealistic standard of beauty, especially to younger generations, which can increase, among others, problems of self-image and eating disorders. The consensus seems to be the addition of a descriptive label when images have been retouched. In France, in 2017, a law was introduced that mandates that all retouched images should present "retouched" in the caption, although the law does not apply to retouched faces. Israel went even

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[136] Goldberg, Susan (Editor in Chief). (2016). *How we spot altered pictures.* https://www.nationalgeographic.com/magazine/2016/07/editors-note-images-and-ethics/ [Retrieved February 2021]

[137] Article on the NYT: Donadio, R. (2015). *World press photo revokes prize.* https://www.nytimes.com/2015/03/05/arts/design/world-press-photo-revokes-prize.html [Retrieved February 2021]

[138] World Press Photo. (2020). *Photo contest code of ethics.* https://www.worldpressphoto.org/programs/contests/photo-contest/code-of-ethics/28580 [Retrieved February 2021]

further, in March 2012, with what became known as the "photoshop law," banning extremely skinny models, defining limits to a model's permitted body mass[139].

At the center of all these controversies is not the use of retouching techniques in itself. But, when individual examples were manipulated beyond what was considered reasonable in its social implications. While it is retouching that is raising these debates, it is not the retouching itself being questioned but values of *truth*, particularly to photojournalism, or society's perception of self, beauty, standards, and ideals. Many other examples can be found. This is just a small selection to illustrate some of the more commonly raised issues and show how photographic manipulation remains constant and under debate.

Reasons for retouching and reasons for preservation – examples from negative collections

Within proper limits retouching is a vast improvement to a photograph, beyond this it is an obtrusive absurdity.
(Johnson, 1898, p. 5)

The following examples show different uses for similar materials and retouching techniques. Debatably, ones are more acceptable than others. All these images show retouching on the gelatin emulsions with red ink, but the apparent reasons vary. They were retouched either to correct a fault in the emulsion, damage during handling, compensate strong shadows, attenuate high contrast, or significantly alter an image according to social aesthetics, client demand, or the photographer's taste.

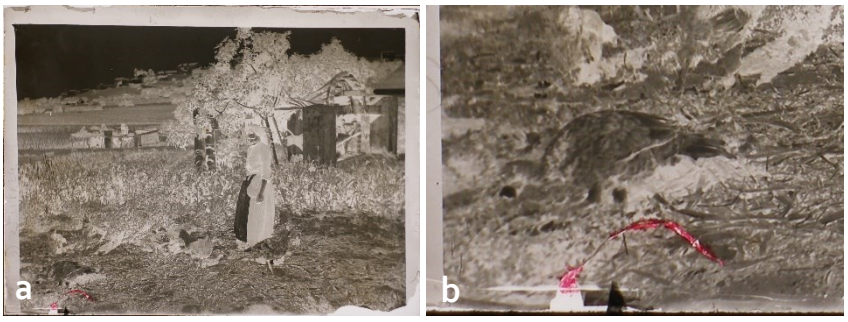


Figure 2.1 – Turkeys' keeper by a Noria, [Guardadora de perús junto a uma nora], dry plate negative; b. detail of the bottom left corner showing retouching, 1890-192? (AMLSB, NEG, 2383)

[139] Announced in the news media, for example, from the page of *Europe1* french channel news, Oct. 1, 2017: O.G. (2017). *À Partir du 1er octobre, les photos retouchées doivent être signalées.* [From October 1, retouched photos must be reported] https://www.europe1.fr/societe/a-partir-du-1er-octobre-les-photos-retouchees-devront-etre-signalees-3450851 [Retrieved February 2021]

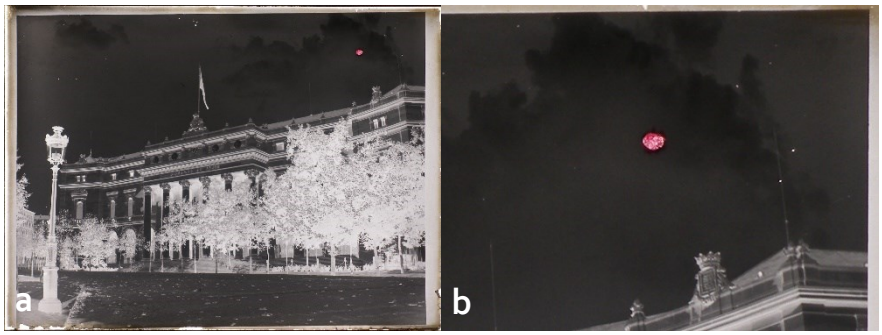


Figure 2.2 – Madrid Stock Exchange, [Bolsa de Comercio de Madrid], dry plate negative, b. detail with retouching, unidentified author (AMLSB, PT/AMLSB/NEG/003449)

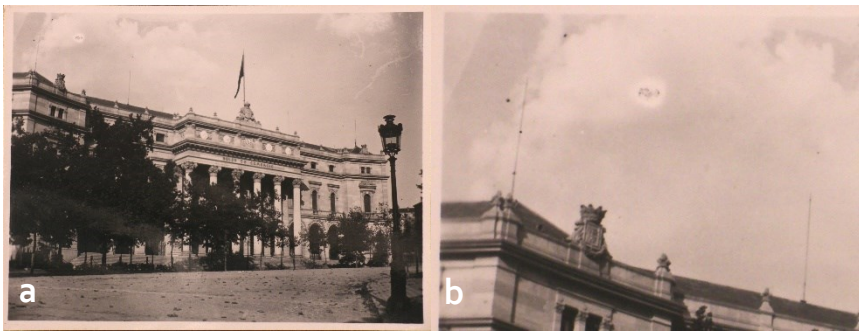


Figure 2.3 – Madrid Stock Exchange, [Bolsa de Comercio de Madrid], a. original contact gelatin silver print; b. detail of the area retouched, s.d. (AMLSB, s.n.).

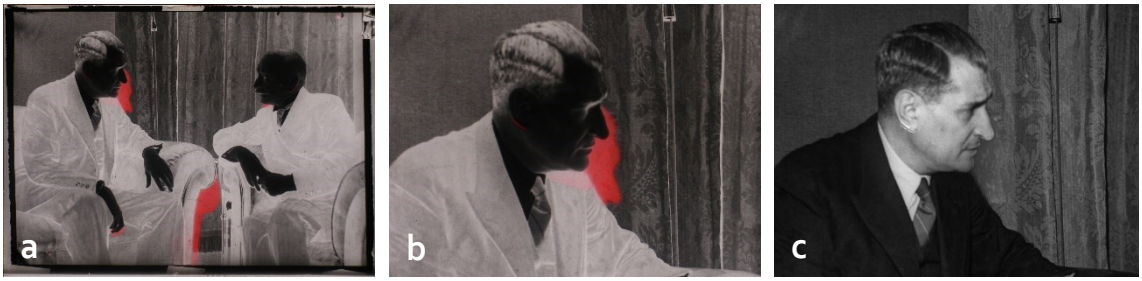


Figure 2.4 – a. Portuguese President Oscar Carmona and Prime Minister António Salazar, dry plate negative; b. detail of a retouched area; c. same detail digitally converted to positive, recreating the intended effect, suppressing the shadow 194? / 1932-1951, (AMLSB, NEG, 1174)

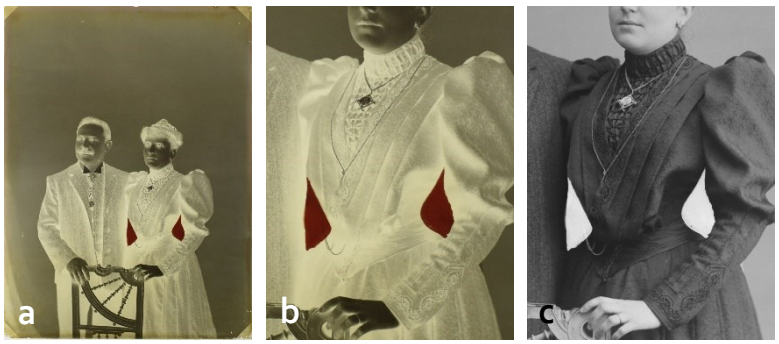


Figure 2.5 – Group portrait, dry plate negative; b. detail of the retouched area; c. same detail digitally converted to positive, Alvão, 190? (CPF, ALV, 127).

In a quick review of these images, it is visible that seemingly similar retouchings have different consequences in the final image.

There was a tear in the emulsion in the first situation, maybe the result of mishandling and the second a hole, possibly an original production defect of the plate. The tear and the hole leave an area without emulsion that, unless retouched, would result in black in the print, interfering significantly in the image pulling attention to it. Retouching the negative, using red colorant, in a density similar to its surroundings, erases it.

In the original print in Figure 2.3, the hole is still noticeable. The retoucher tried to retouch the negative by adding color in the same density of the sky, but the ink overlapped the emulsion, and a white halo was formed. In a print, a black mark is much more difficult, if not impossible, to correct, but on the contrary, a clear area can be easily be concealed. In this example, it would only have been necessary to use a pencil in the same print tones to fill the white space and erase the hole.

The image with the men sitting (Figure 2.4), however, will need no further retouching. The ink was applied in a thin translucent layer attenuating the shadows, which would otherwise be difficult to compensate during the printing process. In this case, if the print was not to the satisfaction, the retoucher would probably just redo his work on the negative and print again.

In the last example (Figure 2.5), the purpose was to erase the information completely. The red ink is densely applied to render the area opaque, which results in white in the print. In this case is, like the first example, the white areas now need to be concealed by retouching the print to achieve the same tone as the background.

Probably all photographers would agree that in the three first situations, the retouching was necessary. And the retouching in the example of Figure 2.4 might have been avoided by careful lighting the scene. The last example (Figure 2.5) can enter the debate of the limits of retouching and the pure form of photography. It would be relatively easy for a conservator to remove the negative retouchings and return the image to its “pure form” and the woman to how she really was.

But should he?

All these examples pose the same problem for the conservator: conservation of a negative with applied retouching medium. If the negative has deteriorated, one easy possibility has been to remove any retouchings. These few examples demonstrate how that would change the image, visual aesthetics and not what the photographer intended.

Identifying techniques and materials is not enough to understand the uses of retouching, and the

conservator needs to know why the negative was retouched and the intended effect and its cultural context. The following chapters will address the retouching practice from different viewpoints to clear all the reasons that justify its preservation. The following section is dedicated to technical manuals and how various authors explained and justified retouching of negatives. And after, the text delves into the more practical aspects of retouching, materials needed, and effects.

2.2. What do (old) manuals say?

And now a few important Do's:
Retouch only where absolutely necessary
Be scrupulously careful in your work
Do only what you can undo if necessary
Be true to the subject, be utterly faithful
Be light of hand and free of heart.
(Weinstein & Booth, 1977, p. 53)[140]

This chapter does a review of technical books on the retouching of photographic negatives, also published elsewhere.[141] Since first reviewed, many more books were made available online. Each year, numerous libraries, archives, and individuals make available in digital form their collections of historical texts that are already in the public domain, free of charge.[142] It allowed, at this time, to expand the original list of publications, but with perfect knowledge that if written the following year, other rarer books could be included in this chapter.

The review follows loosely a chronological order divided by language and countries of origin. First are presented books published in the nineteenth century but with influence or re-editions in the first half of the twentieth century, followed by a review of a small sample published until the 1950s. Also, a short note is added to publishing houses and how the subject is addressed in journals.

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[140] A note meant for conservators, but a sentiment shared by most of the authors mentioned in this chapter.

[141] An early version of the text presented in this chapter was published by the author titled *Retouching glass plate negatives - What do old manuals say* (Pereira & Castro, ECR, 2016). In this chapter, more books and authors are discussed, including some more recent, and that is why the *old* is symbolically removed but paying reference to the original published text.

[142] An essential tool for researchers and the general public is the https://archive.org/, where some libraries also allow conditional access in a loan system to books still covered by copyright. The user can do Boolean searches to find a title or an author or search any word in the database or within a book. This platform reunites books digitized by various sources, such as The US Library of Congress; the Getty Research Institute, The New York Public Library, The Canadian Libraries, Project Gutenberg, JSTOR (Early Journal Content), The Biblioteque National de France (for the BnF a more comprehensive catalog is available at https://gallica.bnf.fr/) and many others including individual users. The platform also promotes the digitization of collections in its own name. Every time a source is mentioned from an online book, from this or other sites, the corresponding web link is added to the reference; and they are many.

In the various books reviewed, some answers or clues were sought out to the questions that frame the project, the ethics and legitimacy of retouching, the visual culture of the time, technical evolution, and the identification of intentions. The more technical aspects – materials and descriptions of practical retouching – are summarized in the following section.

Emphasis is given to authors and works that might coexist from different countries, namely French, British, German, North American, Spanish, and Portuguese editions.[143]

From the start, photography had some recognized technical limitations that did not meet what was expected of the new recording tool. The light images were confronted with truth and art expectations, and they seem to fell short. Imperfect optics generated defects and distortions. Long exposures made stiff poses and forced facial expressions, and the photographic emulsions had limited sensitivity to some colors. One way to circumvent these shortcomings was by retouching.

However, images were retouched not only to correct flaws. From the beginning, photographers turned naturally to retouching to achieve an art status – one way for the artist to contribute to a work that otherwise would be only a mechanical reproduction.

Social and cultural expectations also influence aesthetics and retouching, particularly for professional photographers, as they resort to retouching to meet their expectations but also to please the client.

It was the photographer or professional retoucher who undertook this work. Those that were more successful were the ones with artistic abilities, and they would refer to it as *artistic* retouching, as they also recognized photography as an art. Like other arts, manuals were written explaining and teaching techniques and showing how to prepare the materials.

In the first chapter, many of the names mentioned, besides being inventors and photographers, were also authors of practical manuals and other technical books on photography and the *art* of retouching negatives. These texts were sometimes written to claim authorship, establish authority, and often respond to frequent requests or a need felt by the author. They were also a way to share knowledge and forward the discussion on the retouching's practical and more theoretical issues.

In the publications reviewed here, it is possible to trace technical differences or evolutions over time and from country to country that followed their contemporaneous aesthetic trends. Authors were identified, with both art and science backgrounds, who produced influential texts criticizing, justifying, and popularizing the practice of retouching.

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[143] Some of the books reviewed are, in many ways, repetitive of others in practice or opinion on retouching and were not included here. When it is relevant, comments on them might illustrate specific aspects and be discussed in other chapters.

Retouching in German publications

Hermann Wilhelm Vogel

With considerable influence and translated, at least, to English, the photochemist and author Hermann Wilhelm Vogel stands out. Although his work only briefly addresses retouching techniques, he mentions the need for it and under what conditions he considers it legitimate in the *Lehrbuch der photographie* [Textbook of photography][144] (1867); and in *The progress of photography since the year 1879* (1883). Although his area of study was photochemistry, he sees the potential of photography as an art. An entire chapter is dedicated to *The art of photography*, including topics such as portraits, aesthetics, and truth (Vogel, 1867, pp. 387-467).

Among the authors reviewed here, he can be considered a purist because, for him, photography was primarily a recording technique. The positive image should not be tampered with by manual alterations, such as coloring or painting. As a way to achieve photographic truth, retouching was accepted as a legitimate practice. He also advises careful organization of the studio and the placement of light sources and diffusers and other recommendations to reduce the need for retouching. Photography's technical limitations were also the focus of his research, namely the reproduction of color. He would advise retouching in situations where there was a technical limitation that could not otherwise be compensated. One example is:

> When the details in the shadows are insufficient, the time of exposure should be increased; sometimes, this does not ensure success with such colors as umber and dark green. Under these circumstances nothing remains but to replace the missing tones by negative retouch. (Vogel, 1871, p. 223)

His examples focus mostly on the various actions of light and optics, how different lighting or lenses can change the outcome of a portrait. To this, he asks the reader, "Is this truth?" As he argues with those that defended that photography was the vehicle for truth and should not be retouched. This debate, however, is not resolved to this day. As he starts:

> *Sehen wir zu, inwieweit die Photographie die Wahrheit liefert.* – Let us see now how nearly photography gives us truth.
>
> Admirers of photography assert so often that this young art represents the pure truth, the true counterpart of nature. Photography can, indeed, when rightly applied, produce truer pictures than any other art, but they are not absolutely true, and because they are not absolutely true it becomes important to learn the sources of error, and they are manifold.

[144] An American translation, by Edward Moelling, was first published in 1871 with the title: *Handbook of the practice an art of photography*. All quotes were taken from this edition.

> I consider it my duty to call attention to the sources of untruth in photography. Only when we have learned to know them, and to appreciate them, will we learn also to avoid them.
>
> Houses that are a hundred feet distant look as if they were half a mile away. ***Is this truth?*** No, certainly not; and yet the lens draws correctly, the camera has been placed exactly on a level, and the perspective is mathematically correct. A draughtsman could not make it any better.
>
> If we expose for a long time we will get some detail in the shadows, but the lights will be over-exposed to such an extent that all the finer shades will be missing. ***Is this truth?***
> The photographer now gave a longer exposure. The background had the hazy appearance of the original, but unfortunately the figures in the foreground, which should have been bold and black, had a dusky gray look. ***Is this truth?*** The artist succeeded finally by retouching the negative. (Vogel, 1871, pp. 231-238)

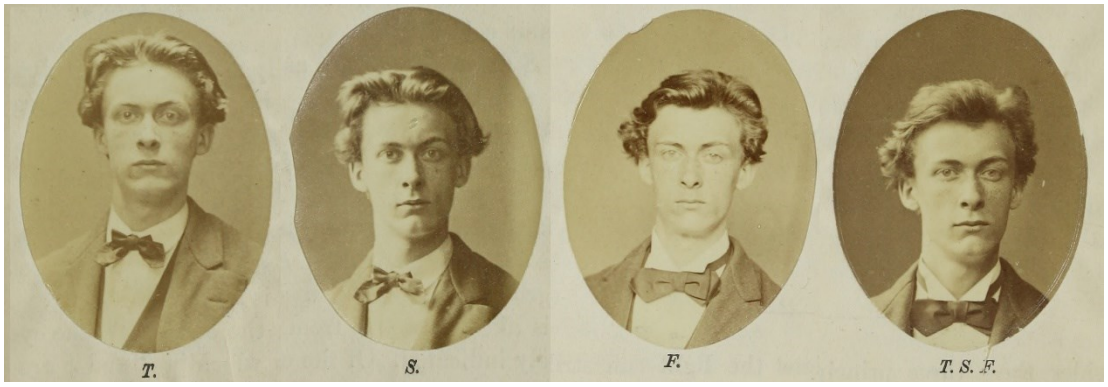


Figure 2.6 – Examples showing how different light settings result in different portraits; T was taken with top-light only; S was taken with direct side-light; F was taken with front-light; T S F was taken with a front, top and side-light. (Vogel, 1875, pp. 303, 304).

He points out untruths with examples, such as Figure 2.6, and only when it is not possible to avoid them recommends retouching. But he does not give indications on how to retouch. Instead, he recommends following the guidelines of another German author, Johannes Grafshoff [145], a photographer and watercolor painter (Vogel, 1867, p. 380).

He is still referring mostly to the collodion technique and not the gelatin emulsion. Collodion is susceptible to abrasion and the atmosphere and, therefore, was systematically varnished to provide a protective layer. Not all varnishes gave suitable surface for retouching, and Vogel recommends a special one from Grafshoff's recipes using a mixture of sandarac and camphor resins (Vogel, 1867, p. 258).

[145] Grafshoff (1869). *Retouche der Photographieen.* (2nd ed). In the American version of Vogel's manual, the name of Grafshoff is sometimes replaced by that of George Ayres, author of the book *How to paint photographs*, possibly, a more recognizable name in that country (Vogel, 1871).

Ironically, and despite Vogel's criticism of photography overpaint[146], the work of Grafshoff also focuses on the painting of prints with watercolor or oils to make them *more like paintings*.

Carl v. Zamboni

Another prominent author is Carl v. Zamboni, Croatian, established in Viena, Austria, in 1880. He was a painter before becoming a photographer and sees retouching as a drawing technique. In the work of 1888, *Anleitung zur positiv- und negativ-retouche* [Instructions for positive and negative retouching], like Grafshoff, he teaches the retouching techniques for prints and negatives. Zamboni, however, distinguishes the primary purpose of both. For him, the retouching of prints serves as a supplement to the photographic work, and as such, not a requirement. Opposite, the retouching of negatives is considered necessary to the final picture.

> For the most part, negative retouching should make the positive retouch unnecessary, and consequently it forms the most important part of the portrait retouching in general, since only a correct result of the picture can be expected from its correct handling. […]
> The main condition for a good negative retouch is the precise knowledge of the matrix's character; this is certainly not an easy task since this requires long experience and a quick overview. However, the negative retoucher can only achieve something solid if he can see at first glance what the matrix is missing and always have the result copy in mind; once he has recognized the inherent errors, it is his task to correct them in the most conscientious manner.
> […] The positive retouch generally serves as a supplement to the negative retouch and the completion of the picture.[147] (Zamboni, 1888, p. 1).

Valuing the negative as a matrix was also considered by other authors, although sometimes not explicitly or for different reasons. For Zamboni, one negative can produce many prints, and if there is a need to retouch the print, the retoucher's work is multiplied by that many. He also notes that, when correctly done, the retouching on the negative becomes invisible after printing. Some retouching techniques use color, the same way as filters, to correct tones and contrast that could not be used in the print.

He also includes a chapter on landscape retouching with examples (Figure 2.7). The negative for landscapes is also considered a matrix, and similar retouching techniques apply. However, Zamboni

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[146] To make a distinction. Overpainting refers to the technique of hand coloring prints and is not considered retouching. Retouching of prints was also done, but at this time, it was mostly corrective techniques to sharpen edges and to conceal spots caused by dust adhered onto the negative. See below section - *Practical* retouching.

[147] Author's translation.

notices that landscapes are reprinted more frequently than portraits. Producing a perfect matrix is, therefore, more valuable. He recommends an extra varnishing step as a protection layer. He also gives indications on how to correct landscapes with high contrast by retouching. As seen before, the sky was frequently overexposed and undefined. A way to remedy this was to replace it with an artificial sky and the final composition obtained by double printing. In this situation, retouchings were used mainly to block out the sky. But Zamboni instead recommends that details in the sky be artificially drawn in pencil and reinforced with a matt varnish applied on the glass surface or in a separate glass.

In conclusion, despite seemingly advising to retouch just the necessary, the descriptions and images included in the work show heavy retouches that altered facial expressions. Even the elderly show the smooth, completely wrinkled skin (Figure 2.8) of a young man.



Figure 2.7 – High contrast seascape, before and after retouching (Zamboni, 1888, plate 8, 9).

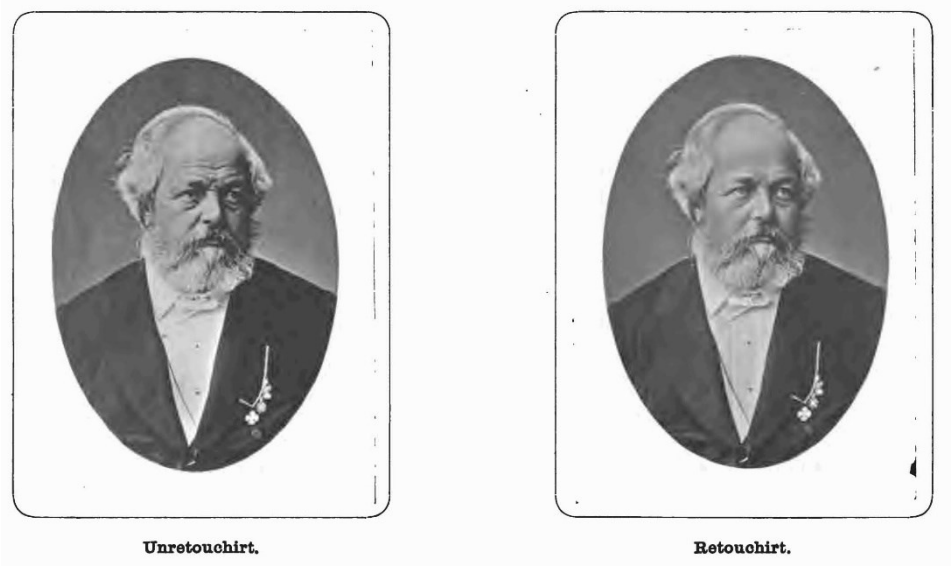


Figure 2.8 – Portraits before and after retouching (Zamboni, 1888, plate 1).

Retouching in the UK and the US publications

Henry Peach Robinson

The previously mentioned, H.P. Robinson is one of the first authors and photographers to defend photography as an art form. His written work would influence photography's aesthetics in his time and future photographers. One of his more practical books is *The studio and what to do in it* (Robinson, 1891). In this book, the chapter dedicated to retouching does not describe the retouching techniques but instead addresses their history, developments, and uses (1891, pp. 116-121). These are some of his statements on retouching:

> In the earlier years of negative retouching, photographers would confess its use with apology and hesitation. It soon, however, acquired a firm foothold in the studio of every portraitist, and the skilled retoucher was indispensable. In this country the legitimacy of the process, per se, is no longer discussed, but is, by general consent, tacitly admitted. Excess is, of course, condemned as inartistic, untrue, and unwise, even by those who most egregiously overstep the fair line of legitimacy. Photographers occasionally discuss the subject still. […]
> Retouching is legitimate when it does not falsify nature; it should be used only to aid the well-known shortcoming of photography.
> In nature we scarcely see a freckle on the face if we do not look closely for it; in the negative the freckle is represented by a hole which prints much darker than the freckle appears in nature; it is legitimate to fill up this hole so that the result may the better represent nature. (Robinson, 1891, pp. 118-120)

Another work, possibly, Robinson's most recognized text, is the *Pictorial effect in photography*. It was not written as a practical manual, although, in the introduction, he states that it was intended for a student of the art, the new or aspiring photographers. The book considers instead rules on aesthetics, perspective, and composition. He also debates the question of truth as being a necessary quality to art. For him, all photography is truth, but not all is art because, for that, it must reunite truth and beauty.
In the debate of purely mechanical reproduction and the artistic aspirations of photography, he references John Ruskin (1819-1900) and how he is interpreted to defend both sides of the discussion[148]. On the one hand, they quote Ruskin's recommendations to artists that every detail in nature should be copied. On the other hand, Ruskin is also recognized to know the difference between the eye and lens. Possibly from his experiments with photography, Ruskin knew that the eye changes image perceptions. And that, as the eye focuses on different details, the image is changed. Also, the extent of detail changes

[148] John Ruskin was an influential figure of his time, an art critic and writer, and among other things, a photographer. More than one hundred daguerreotypes are attributed to Ruskin, and many others are connected to his travels to Venice between 1840-1852. He praises photography and recommends it as an aid to drawing, but he also recognized its shortcomings in rendering lights and shades (Harvey, 1984; Hart in Hannavy, 2008).

with distance, and thus art should represent the same detail nuances (Harvey, 1984).

A particular debate refers to the legitimacy of altering the skies. Robinson defends the already established technique of double printing to obtain the pictorial effect. As he considers that they would be otherwise, dull landscapes:

> I have often been advised to consider my sky as a 'white sheet thrown behind the objects!' Certainly, if the sky is obtrusive, as mine are, it is bad; but if it is evaded, as mine are not, it is worse; it must, and always shall, with me, make an effectual part of the composition. (Robinson, 1892, p. 49)

> The doctrine […] that anything beyond mechanical copying or dull map-making was heresy in photography. Concerning the impropriety of using any other sky in a photograph […] than that which was actually presented at the moment of taking the rest of the picture. […] This doctrine would reduce all photographs and all photographers to one dead level. […] Truth may be obtained without art. The exact representation of unselected nature is truth; the same of well-selected nature is truth and beauty. The former is not art, the latter is.
> I have not, in this work, advocated the use of artificial skies, or painting in skies, on the negative, […] because I believe the natural sky, added from a separate negative, to give the most complete results; but I see no reason whatever why the negative should not be improved, if it is found necessary, without any departure from truth. (Robinson, 1892, pp. 55, 56)

For the more technical aspects of photography, Robinson recommends William de Wiveleslie Abney's *Instruction in Photography.*[149]

J. P. Ourdan

Ourdan, is English but moves to America, where he continues to work as a photographer-retoucher. In America, he also re-writes his text: *The art of retouching* (Ourdan, 1880),[150] presented as follows:

> Having retouched many negatives during that time [Ourdan] is able to make a more complete and exhaustive treatise, embracing points applicable to American tastes and negatives which would never occur in European practice (Ourdan, 1880; Preface, p. iv)

For Ourdan, photography is undoubtedly an art. On retouching, he justifies:

> For, as beautiful as the Art of Photography is, there can be no doubt that it abounds in shortcomings, and to meet these Retouching is without dispute a powerful adjunct. (Ourdan, 1880: vi)

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[149] Captain Abney (1843-1920), as referred by Robinson and designated in the earliest editions. Abney's book is an entirely technical book on photography, with little consideration on aesthetics and the reasons for retouching or its legitimacy. Re-edited multiple times, in its later editions, little resembles the earlier ones as the book is adapted to photography's technical advances. Abney, W. d. W. (1876: 3rd Ed.; 1900: 10th Ed.).

[150] The original book was called *Concise instructions in the art of retouching*, published by Marion & Co., London (1876).

For Ourdan, retouching is a corrective technique, but, as he also considers that he is entitled to some artistic license, its ultimate goal is to give *artistic* character to the image. He highlights the importance of knowledge in drawing and includes illustrations on the human head's proportions (Figure 2.9). He also focuses on the role of light in avoiding retouching, and the artistic potential of carefully lit portraits with pondered light and shade areas, that he refers to as Rembrandts[151]. Finally, Ourdan also comments on differences found in retouching work in other countries:

> The Americans seem to have adopted all the various methods. As a rule, however, they work rather more in a scumbling style, giving the strokes no particular direction, but making a touch wherever taste suggests or an inequality requires it; and this is the most convenient manner, no particular notice being taken of the direction of the lines of the skin. [...] The methods in use upon the Continent of Europe are, perhaps, nearer the perfection of retouching than most of those generally employed […] In Germany the finished result resembles more the hatching upon a crayon drawing or watercolor. […] The method practiced by the French generally has the advantage over the German of being less liable to lose the likeness (Ourdan, 1880, pp. 79-82)

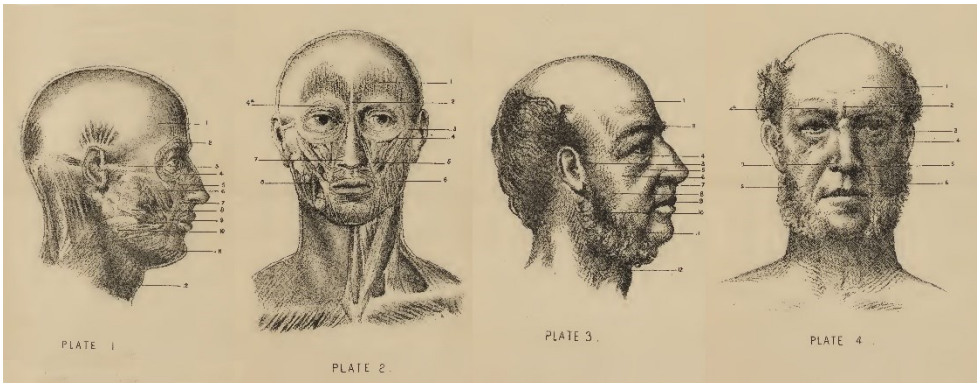


Figure 2.9 – Knowing the human head and muscles for drawing and retouching (Ourdan, 1880, plates 1-4).

George B. Ayres & William Kurtz

George B. Ayres was an American author, artist, and inventor who wrote: *How to paint photographs*. His book was re-edited, extended and revised, by the author, and the version commented is the sixth edition, from 1883. This version includes additional topics such as crayon-work, ceramic painting, chromo-photograph, and an augmented chapter on retouching. The information given on retouching is credited to William Kurtz.[152]

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[151] This expression is not only used by Ourdan. It becomes common to describe portraits that use strong contrast with lighting, directed only to part of the face. See chapter *1 - In the studio*.

[152] In the second edition of the book, from 1870, all indications on retouching are given as William Kurtz's direct quotes. The sixth edition provides just a footnote: "Through the assistance of Mr. William Kurtz, the renowned New York artist, this book had the honor of giving the first comprehensive exposition of negative retouching printed in this country, in its second edition, issued October 1869" (Ayres, 1883: 180).

William Kurtz (1833-1904) was a German photographer that also knew painting and lithography. In the US, he would establish a portrait studio in New York, that after 1883 even worked with electric light. His work is best known for his "Rembrandt" portraits. He was a pioneer in photography and printing in America. From Vogel, he had learned a color process that he patented in the US. He is also the author of one of the first colored images, a well-known still life, published in 1893 (Hirsch, 2015; Taft, 1964).

In Ayres' text, he refers to retouching as an "art-resource" and the "License of art" as a way to justify the retouching beyond just correcting limitations of photographic techniques. On portraiture, he explains that the negative should always be retouched. Even when the person requesting a work asks to be portrayed as he is, he justifies it:

> Where the artist's better judgment suggests improvement, which shall not impair the likeness as a whole, it will not be complained of as objectionable (Ayres, 1883, p. 24).

He also underlines the existing tendency to exaggerate retouchings and summarizes that the result of any retouching should only be "enjoyed," while the retouching work should be "imperceptible" (Ayres, 1883, p. 189).

Robert Johnson and Arthur Hammond

Yet another English author, with extensive work also published in the US, is Robert Johnson. Like others, he debated the place of retouching in photography and art; he wrote:

> It is not so very long ago that photography itself was condemned in a most wholesale manner. A photograph, it was said, could not be a work of art at all; it was purely mechanical, and had no claim to be considered as artistic. The photographer was understood to be a somewhat dirty individual, arrayed in a velvet coat and a slouch hat, whose fingers were generally black with nitrate of silver. […] This is all passed […] This is as it should be. It is a narrow and bigoted perception that can only see one side of a subject, and we think that if we keep our minds open on the subject of "retouching" a photograph, we shall conclude that it is not only justifiable, but necessary, on artistic grounds. (Johnson & Chatwood, 1895, pp. 116, 117)

In 1886, still in the UK, he published a first edition of the manual, *A complete treatise on the art of retouching*. However, would be his later version, *The art of retouching and improving negatives and*

prints, the one most recognizable[153] (Figure 2.10a-d). For the purpose of this research, it is considered the American 14th edition, which was revised by T. S. Bruce and Alfred Braithwaite for negative and print retouching, respectively.[154]

It was written as a practical manual with step-by-step instructions. It differs from the English version by including several images with examples of retouching. Comparing Johnson's several books in its several editions is possible to follow some technological and industrial advances that most affected photography and retouching. He refers to the adaptation of techniques and new equipment and retouching machines, such as using an electrical vibrating pencil and the airbrush.

He comments on one of the major changes into the new century, the introduction of film as an alternative to glass support. Film negatives were smaller and difficult to retouch.

He also makes note that materials and tools specifically for retouching were at the time already available from well-established companies like Eastman Kodak and Agfa-Ansco.[155] He mentions them by their trade names, such as the Eastman diffusion disc, Eastman Abrasive Medium, or "Satin" and "Oxford" screens from Agfa Ansco. For the retouching medium, he gives L. P. Clerk's[156] recipe but recommends best to buy prepared.

It is also possible to perceive an aesthetic evolution. Johnson's first books refer to the classical sculptures and known painters as standards from whom to learn (Figure 2.10e).

> I may here remark in passing that anyone wishing to become a good retoucher would do well to get a good plaster of Paris mask, Juno, Venus, Diana, etc.—they may be bought for three and sixpence at Bruciani's, near Covent Garden—and by putting it in a variety of conventional lights, such as are used in first-class photography. (Johnson, 1886, p. 17)

> In order to learn how to add clouds to a negative the best advice I can give is, examine carefully the works of such artists as Turner, Birket Foster, Leader, Linnell, Constable, etc., (Johnson, 1886, p. 45)

In the 1941 edition, he mentions the motion picture's influence, and he remarks on glamour and beauty.

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[153] His work, or illustrations from his work, are the most common result in online searches on publications about retouching from this period. It was also mentioned, and illustrations included in Heinz and Bridget Henish's *The painted photograph* (1996) and the exhibition *Faking it*, at The Metropolitan Museum of Art of New York (Fineman, 2013).

[154] The selection of this edition relates exclusively to availability. Simultaneously, it is recognized that it gives an interesting evolution from Johnson's earlier texts.

[155] Marion & Co published Johnson's English editions and included many pages with advertisements for retouchings supplies and other photographic materials sold by the company.

[156] A reference to L. P. Clerc's manual: *Photography Theory And Practice: The English edition of "La technique photographique,"* first published in 1930.

In motion pictures, retouching of each frame was, obviously, impossible. The alternative strategy was to use cosmetic makeup. And Johnson mentions the sale of special makeup kits[157] for the movie industry that were soon adopted by professional photographers. Not all makeup was suitable. He calls it "straight" or photographic makeup and refers explicitly to kits by the cosmetic companies Max Factor and Elizabeth Arden.

He also stresses the importance of these and other *original retouchings*, as Vogel called it,[158] and the preparation before photographing to reduce the need for retouching since negatives were also beginning to get smaller with film.



Figure 2.10 – Examples of the possibilities of retouching (Johnson, 1936, fig. 4, 5, 12, 13).

This work continued to have revisions and editions by Arthur Hammond,[159] and he would appear as the author in some versions. The justification being that so many advances had happened that he brought the book up to date. However, the instructions for the retouching of negatives present little change, and it includes the same illustrative plates from previous editions (Figure 2.10a-c).[160] In the preface, he gives an important note about changes in methodology:

> It was the usual custom in the old days to use large glass plates which were etched and pencilled and then contact prints were made the same size as the negatives. Today many portraits are made on small films and the prints are made by projection and therefore somewhat different methods of retouching have to be used. Chemical reduction on negatives now is often used instead of etching with a knife, and enlarged negatives are often made from the small original negatives. (Hammond, 1948: v)

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[157] The use of "retouching" makeups is a practice in cinema and television to this day.

[158] See above, chapter *The original* retouching.

[159] Hammond was himself a pictorialist photographer and author of at least another book *Pictorial Composition in Photography*, in 1920, and contributor in several instances to the magazine *American Photography*.

[160] Some of the same illustrations were included in the *Complete Self Instructing Library of Practical Photography* in the 10th and last volume dedicated to retouchings. The collection was published by the *American School of Art and Photography* and edited by J. B. Schriever, with no mention to these authors. (Schriever, 1909).

In another book by Johnson, *Photography, artistic and scientific* (Johnson & Chatwood, 1895), he digresses on the legitimacy of retouching and summing up his point of view on the state of the matter:

> Retouchers have only themselves to thank for this attitude taken against them. Some retouching is detestable; it is senseless and purposeless, and cannot be too much condemned. But as there are artists and Artists, photographers and Photographers, so there are retouchers and Retouchers; and we may assume that if the object of retouching be legitimate, and if it be carried out in a discreet and intelligent manner, the result should justify the process. It is most probable that any very sweeping condemnation is inaccurate, so, on the other hand, blind partisanship of any process or theory is likely to lead us astray. (Johnson, 1895, pp. 116, 117)

The US - Women authors

At the turn of the century, more and more women were often employed as retouchers since the work required delicacy and patience, which were considered typically feminine characteristics. However, some women established themselves as professional photographers. A French article from 1902, translated to Portuguese, identifies that it is in the US and the UK that women first established as professional photographers (Gastine, 1902), and the author notices:

> In England and from the other side of the Atlantic the first established women photographers were drawing artists abandoning in part or totally the brush, the pencil or drawing stump, and consecrate themselves to photography portrait. Their way of work differs profoundly from our Parisian professionals[161]. (Gastine in *BP*, 1902, pp. 113-115)

Clara Weisman

Clara Weisman was one such American woman, photographer, author, and with a background in painting. Weisman saw photography as an art object, intended to be unique and not to be reproduced in infinite copies. Her work can be considered part of the pictorialism movement.

Other pictorialists, like H.P. Robinson, made use of photomontage to create their work. Weisman instead recommended the practice of retouching negatives and various other preparations before the image was printed.

Her text's title suggests from the start her view on retouching and its contents: *A complete treatise on artistic retouching, modeling, etching, art, and nature, art and photography, character chiaroscuro, composition, style, and individuality* (Weisman, 1903). Retouching is explained with examples in which

[161] Author's translation.

composition, lighting, and retouching have equivalent roles as brushes and paints serve the artist painter. And she adds:

> What is retouching [...] It is a preserving of modeling either by pencil, knife, etcher, charcoal, crayon, brush or color—anything that will perfect the negative (Weisman, 1903:17)

Like other authors, Weisman believes that the photographer and the retoucher need to have artistic training, knowledge of drawing, and the human figure (Figure 2.11a). And that, art photography is not to produce an accurate picture but to capture the image beyond merely recording it, moving away from the *Realism* that marked the early history of photography (Figure 2.11d). Although she advocates extensive use of retouching, the goal is always to retain the photographic character and not over-retouched (Figure 2.11b, c). In a chapter dedicated to art and nature, she mentions several names of philosophers and artists from various periods that influence her view on art and her position on retouching, like: Goethe, Plato, Raphael, Michael Angelo, Rembrandt, Van de Velde, Mauve, Millet, Corot, and Iamblichus. In her words:

> The more artistic ability one possesses the more power he has to portray the pictorial. (Weisman, 1903:10)

> Goethe says, "Art is called art, simply because it is not nature. An artist should not be a mere copyist. Something higher and more subtle is required. The beautiful and the pure idea must be in the mind, then it is no matter what the model is." (…)
> Plato says, "If you take a man as he is made by nature, and compare him with an another who is the effect of art, the work of nature will always appear the less beautiful." (Weisman, 1903:107)

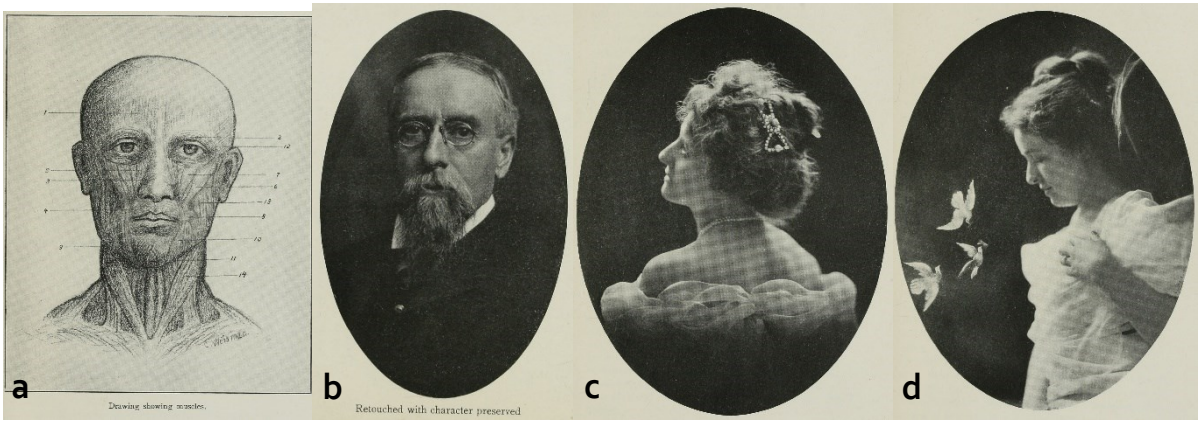


Figure 2.11 – a. "Drawing showing muscles," by Clara Weisman; b. Portrait "retouched with character preserved"; c. "Profile retouched properly"; d. "Dreaming of love" (Weisman, 1903).

Retouching by French authors

At the turn of the century Portugal receives direct influence from French literature on photography, which is recognized in the many books by French and Belgium authors found in Portuguese archives and collections. Among them *La photographie, son histoire, ses procédés, ses applications*, by Henri Gossin; *Photographie en Amérique*, by Alphonse Liébert (1827-1913, French, also worked in the US); *Art en photographie*, by Frédéric Dillaye (1848-…, French); *Photographie par emulsion sensible*, by Alfred Chardon (1830-1897, French); *Traité Pratique de Phototypie*, *Manuel do Touriste Photographe Vol I & II*, by Léon Vidal (1833-1906, French); *Traité général de photographie* Disdéri v. Monckhoven (1834-1882, Belgian); *Les éléments de la photographie*, Alfred Hannot (1828-?, Belgian). From all these stands out C. Klary with specific works on retouching.

C. Klary

C. Klary (1837-19??) stands out because he is the most often found translated into Portuguese, both in Portugal and Brazil. He was the editor of the French monthly magazine *Le Photogramme*. He also contributed to other magazines with photographs and opinion articles, including the Portuguese monthly *Boletim Photographico*. Other known and self-publicized accomplishments include a teaching position at the *École Pratique de Photographie* [Photography Practical School] in Paris. And having co-invented a device with C. Kindermann, the *Alenagraph* – a retouching machine (Klary, 1900).

He is most recognized for the work *L'art de retoucher les négatifs photographiques* [The art of retouching photographic negatives], first published in 1897. His text shows an evident influence, and sometimes complete transcriptions, from the German author Vogel and the English author H.P. Robinson, both already discussed.



Figure 2.12 – a. Advertisement for the *Alénagraph*, by Klary & Kindermann (Klary, 1900, p. 36); b. Portrait; c. A New York City street at night, in the winter by Klary (*BP* no.12, 1900).

Retouching in Portuguese publications

In Portugal, there were several technical works on photography circulating in the first half of the twentieth century, and many were original or translations of foreign authors, like Klary.

Oliveira Simões

Interesting work authored by José Maria de Oliveira Simões is *Apontamentos para um curso de photographia* [Notes for a photography class], published by the *Portuguese Red Cross Society*, in 1893. The book has two uncommon aspects. First, it is photolithographed from a handwritten text, further suggesting that it was meant to be used as a syllabus. And second, because it was not written by an experienced photographer but is a compilation of sources done by a military engineer. Simões identifies the consulted books, listing several French and Portuguese authors, and a Spanish version of Giuseppe Pizzighelli and Arthur Freiherr von Huebl's book on the platinotype (Table 2.1).

Table 2.1 – "Consulted Books," titles and authors as described in *Apontamentos para um curso de photographia* (Simões, 1893, p. 240)

Title	Author	Translation	Language	Original edition
La platinotypia	Pizzighelli e Hübl	[The platinotype]	Spanish	1882 (1st German edition)
Photographie en Amerique	Liebert	[Photography in America]	French	1864 (1st Ed.)
Photographo amador	Sequeira	[Amateur photographer]	Portuguese	1886 (1st Ed.)
Merveilles de la science	L. Figuier	[Wonders of science…]	French	1869
Photo lithographie	Hannot	[Photolithography]	French	1870
Photographie	Gossin	[Photography]	French	1887
Traité general de photographie	Monckhoven	[General treatise on photography]	French	1856 (1st Ed.)
Lições de photographia	Pina Vidal	[Photography lessons]	Portuguese	unidentified
Lições de photographia	Aniceto Rocha[162]	[Photography lessons]	Portuguese	1871-72

Simões does not give instructions on how to retouch, photograph, or much of the camera and laboratory work. He describes the wet and dry collodion and dry plate processes, but just as recipes

[162] Aniceto Rocha, like Oliveira Simões, followed a military career and taught photography as part of the training at the *Escola do Exército* [Portuguese Military Academy]. A known syllabus for the academic year of 1871-72 lists 60 books from several authors, mostly French (Almeida, 2017, pp. 90-93).

rather than a practical tutorial. He justifies it by saying that the practical aspects of photography are learned in the laboratory and not in a class. But he includes a relevant historical note of the invention of photography.

He then describes all the equipment necessary, including a drawing and description of a retouching desk, copied from Liébert's *Photographie en Amerique* [Photography in America] (Liébert, 1874).

The text was probably meant to be used in a class included in military training. Still, it gives insight into the practice of photography in Portugal at the turn of the century. For one, it highlights an evident influence from French authors. And second, Simões' includes the retouching table, vignetting apparatus, and headrests in the chapter on "related equipment" along with the washing trays and plate holders, which confirms that retouching was a legitimate and accepted part of the photographic process, even for military photography.

Adalberto Veiga

Adalberto Veiga (1875-1951) is known to have translated into Portuguese texts on photography from different sources that were published in a six-volume collection as the *Enciclopédia fotográfica* [Photographic Encyclopedia]. The second volume is dedicated to retouching, *Retoque de Negativos e Positivos Photographicos* [Retouching of photographic negatives and positives], first published in 1904. The original author of Veiga's book on retouching is not mentioned. However, the first volume, *Manual prático de fotografia* [Practical manual on photography] (Veiga, 1931, first published 1904), refers to "the best authorities from Austria, Germany, England, such as Ratt, Eder, Miethe, Ramsay, Abney, Lumiere, Mendel, etc." Other editions of the same book refer to the translation as "coordinated according to the most notable and modern French, English, German and Italian Works."

On retouching of negatives, the text divides into landscape and portrait photography. For landscape, it starts by saying that the retouching is simpler and reduced to spotting. Then it continues explaining several aspects of retouching and double printing for landscape composition. To this, Veiga advises producing two negatives, one adjusted for the landscape and another best adjusted for the sky. On a note, and as an alternative, he mentions that negatives with artificial skies are available for sale.

Concerning portrait retouching, it states that its purpose is to correct faults and for the retoucher to recognized them. The curious part is the description of some of the *faults*, including visible veins and visible clavicles, in people he describes as too thin, allowing today a glimpse into beauty and aesthetics standards of his time.

Arnaldo Fonseca

Arnaldo Fonseca (1868-1936?) stands out as an author, photographer,[163] and teacher of photographic techniques at the popular *Academia de Estudos Livres* of Lisbon [Open Studies Academy]. He taught a course on photography, at least in 1900, that included the topic of retouching in the fourth part of the course, centered on the negative. (*BP*, n.3, 1900, p. 36).

The course followed the same sequence of topics as in his book *Guia do Photographo* [The photographer's guide], from 1905. While there is no known work from him dealing exclusively with retouching, this book presents the essential summary of the photographic techniques of the time. However, it does not extend, like the other authors mentioned here, to justifying the use of retouching. Retouching for Fonseca is presented as just another step in the photographic process, describing materials and giving recipes. It was found to be the tendency in the first decade of the twentieth century. Apart from the more technical books, he also wrote several essays and opinion articles as editor of the magazine *Boletim Photographico*.[164]

Diogo M. Azinhaes

Another author of mention is Diogo M. Azinhaes. He wrote a small book titled *Aos amadores, tratado de retoque de clichés photographicos* [To amateurs, a treatise on retouching of photographic plates] (1899). The curious thing about this "treatise" is that the text is just 18 pages long, divided into seven very small chapters, while some of the other books mentioned go to 300 pages. Even more curious still is that it touches every aspect seen on other books, albeit using a single sentence. He describes every step and materials needed for retouching, including combined printing, namely "when a more interesting background is needed" or to compose an individual portrait starting from a group portrait.

A Spanish example

Kâulak

From Spain, a highlight goes to the author Antonio Cánovas del Castillo y Vallejo (1862-1933), also

[163] As a photographer, Arnaldo Fonseca photographed the Royal family and society, retiring in 1910 to pursue a political career in the new Portuguese Republic. More on Arnaldo Fonseca's studio portraits in chapter 4 - New interpretations – Rediscovering Arnaldo Fonseca, as he is one of the photographers considered in this research.

[164] More on the magazine *Boletim Photographico* see chapter 1- Portugal – Boletim Photográphico. And more on Arnaldo Fonseca see chapter 4 - Arnaldo Fonseca.

known as Daltón Kâulak, or just Kâulak (Figure 2.13). He was a lawyer, politician, art critic, painter, and photographer. He was also a researcher at the Fine Arts Circle of Madrid's photography section, later Madrid's Photographic Society, and active in many photography-related initiatives, and contributed texts to magazines and clubs. He is credited with being the first to promote Intellectual property concerning photography in Spain. He had a Portrait studio named Kâulak, situated in Alcalá street, one of the most famous streets in the center of Madrid. (Sougez, 2017; Sanchéz Vigil, 2018) His publications on photography are signed as Kâulak, and it is highlighted *El retoque fotográfico* [Photography Retouching] published in 1921. In this book, he gives detailed and practical instructions for retouching.

Kâulak presents his reasons, as some of the others reviewed here. He considers that it should be used to correct photography limitations and gives an account of several, their causes, and remedies. He argues:

> So, we have that the plate's image, in its outline, may not be adjusted to the truth or plausibility. Likewise, its intensity and tones can also be lying since they are affected differently by the light of each color. Is that not enough to justify the retouching?[165] (Cánovas, 1921, p. 16)

> Portrait painters (who inadvertently *retouch* by copying only the indispensable and fundamental of the portrait) give us an example of what can be done by retouching.[166] (Cánovas, 1921, p. 44)



Figure 2.13 – Self-portrait - Daltón Kâulak in his work office, showing Kâulak holding a negative plate at his retouching desk. *Graphos ilustrado*, 190? (source: Wikimedia Commons)

[165] Author's translation.
[166] Author's translation.

For Kâulak, the retouching of negatives is just another step in the photographic process. Whereas, for art photography, he considers more relevant the retouching of the prints and the *original retouching*[167] that he calls "the best retouch." Kâulak refers to all photographic manipulations as retouching of one type or other, either in the negative or print, either chemical or manual. He considers that the mechanical part, the simple capture of the image by the camera, is not art, however beautiful the image may be. To be considered art, it needs the intervention of the artist, which is done by manipulation. Unlike Clara Weisman that gives priority to negative retouching,[168] Kâulak gives more emphasis to the print. Negative retouching has other purposes, as he put it:

> And retouching is necessary, always, to a greater or lesser extent; as it is always necessary the cutting of a diamond. Nature produces it by creating pure carbon, and yet it does not shine, that is, it is not so bright, until the gemcutter cleans, polishes, and cuts it. And so photography will seldom be worthwhile or artistic, without the necessary retouching intervening to transform it, as earthly carbon is transformed into shiny diamonds. (Cánovas, 1921, p. 12)

> [on the retouching of prints] We are now going to study the retouching of paper prints, the most important in modern artistic photography. […] The art starts with the retouching of the print.[169] (Cánovas, 1921, pp. 71, 77)

This quote shows an unusual position compared with previous authors. For example, if one compares it with Vogel, discussed above.[170] Despite having conflicting ideas about art photography, some parallels can be seen in Kâulak and Vogel's texts. They both have a comprehensive understanding of photography's limitations, and similar examples can be found in both authors, justifying retouching as a search for truth. And he gives an example when retouching is no longer necessary:

> Photography will be truth the day when the spheroid aberrations of the lens are reduced to the minimum that is contained by the human eye, and can accurately photograph the rainbow.[171] (Cánovas, 1921, p. 15)

For Kâulak, as it was for Vogel, knowing the reasons for each limitation and how to avoid them was the best way to obtain the best image. But Kâulak defends that, what happens after the camera, and the retouching of the negative, which is manipulating the print, makes it possible for photography to

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[167] See chapter 1 - *The original* retouching. It is considered "original retouching" all the actions done before the camera work, such as staging, lighting, posing, the use of makeup, filters, etc. Its purpose is to influence, reduce or eliminate the need for the retouching of the negative.
[168] See above, chapter 2.2 - *Clara Weisman.*
[169] Author's translation.
[170] See above, chapter 1 - *Hermann Wilhelm Vogel.*
[171] Author's translation.

achieve art status. It is a common argument among the pictorialists, but surely, Vogel would disagree. He also discusses the pose. Kâulak finds some prevalence in the standards for the pose that had been set by Disdéri's *carte-de-visite* and found stated in other manuals. He argues a need to break out from it. Kâulak explains that some tricks can help achieve a better image and avoid retouching, but these should not be considered rules as he argues that the best pose, and lighting, should be found for each sitter.

These views and recommendations are indicators of an aesthetical evolution happening in the new century, not just for art but also for studio photography.

Some influential publishing companies

Along with the beginning of the industrialization of photography, commercial establishments were set up dedicated exclusively to the business of photographic materials and equipment. They also offered spaces for exhibitions, salons, training courses for amateurs, and more. Some provided related services and worked as photography studios, publishers of books and technical journals. The stores that were also publishers set a group apart from others for their role in promoting and developing photography. Their publications also worked as catalogs and had several pages of advertisements at the beginning and end, with listings of products and services available at their stores and associated suppliers. An amateur could obtain in one store all the equipment needed and the books teaching how to do it. Professional photographers could also share their opinion articles and get access to the latest innovations.

Although not exclusive to photography, in Portugal, the major department stores also sold photographic materials and published technical books teaching photography. In Lisbon, the two most prominent department stores were Armazéns do Chiado, which published, for example, *Novo tratado de photographia: o mais prático e elucidativo o mais correcto e augmentado* [New photographic treatise The most practical and elucidative the most correct and augmented] by José Maria de Liz Dionysio de Almeida, in 190?. Armazéns Grandela published, for example, *A fotografia em 12 lições* [Photography in 12 lessons] by Arnaldo Fonseca, in 1911.

Specifically dedicated to photography was the Worm & Rosa store, which published other books by Arnaldo Fonseca, like the above-mentioned *Guia do Photographo* (1905). Also, the monthly magazine

on photography the *Boletim Photographico* between 1900 and 1914, where Arnaldo Fonseca served as Editor until 1910.[172]

The *Boletim Photographico,* like other magazines on photography, would publish many articles condemning retouching and many more promoting it. Articles on retouching focused on controversies aroused in events and publications, the history of retouching, technological novelties, and the practice of retouching.

In England, it is of note the Marion & Co, with a store in London. In the last quarter of the nineteenth century, it was an active promoter of photography, possibly the most influential. Notably, they sold sets for amateur photography and retouching materials (Figure 2.14). It was one of the first stores to deal with photography as an industry, becoming one of the largest, if not the largest in England at that time (Hannavy, 2007, pp. 892-894). One publication, among others, was dedicated to retouching of negatives and written by Robert Johnson, discussed above – *A complete treatise on the art of retouching photographic negatives*, first edition from 1886.

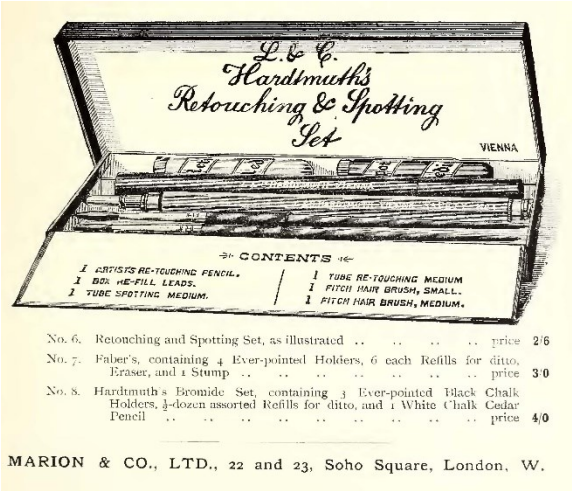


Figure 2.14 – Hardtmuth's Retouching & Spotting Set. Advertisement Johnson's manual published by Marion & Co (Johnson, 1901, p. 176).

In the United States, of reference in publishing is the Scovill & Adams company. They sold photographic material in New York and had an editorial headquarters in Washington. They published complete collections of manuals dedicated to photography, divided into practical lessons. From 1889, one example was *The modern practice of retouching negatives, as practiced by French, German, English & American experts.*

[172] See above, chapter 1 - *Portugal – Boletim Photográphico.*

This text is frequently attributed to Paul Piquepé. It is, in fact, a compilation by three authors: Piquepé, H. P. Robinson, and Johannes Grasshoff, all mentioned above. This work is particularly curious because it analyzes each author's different views, representing France, England, and Germany, respectively. It shows the pragmatism of Piquepé describing techniques, the pictorialist intentions of Robinson in the chapter on portrait photography, and the emphatic retouching by Grasshoff in the chapter dedicated to landscape photography. It could be seen as a bridge between the different approaches to retouching.

This list does not include the Eastman Company because no publications were found from the beginning of the twentieth century that might have circulated in Portugal dedicated to retouching.

Paul Piquepé – multinational author

Of French origin, Paul Piquepé first published in England, and his books deal with collodion negatives. But it is included here, as last in this list, because he wrote in different languages, worked in several countries, and is frequently found in Portuguese collections. Some of his English books have later translations to French and were reprinted still in the twentieth century. First published in 1881, *Traité pratique de la retouche des clichés photographiques* [Practical treatise on the retouching of photographic plates] was not updated, and later editions present precisely the same text.

Another relevant work is from 1886 *Practical treatise on enameling and retouching photography*. Written in manual form, Piquepé offers practical suggestions and examples. In his French works, there are also references to different external sources such as photographic meetings, in which he took part, individuals, or periodicals to which he had access, such as *The British Journal of Photography* (Piquepé, 1881).

This text and the above published by Scollvil & Adams with contribution be Piqupé helps to accept and agree with Ourdan's observations about differences between retouchings from different countries.

When comparing Piquepé's illustrations with, for example, Zamboni's manual, one sees that "minimum" retouching does not mean the same to each author.

In Piquepè's example, Figure 2.15, the skin is smooth, but the girl retains likeness and looks as if more rested (Figure 2.15), while the skin of Zamboni's sitter looks more polished with a stretched out skin unnatural for the age of the sitter (Figure 2.8). Still, both of them present a notorious change in skin texture.



Figure 2.15 – Portrait without retouching and retouched (Piquepé, 1881)

Later publications

The publications of books on retouching have not stopped, to this day, adapting to the new needs and technology. But even after the introduction of color and its generalized use, professional photographers – and amateurs – would still use black & white for aesthetics reasons. For example, supplies for the retouching of black and white negatives were included in Kodak catalogs as late as 2003 (Kodak, 2003). More modern books are generally more technical and less focused on aesthetics, but many still include some theoretical sections identifying the reasons and justifications for retouching.

Selected examples,[173] in chronological order of the editions consulted here:

Draper, Ernest E. & Harkness, Norris (1941). *Negative retouching and print finishing.* New York: Crown Publishers.

Fanstone, Robert M (1948). *After-work on negative and print.* 4th reprinted ed. London: The Fountain Press.

Frerk, Friedrich Willy (1948). *Los negativos cómo se mejoran* [All about improving negatives.]. 3rd ed. Barcelona: Ed. Omega.

Marin, Corrado (1960). *Il ritocco positivo e negativo: Chimico - manuale - meccanico.* 4th ed. Trieste: Edizioni tecniche fotografiche. [the only Italian publication here, but included because it was available in Portugal]

Jacobson, C. I. (1966). *El revelado: La técnica del negativo* [Developing: the negative-

[173] Because it is outside the set time interval for this research, an exhaustive search of published manuals from the middle of the 20th century was not carried out. Only a selection is presented that serves to illustrate the variety and continuity of this type of publication.

technique]. Trans. Luís Jordá. 4th ed. Barcelona: Omega.

Croy, Otto R (1967). *Retouching: Corrective techniques in photography*. 5th impression ed. London: Focal Press.

Floyd, Wayne (1968). *How to retouch & spot negatives & prints*. Philadelphia: Chilton Book Co.; Amphoto.

West, K. (1972). *Guide to retouching negatives and prints*. New York: Amphoto.

Podracky, John R. (1980). *Photographic retouching and airbrush techniques*. Englewood Cliffs; London: Prentice-Hall.

Miller, Jan Way (1986). *Retouching your photographs*. New York: Amphoto.

Reed, Vilia; Kodak (1986). *Photographic retouching*, eds. Frank McLaughlin, Deanna Tiefenthal. Rochester, N.Y.: Eastman Kodak Co.

Weiss, Veronica Cass (1986). *Retouching from start to finish*. 4th printing ed. Hudson, Fla.: VC Pub.

Bridgewater, Peter; Lewis, Brian; Breckon, Brett (1988). *Design: Graphics, illustration, airbrushing*. London: New Burlington.

Some of these authors were published in different countries and translated into other languages[174]. These manuals show that many of the retouching techniques developed in the nineteenth century would still be valid and were used late in the twentieth century for black & white photography.

However, as the negative reduces its size, with the generalized use of film that replaced the glass plate, the retouching practices transfer more extensively to the print.

The retouching of prints was initially considered a finishing step and excluded from a more strict definition of retouchings.[175]

While negative retouching was generally considered a part of the photographic process and done by the photographer himself or by a retoucher inside the studio, the retouching of the print was a

[174] Like the books attributed to Paul Piquepé, Klary, or Johnson, in these other books, it was noted that authorship was used freely, and the exact text and images are used in several publications. For example, part of the same text and illustrations were found in two Spanish editions by the same publisher. One is authored by Jacobson and the other by Frerk. In Jacobson's version, some illustrations are credited to W. Nurnberg. In the second, the images are not credited. W. Nurnberg may refer to Walter Nurnberg, another author of photography books such as *Lighting for Portraiture* and *Lighting for Photography*, translated in several languages.

[175] For many authors, and in this text's scope, the coloring and other visible alterations to the print are not considered retouching in a strict sense but overpainting, mixed media, and composite photography. *Retouching of prints* was only used when referring to manipulations that result invisible and do not alter the photograph's general characteristics.

supplement to photography. It was an optional step in the production of the print and not necessarily done by the photographer or retoucher. Design artists would transform the photographic image into a means of communication; a picture was no longer just a picture and intentionally meant conveying a message, but not that of the photographer.

Among the random things sometimes found online, a leaflet by the Meyer Both Company, a publishing company operating – at least in the 1920s – in Chicago, Illinois of the US, describes photo-retouching:

> The increasing use of retouched photos as mechanical illustrations in advertising has made photo-retouching a most important department of commercial art principally because it is an economical method and also because it gives an accurate and reliable representation of the object. It is less expensive to photograph an elaborate subject with small details than to make a drawing of it. […]
> In order that the term "photo retouching" may be perfectly understood, we will state that the retouching referred to is the retouching of photographic prints and not the retouching of negatives, which is an entirely different matter. […] The retouching of the negative is done by an artist who is called a retoucher. This work is done on the negative in the photograph gallery before the print is made, and is a class of work that is handled by the photographer, rather than by an art department. So the student will understand that the term, photo-retouching, refers to the retouching of photographic prints or positives, and not to the retouching of the negatives from which the prints are made. (Meyer Both Company, 1922, p. 1)

As described in the quote above, the retouching of prints was not an invisible work and introduced more dramatic changes to the images. The techniques were entirely different from those used on the negative, and the airbrush substitutes the pencil and brush as the standard retouching method. A clear indication that most corrections and other manipulations are done to the print is the designation *Airbrushing* instead of *retouching* in the manuals' titles.

With digital photography, technical manuals continue to be written. They usually address specific photo-editing software, and because new features and updates are continuously added to the software, the publications are renewed each year or with each version. Adding to these, some photographers continue to write about the use of digital technology for the retouching of images but in more general terms and not as manuals to one specific application. This is possible because the essential tools in digital editing software are similar and reproduce the practice of analog photography and manual retouching and editing, such as: vignetting, dodging, burning, solarize, mask, brush, crop, and so on.

Overview

The works reviewed reveal the diverse ideas and positions of their authors on the parameters of aesthetics and visual culture and illustrate how they vary with time, from one author to another and

from country to country.

While the legitimacy of retouching in photography shows no signs of consensus to this day, many of the retouchings, in the broad sense, are accepted, and every author recognizes negative retouching as necessary. These authors acknowledge and present their justifications and their arguments. Those with a background in science recommend it primarily as a way of overcoming technical limitations. Those with experience in art manifest a broad position, with retouching being considered as an artistic tool.

Many explain the main shortcomings in photography and the most common faults during processing and how to remedy them. Not all problems were recommended to be compensated by retouching the negative. A great deal could be accomplished by avoiding them, by doing the *original* retouching, particularly controlling light with filters, lenses, diffusion screens, and proper lighting systems.

Notably, there is a divide and emphasis on the relation between art photography and retouching.

Authors like Zamboni gave primary importance to the retouching of negatives, and the retouching of prints was considered secondary or, in the pure sense, not at all necessary.

With pictorialists, manipulating the print became the artist's tool of expression. However, not initially, or not for all of them. Robinson and Weisman still did most of their manipulations in the negative. Later pictorialists, for example Kâulak, would find the retouching of negatives merely a technical necessity, while the retouching of prints was the artist's tool. The image was significantly altered in the print by various manipulations and alternative printing methods, including adding color or printing in color.

Comparing Robinson and Kâulak again, both agree that just the camera's mechanical operation was not art. But while Robinson would achieve art by carefully choosing and preparing compositions, Kâulak only considers art when the artists change the mechanical image to another "less photographic state."

It is clear that the retouching of dry plate negatives was done with an artistic hand and an understanding of materials, light, and for portraiture, the basics of anatomy. Even those who did not have the "artistic hand" recommend following directions of those who had or limit to the basic retouching so as not do more damage than good.

Bellow are described, from the collection of books available, the essential equipment and materials for retouching. Examples are given from earlier manuals and Portuguese collections.

2.3. Exploring common reasons for retouchings in portrait photography

Retouching and perception

As photography established its many uses, new ideas were being explored in other areas of science, such as visual perception, that would influence Art and the understanding of photography in general. To understand perception, the eye's physiology was again studied compared to the lens and the camera obscura, but this time, identifying the differences.

Hermann von Helmholtz (1821-1894), a physicist, is considered the father of modern studies on visual perception. He studied the eye and proposed theories on perception in the 1860s. These would be further developed in new ways of understanding images, color, and perception in the following years.

Some authors took these ideas back to photography and developed their considerations about perception, photography, and art. One text with particular importance was written by Peter Henry Emerson (1856–1936), *Naturalistic photography for students of the art*, in 1889. It was written after H. P. Robinson *Pictorial Effect* in 1869, but at a time when Pictorialists were leaving their mark establishing Photography as Art. Emerson defended "photography from the artistic standpoint" but as an opposition to other authors of that time, which described photography's artistic rules derived from Painting. For him, true art draw from nature, and he considered all theological or any other subjective theme to be unsuitable to Pictorial Art and goes so far as to say:

> From about a.d. 450 we are told that church pictures become no longer only decorative, but also instructive. Here then was a wrong use of pictorial art – it is not meant to be symbolic and allegorical, or to teach, but to interpret the poetry of nature. (Emerson, 1889, p. 45)

> A fatal error. Doctrinal subjects are unsuitable for pictorial art, and will never live. Who cares now for Giotto's "Marriage of St. Francis and Poverty"? but who would not care for a landscape or figure subject taken by Giotto from the life and landscape of his own times? – it would be priceless. (Emerson, 1889, p. 50)

For Emerson, the value in Pictorial art was in depicting from nature to which photography was most suitable. It followed that he condemned any arranged composition, artificial light systems, and, of course, retouching.

However, he does not defend purely scientific and technical photography, what was called *straight photography*, as art. He debates like others that the lenses' sharp images are far from the truth, and describes how the image is imperfect, and states its reasons. He argues that the eye captures an imperfect and different image from that captured by the glass lens. He reflects on the rules of visual perception and works like those by Helmholtz instead of turning to themes or aesthetics of paintings.

For example, he noticed that the eye could not focus simultaneously on the entire visual area and only focuses on the center. That the eye reacts differently to dark and light objects, and when the two are close, the bright object's borders get diffused. The eye is affected by a blind spot, introducing imperfections that do not affect the overall perceived image because the eye is continually moving. For all this, he suggests:

> All these slight imperfections make the eye's visions more imperfect than that of the optician's lens, (…) The rule in focusing, therefore, should be, focus for the principal object of the picture, but all else must not be sharp; and even that principal object must not be as perfectly sharp as the optical lens will make it. (Emerson, 1889, p. 119)

There are many ways to make an image less sharp. Emerson describes the effect, which recalls what was said about the Petzval lens, finally not approved by him or any vignetting devices. Instead, and approved by Emerson, were the rectilinear landscape lens to be used "slightly out of focus." He praises the portraits by Julia Margaret Cameron (Figure 2.16a) that used one of such lenses. It can be argued that Cameron's portraits are not so slightly un-focused. Also, it is believed that before she started to use a *Rapid Rectilinear* lens by Dallmeyer, in 1866, she had a Petzval type lens[176] not appropriate to her camera that introduced fuzziness and made it difficult to focus. The initial photographs possibly influenced her later work, intentionally or not, with the rectilinear lens (Brusius, 2010; Gernsheim, 1975, pp. 70-71).

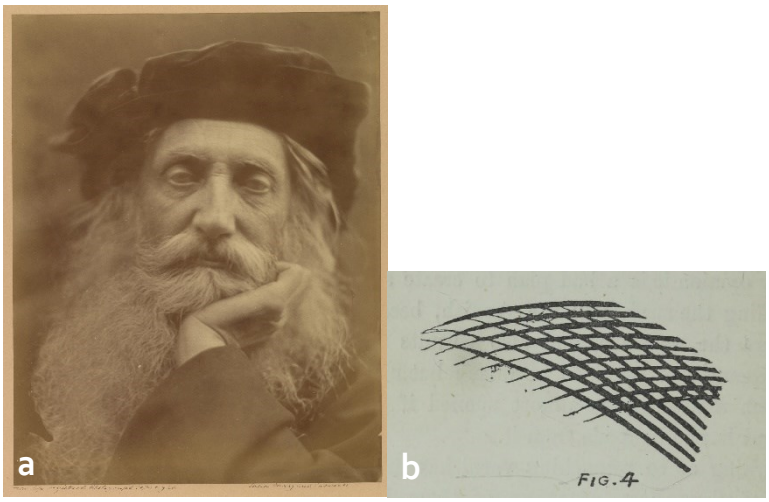


Figure 2.16 – a. Portrait of Henry Taylor, albumen silver print, Oct 10th, 1867, Julia Margaret Cameron (The MET, no. 35.85.1); b. Crosshatching (Hubert, 1895, p. 26)

[176] The "Jamin" lens is now in the collection of the Victoria and Albert Museum. It was offered to Cameron by Alvin Landon Coburn, identification number V&A, RPS.2467-2017. http://collections.vam.ac.uk/item/O1411496/camera-lens-belonging-to-julia-photographic-lenses-jamin/. [Retrieved February 2021]

Other ways to introduce fuzziness was to use filters over the camera lens, or while printing, made of translucid paper or fabric, or other. Alternatively, by covering the negative with a ground-glass, ground-glass substitute, paper, fabric, or a matt-varnish painted on the negative glass surface.

What these do is introduce a visual interference that erases the small features from perception. At the same time, the photographer can choose the lens best adapted to his subject.

The major problem with using a filter or an unfocused lens is that it attenuates undesired wrinkles while also blurring the entire image. And photography loses the detail clamored by some.

A similar principle to this visual interference is used in drawing when doing crosshatching to define tones, volumes, and shades. The fine lines of crosshatching are not perceived individually but only the effect perceived in tonal variation.

Crosshatching can be used locally and is recommended in manuals as a retouching technique, for example, in Hubert's The art of retouching (1895), done in semi-oval strokes (Figure 2.16b).

In the reviewed manuals, all authors agree that training in drawing is most helpful. However, by following the manuals, it was found that each retoucher followed different patterns. For the more practical aspects, there was no need for such perfected drawing technics like crosshatching. To erase an undesired feature from the image, such as a wrinkle, it was only necessary to cause visual interference by adding small marks that opposed that of the wrinkle by disposition or direction. Those who compared retouching techniques concluded that any handling and patterns of the pencil and brush would give acceptable results, and the student should choose the one most suited to him. The observation of collections proves that instead of crosshatching, retouching is made of dots, commas, smudges, or when lines, swirls, and other aleatory patterns, like the examples in Figure 2.32.[177]

The concepts of drawing that relate to light and shadow are nevertheless essential. The patterns, drawn in ink or pencil, however random they might seem. If they do not comply with the natural shades of the forms, they also remove surface volume.

The difference and risk of localized retouching is that removing a shadow on a homogeneous surface like the face's skin removes what makes a face unique. The result is a flat surface of the uncharacterized, drawing-like face. A person does not recognize himself in such a retouched portrait, and photographers and other artists immediately identify the faults in the retoucher's technique.

The new understanding of perception also helped better accept photography with its shortcomings, even if it could not reconcile sides on the definitions of art, the representation of nature, and truth.

[177] The retouchings machines and vibratory pencils were based on the same principle, and the result was the lines in aleatory patterns.

Ortho- and Panchromatic

As explained before and summarized in the quote below, the *ordinary* photographic emulsions were mostly sensitive to blue and ultraviolet light. In *The photographic instructor for the professional and amateur*:

> If we expose an ordinary photographic plate at the solar spectrum, these effects will show to perfection how differently the two ends of the spectrum work. Violet and blue will give very pronounced impressions, but they will diminish more and more, until, at the other end of the spectrum, no effect is visible.
> This is exactly what we notice, in every-day photographs. Yellow and orange copy much too dark; some reds do not impress the plate at all; and blue and violet, no matter how dark they may be, invariably come too light; and the variety of colors in fabrics, embroideries, paintings, and many natural objects have thus given endless dissatisfaction to the photographer. (Adams, 1888, p. 114)

Figure 2.17a shows how the same floral composition can result utterly different when photographed with an ordinary plate and with an isochromatic[178] plate. The second example, Figure 2.17b, appears in a booklet by Eastman Kodak Company. It shows how different a portrait looks with an ordinary plate and a panchromatic plate. In the first example, only a guess because the complete description is not included in the booklet, possibly shows clothes with an orange bonnet, a yellow sash, and a shirt with blue drawings in a light background. The second example better illustrates how it affects the skin.



Figure 2.17 – Portraits, illustrations from *The photography of colored objects*, from the second (1916, p. 65) and third (1919, p. 64) editions: On Ordinary Plate, On Panchromatic Plate with K3 Screen.

Besides a better representation of color, choosing to use orthochromatic plates had several other advantages, for example, reducing the need for retouching in portrait photography as noted in an

[178] Isochromatic was the designation given by some manufacturers and authors instead of orthochromatic.

article in the magazine *Boletim Photographico*[179] commenting on Adolf Miethe[180] opinion:

> Comparing the effect of negatives on orthochromatic plates with that of ordinary plates, there is a big difference in favor of the former. […] Hair color is more natural. What is remarkable is the reproduction of the skin; the small defects that are exaggerated in the ordinary plate are barely visible, and it could almost be suppressed. Freckles, when not very pronounced, almost disappear completely. […] Also interesting is the reproduction of the eyes. The blue eyes do not give a white spot in the print as in ordinary plates. […] It is Dr. Miethe's opinion that, using orthochromatic plates, retouching is reduced which is an excellent advantage for the artistic effect of portraits.[181] (BP n68, 1905, p. 123]

If some retouching began because of the plate's color limitations, it was also understood that the new plates did not resolve all the issues, and retouching was still necessary to complete the image. Later, photographers would even use these light limitations for aesthetic purposes, for example, George Hurrell's pseudo-tanned portraits (see example above, actress Jean Harlow Figure 1.48), but never relinquishing retouching.

Correcting blues and reds

Over-sensitiveness to the blue could be, in part, corrected by using a yellow filter. But to compensate for other colors and extreme situations, many of the corrections were done by retouching, the following are a few selected examples.

Blue eyes with direct light would result completely white with only the black dot for the pupil. One way to avoid this was to change the position of the head or the light. If not, the iris needed to be corrected with retouching.

It was easy to photograph a person with red hair with good results, as the denser areas would register black and less dense would be as highlights producing more texture than regular brown or black hair. Other blond, brown, and black air were frequently enhanced by specific lighting, well-chosen backdrop, and retouching.

Someone blushing or with freckles would have the portrait dramatically changed. The result would be

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[179] The *Boletim Photographico*, already mentioned, corresponded with international photographers and authors and then made available to the Portuguese public via translations or, as in this case, just a commentary on practical and technical information from foreign books or articles.

[180] Adolf Miethe (1862–1927) was a German photo-physicist and author about photography. He was the successor to Hermann Wilhelm Vogel in the chair of photochemistry, photography, and spectral analysis. His research also contributed greatly to the advance in dye sensitization of photographic emulsions and color photography (Klamm in Hannavy, 2008, p. 929).

[181] Author's translation.

a darkened face and black spots that were not realistic, not the truth. The negative could be retouched to correct this effect, retouching spots or the entire skin covered with a colored dye that had the same effect as a localized filter. Figure 2.18 shows how freckles are exaggeratedly marked and much more visible than to the naked eye. Retouching the face is a way to represent better the truth.



Figure 2.18 – Face with freckles, "three stages of retouching" (Schriever, 1909, p. 65)

Blurriness and Movement

The advantage of studio photography was that the photographer controlled every aspect of the process. Well, everything but the sitter. Directing the attention of one sitter was more manageable, but group portraits always posed problems. Headrests were still in use, but despite this, on occasion, there was someone that was not right. Kodak's "You push the button" foretold future photography but, for dry plate photography, each plate still represented hours of work and expenses. Doing another sitting was troublesome, so photographers would avoid it by doing multiple plates and test prints before retouching. The retoucher would then do his best, but intense blurriness was difficult, if not impossible, to correct. Closed eyes were also a common flaw, and how to fix it was explained in detail in several manuals. But even if Clara Weismann, in her manual, believes that a beginner can do it with good results in his first attempt, most of such corrections needed the retoucher's best artistic capabilities (Figure 2.19).

> In the unretouched negative [shown in the image], the eyes are nearly closed and the expression sad, to show what could be done, and successfully; the eyes were opened and expression changed completely; […] First make a careful drawing with a pencil on the negative, of an eye open, drawing the eyelids, outside of the iris and pupil. Now take an etcher and etch in the pupil, outside of the iris, the shadow cast by the lid and eye-lashes, keeping the delicacies of these in their respective places. Strengthen the whites of the eyes where necessary. Study the lights and shades and delicacies of a "good" negative and it will be surprising what even can be done at the first attempt. (Weisman, 1905, pp. 65,66)



Figure 2.19 – Female portrait, "Not retouched" and "Expression changed by use of pencil and etcher" (Weisman, 1905)

The headrests were to aid a person stand still enough time for the portrait. For men and children that did not wear large clothes, the base was sometimes visible and needed to be erased. With the etching knife, pencil, or dye, any of the techniques could be used to disguise unwanted elements, as shown in the examples in Figure 2.20.

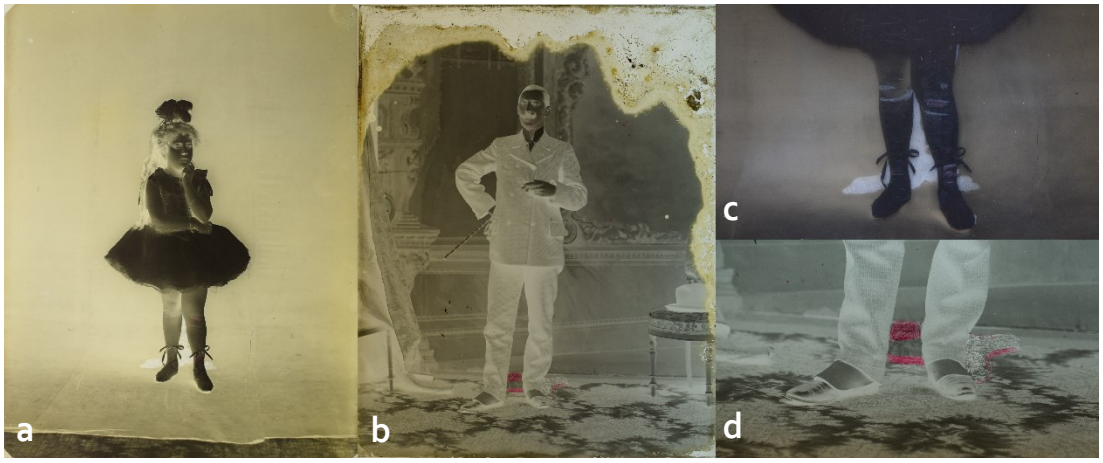


Figure 2.20 – a. Children's portrait with ballerina costume; (CPF, ALV, 77, "9877"); b. Man's portrait, detail with headrest deleted with retouching dye (CPF, ALV, 191, "2050"); c. detail with headrest base deleted with pencil; d. detail with headrest base deleted with red dye.

Moving objects lose contour definition, and so retouching could be used like drawing to redefine outlines. In chapter 1, an example by photographer Jean Laurent was presented with a bull that slightly shifted his position. Although the image does not show as well as seen in hand, what the retoucher did was a sketch type drawing of the ox's head and leg's contours.

2.4. Retouching Practice

Materials and equipment


108 ADVERTISEMENTS

RETOUCHING DESKS.

No. 6. Soho Retouching Desk. (3)

A well-made Desk in blacked mahogany, with movable plate holder to take negatives of all sizes up to the largest the desk is made to take. The desk is fitted with an opal light Reflector and drawer for Pencils, etc.

Price.

8½ × 8½ inches .. .. 22/6 each.
12 × 12 ,, ... 30/0 ,,

Box of Finishing Materials. (2)

Japanned Tin Box with lock and key.

Containing 18 half-pans of Winsor & Newton's moist Water Colours — Vermilion, Indian Yellow, Rose Madder, Cobalt, Aureolin, Chinese White, Vandyke Brown, Emerald Green, Sepia, Prussian Blue, Raw Sienna, Crimson Lake, Indigo, Light Red, Terra Verte, Burnt Sienna, Yellow Ochre and Gamboge, 4 Brushes, Stumps, Chalks, Knife, Bottle of Gum Arabic, Box of levigated Pumice Stone, and small pan of Oxgall

Price 35/0.

The "Excelsior" Retouching Lamp. (3)

This Lamp has been specially designed for the use of Retouchers, by one who has for many years been principal retoucher to several of the leading houses in England. The object is to produce a Lamp which will give a uniform light that can be regulated to any intensity, and that will not tire the eyes by continual use. This is accomplished in the "Excelsior" Lamp, which has also a powerful Green Reflector that cannot tarnish—adjustable to any angle. The light can be shone immediately on the work if a piece of Opal be placed behind the negative, or, to those who prefer it, the Reflector can be so adjusted as to throw the light on white paper immediately in front of, and on the same level as the base of the Lamp; in this case no Opal is used, but the direct rays must be shielded off the negative.

The Burner is Excelsior Patent Single Wick, and will give a greater light than any other Burner burning the same amount of oil.

Price, 6/0.

MARION & CO., LTD., 22 and 23, Soho Square, London, W.

After having made sure that you are physically suited for retouching, proceed to get the implements that are required. (Johnson, 1941, p. 10)

Figure 2.21 – Retouching desks and finishing sets by Marion & Co. (Johnson; 1901)

Besides describing retouching techniques, manuals listed all necessary materials. These would change in time, with different photographers and retouchers. Photographers with artistic backgrounds would use art materials, while others would recommend buying from suppliers specific to photography. These are frequently mentioned by brand, sometimes including price, testifying to the practical nature of these books. The continued rising of photography's industrialization will reflect the establishment of standardized retouching products, even if the material or mixture varies slightly from one company to another. Those texts published by photography suppliers such as Worm & Rosa, Scovill and Adams, and Marion & Co. would, obviously, recommend their materials. Some were high-quality with luxurious finishing, like the example from the Marion & Co. in Figure 2.21 showing the *Soho Retouching Desk* made of mahogany wood, and the *Box of Finishing Materials* is described as Japanned and with a lock.

The retouching desk

A piece of essential equipment for a retoucher was the retouching desk, a surface where to work. These were built with a basic Z structure, the work surface was the inclined plane, and the other two serve as base support and a protective cover. It was fitted with a grounded glass surface that allowed the negative to be seen with transmitted light, like in a modern light table. The base would have a mirror to help direct the light to the work surface. The ground glass could be fitted with masks of different sizes that allowed light to pass only in the area and the size of each negative blocking light to the rest. Sturdy constructions were used by professionals who needed to use them for long hours, sometimes built into tables. For amateurs, inexpensive and homemade structures could also be used with the same effect.

Authors would often share their personal opinions on materials and, for example, Ourdan gives an extended description of his patented retouching desk with a built-in magnifier and pencil holder (Figure 2.22a) (1876); and Johnson (1941, pp. 12,13), Hubert (1895, pp. 10,11) and Piquepé (1881, pp. 4-6) include descriptions on how to build one.

> I will confine myself to a homemade [easel] and proceed to construct it to suit the humblest pockets. And I would prefer this because it may serve a double purpose, for if the student should not have patience enough (for a certain amount of patience will be required of the beginner) he can easily alter it into firewood; and, secondly, the unsuccessful pupil (for they are mostly apt to blame either the tool or the teacher) cannot accuse me of driving him into unnecessary expense. (Hubert, 1895, pp. 10-11)

The retouching desk was set against a light source, like a window, so the light came first through the ground glass. Sometimes it was fitted with extra covers to the top and sides, made of dark fabric or other material, to eliminate other lights. Working in semi-darkness with light coming only from the area to be worked on helps see the negative features in more detail and more defined, reducing straining of the eyes. In the back, the desk usually had a mirror that helped to redirect light. And to work at night, they were fitted with a lamp and a diffuser (Figure 2.22b). Some would be built with extra features, such as adaptors to different negatives sizes or a drawer to store retouching materials. The desk was also used for coloring lantern slides or other transparent images that could be worked on with more light.

Many authors caution the aspiring retouchers to the demands of working for long hours, particularly to the eyes, as the work demanded minute details. The companion to the retouching desk was the magnifying glass. Others advise on the correct posture for working, some including illustrations. Finally, others recommend stretching exercises after long working hours (Johnson, 1941; Croy, 1951; Weiss, 1986).

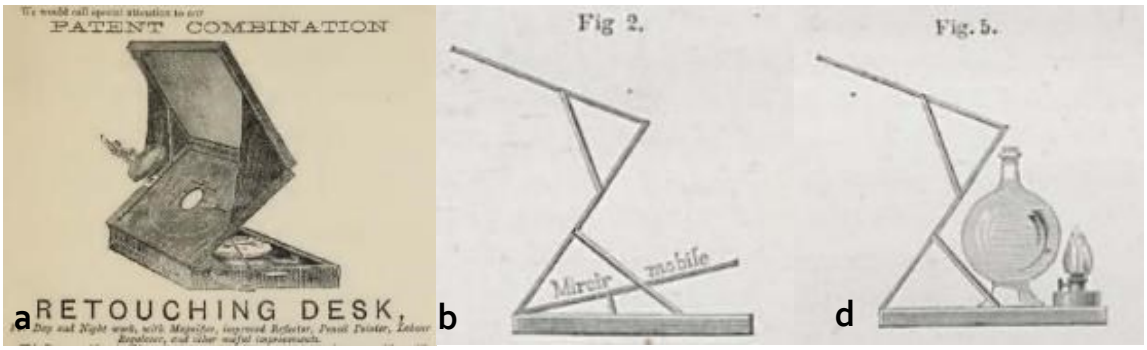


Figure 2.22 – a. Ourdan's retouching desk, in *Concise instructions in the art of Retouching* (1876); b. Retouching desk with adjustable mirror; c. Setup for night work, illustration in the *Traite pratique de la retouche* (Piquepé, 1881).

The pencil, brush, knife, and other tools

With illustrations, lists, and descriptions, most manuals complement the rest of the materials needed. Below is a list of all the essentials and their respective uses.

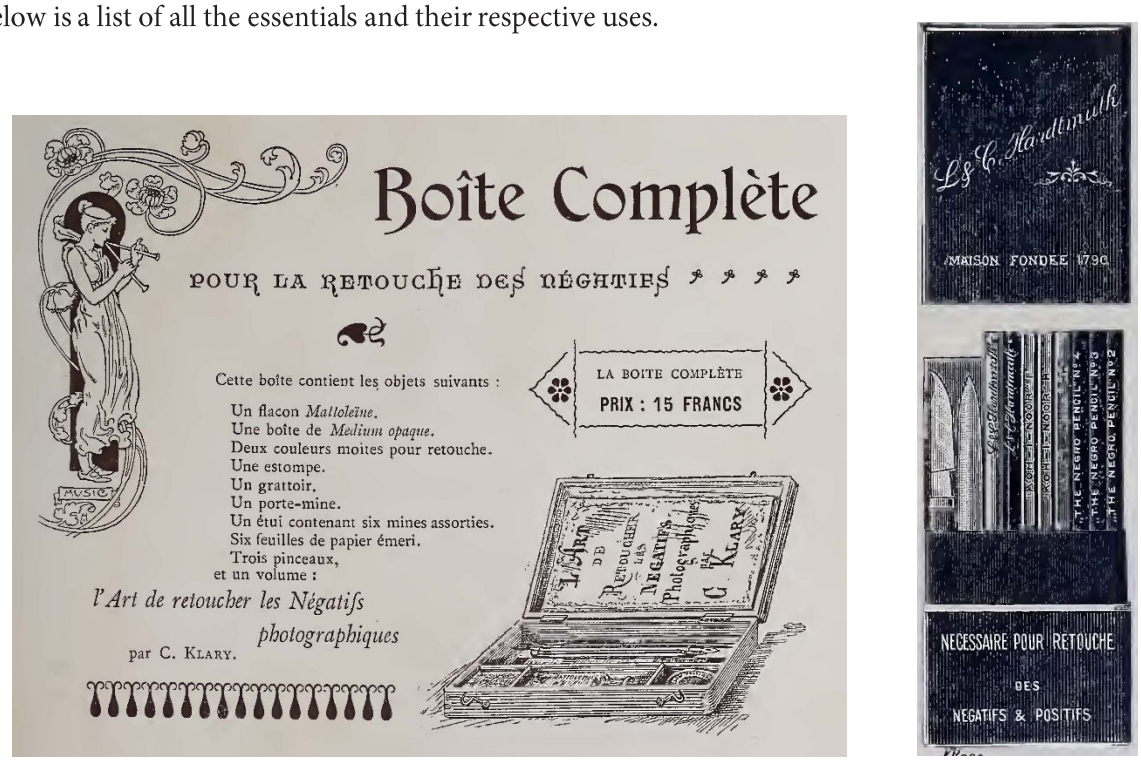


Figure 2.23 – *Complete box*: a bottle of Mattoleine (retouching medium), a bottle of opaque medium, two retouching colors, a stump, a scraper, mechanical pencil; a case with assorted leads, six sandpapers, three brushes, and one volume of the Art of retouching photographic negatives by Klary; The "Nécessaire" set with 3 Negro-pencils; 3 Koh-I-Noor pencils; 1 sanguine pencil; 1 white pencil; leather stomp; Knife to sharpen the pencils (Klary C. , 1900).

Fine brushes: no. 00 – 0000 high-quality sable brushes, different brands most mentioned, by Winsor & Newton. While 00 grade was recommended for water-colors, the 0000 grade was more suited for opaque colors.

Fine pencil or mechanical pencil: with different grades, frequently mentioned by name, for example, Koh-i-Noor, Contè, and Faber. The various grades have specific uses, similar to

drawing.

Stumps: Leather and paper, several sizes. The stump (or *tortillon*) was not bought but made from a piece of paper or leather tightly wound to form a stick. They were used as a complement to pencil and brushwork or used with abrasive mediums.

Retouching knife or Etcher or Etching knife was a blade specific for retouching. Etching it is precision work. More robust blades were recommended instead of the conventional scalpels or razor blades because these could be caught or vibrate when scraping across the emulsion. The retouching knives were styled from pocketknives or engraving knives such as the ones in Figure 2.24. They were used exclusively for retouching, and the retoucher set needed to include other knives or blades for other purposes, like sharpening pencils.



Figure 2.24 – a. Schriever Etching Knife, and method to hold the knife (Schriever, 1909, p. Vol 10); b. Advertisement to the Eastman Etching Knife.

Etching is a term used in engraving referring to making incisions on a surface. It is also apt here, the difference being that the knife removes photographic emulsion. The effect is density reduction and was used to compensate for overexposed areas and sharpen dark lines and contours. It is one of the most technically demanding retouching techniques, and not all retouchers would venture doing it. The biggest problem being that it cannot be undone as it effectively removes the emulsion and, cutting too deep, results in the darkest and the most difficult to correct in the print.

Dyes and varnish

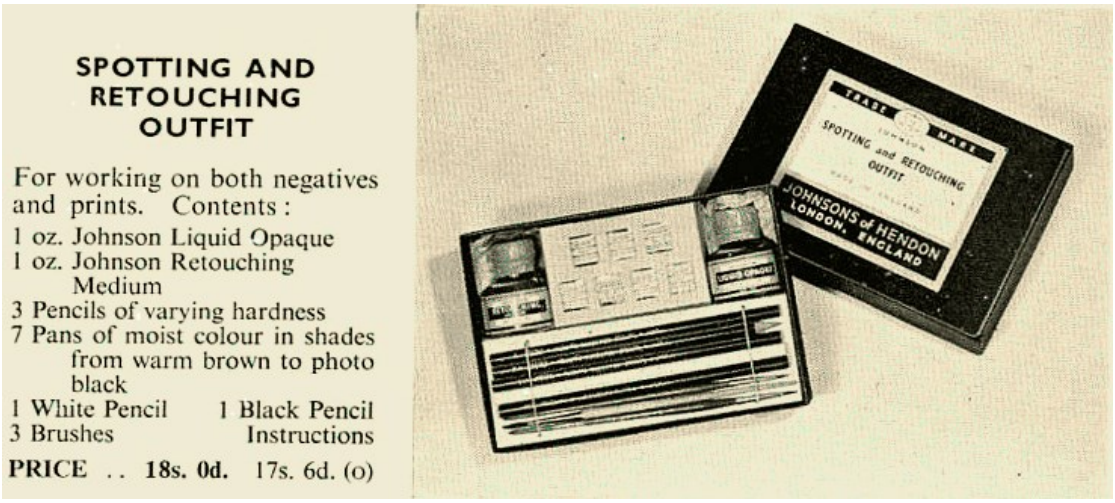


Figure 2.25 – Johnson spotting and retouching outfit: 1 oz. Johnson Liquid Opaque; 1 oz. Johnson Retouching medium; 3 pencils; 7 pans of moist colour in shades from warm brow to photo black; 1 white pencil; 1 black pencil; 3 brushes; instructions.

Red colorant for density correction: generally designated *Carmine* or *Neo coccine*: New coccine enters the photographer's vocabulary even if not referring to the real New coccine but any other red colorant used with the same effect: cocim (PT), neococcina (ES), neu-coccine (DE). New coccine is used to correct the negative's density, as a retouching medium or a dodging dye. It is not to be confused with the natural colorant cochineal red obtained from beetles of the same name, also known as carmine. It is an artificial colorant, the name is for the red intensity that resembles the natural cochineal version, but chemically it is a very different compound. New coccine is a food-grade lightfast red colorant with high tinting power that could be diluted many times for controlled densities. The real cochineal dye was known to fade to light. Some manuals mention the New coccine by name, with slight variations for each language. The exception is found in the American publications, which usually do not mention New coccine, but a red colorant in general or the Kodak Crocein scarlet, maybe as a testament to Kodak's influence on the marketing of photography supplies. Crocein scarlet is a different compound with similar properties, but its hue is more orange. An exception was found in Wayne Floyd's manual *How to retouch & spot negatives & prints* (1968). Although the images clearly show Kodak's Crocein scarlet bottles, one of the captions reads: "Crocein Scarlet (better known as New Coccine)." The authentic new coccine is available as a food colorant, but it was usually

sold by photographic companies in liquid or powder form, specifically for photography. The most crucial characteristic of whichever dye selected was lightfastness, meaning resistance to fading by light. This is noticeable in collections and old bottles in which the red dye maintained its color and tinting capabilities.



Figure 2.26 – Different presentations for red retouching dye: Agfa neu-coccin liquid and powder / Ansco New Coccine powder / GAF New Coccine powder (GAF was the designation of the American factory of Agfa-Asco after 1941 when seized postwar by the Us government) / Kodak crocein scarlet powder.

Opaque medium: with many formulations and with as many commercial designations and sold by many suppliers. Fotopake, Photopake, Speed-o-paque, Gihon's opaque, Kodak Opaque and Spotting Medium, etc. As an alternative, it was also used a bituminous material from art suppliers. Photopaque is a reddish or black pasty medium, and similarly to New coccine, became a generalized designation in photography. As the name suggests, the purpose was to block out rendering the area opaque during the printing process. It was used to whiten the skies, remove unwanted elements, and prepare negatives for multiple printing, as seen in many examples since the invention of photography. The photographer's background can influence the choice of materials, and typography inks or other artist's lightfast pigments were also used, such as red earth (iron oxide pigment).

Indian Ink and an assortment of watercolors: yellow, green, and blue were less frequently used but mentioned. The use of these colors in the negative had a similar effect of photo-filters, mainly changing contrast, identical to New coccine, apart from black that worked like the opaque medium. Winsor & Newton is often a reference for water-color supplies. But not to be confused, as many publicized color dye sets were to be used to color and retouch prints (Figure 1.63).

Retouching varnish: Mattoleine, Mattoleïn,[182] retouching dope, or retouching medium (Figure 2.27). The basic recipe was done with Dammar resin and turpentine in approx. 1:1 (ml/g) ratio.

The varnishes used for collodion negatives as protective layers were prepared with hard resins, like shellac or sandarac, which did not give a suitable surface for retouching. To correct this, it was recommended scrubbing the surface with pumice powder or other abrasives, to what was called "to give tooth." To have "tooth" is to achieve a rough texture so a pencil could write on it. As an alternative, it was recommended to apply a second varnish that did not need the "giving tooth" step because it would dry with a rough enough surface. It was accomplished with soft resin varnishes such as Mastic and Dammar. This is mentioned in many earlier texts and manuals left out of this research for its timeframe. For example, one by Josef Maria Eder, *Ausführliches Handbuch der Photographie* [Detailed handbook of photography] as he remarks:

> Such [varnished] layer is very hard (…) and does not accept pencil retouching easily if it is not rubbed off with Mattolein, etc., beforehand. (Eder, 1898, p. 288).

> A more popular means than sanding to make it easier for the varnish layer to receive pencil retouching is applying liquids that produce the same effect. They are called "Retouching Essences," "Mattolein," or "Grapholein." (Eder, 1898, p. 292)

He also makes direct reference that this information came from "Grasshoff, Retouche von Phot. 1869. S. 9.,"[183] the same author recommended by Vogel.

Dammar became the base for many, if not all, recipes and the commercially available retouching varnish main ingredient. Still, many existed, and each one claimed to be the best.

In Europe, it would be known as Mattolein [Mattɵlaɪnə], with slight differences for every language but English. The many English manuals consulted here, either American or British, seldom refer to mattolein and mostly refer to it as retouching varnish, fluid, medium, or dope. Could this be another influence from Kodak? In the American Kodak catalog, the varnish is always mentioned as a retouching

[182] Erratum: in one earlier publication, *Mattolein* is identified as an Arabic gum-based varnish by mistake. (Pereira C. , 2016).

[183] He refers to other texts, also mentioned above and others, such as Liébert's *Photographie en Amerique*; Abney's *Instruction in Photography*, and gives varnish recipes from authors such as Piquepé and the Portuguese scientist José Júlio Rodrigues (1843-1923) and his text *La section photographique des travaux geographiques de Portugal.* [The photographic section of the geographical works of Portugal] published in 1877 (Eder, 1898, pp. 287-288). It is a testament to the collaboration and channels of communication between countries.

medium or retouching fluid. However, in Portugal at least, the Kodak retouching varnish was available with the designation *Mattoleïn* in the back (Figure 2.27b).

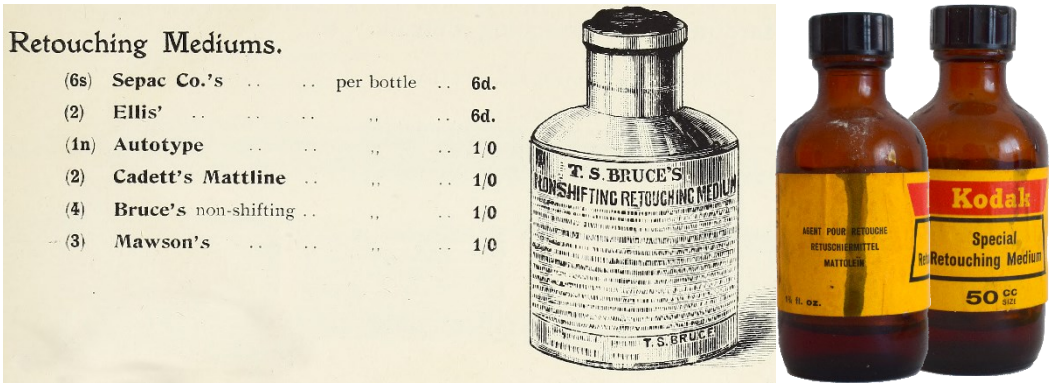


Figure 2.27 – List of retouching mediums advertised by Marion & Co. (Johnson, 1901, p. 109); Kodak retouching medium, with designation "Mattoleïn" written in the label.

The advertisements in a publication by Marion & Co., from 1901, lists several retouching varnishes, including Cadett's Mattline (Figure 2.27e) (Johnson, 1901, p. 109). Could it be something here or just a coincidence?

Eder identifies that mattolein was introduced by Hommel, in 1872, as a retouching essence (Eder, 1898, p. 293). However, it was not possible to verify this as no other references are given to whom Hommel is.[184]

Like the New coccine, mattolein was adopted into the retouchers lexicon. Nowadays, in Portugal, the word is no longer recognized, and only a few still remember it. However, it is still found in other languages, particularly Germanic. In Kerner's German lexicon, it is defined as a retouching varnish[185] (2007). Schmincke, a German company of art supplies, has a line of products for photography called *Diaphoto*, which includes a type of varnish designated Mattolein (Figure 2.27f).

[184] Eder may be just referring to the introduction of Mattolein in the Austrian market. A careful analysis of his texts shows that he credits Austrian scientists and photographers above others. For example, he also identifies as the inventor of negative retouching, in 1860, the Austrian Emil Rabending (?-1886). Other sources confirm this to be false, and the credit is accepted to go to German Franz Seraph Hanfstaengl (1804-1877), which presented examples at the Universal exhibition of 1855. See above chapter 1 - *First Retouchings*.

[185] As defined Kerner's German lexicon: Mattolein – Retouching varnish, which is applied as a coating on the image layer of the negative or positive slide to make it susceptible to retouching with a pencil. The varnish consists of spruce resin, dammar, or mastic dissolved in turpentine oil. [author's translation] (Kerner, 2007, p. 426).

Other supplies

Abrasive paste: pumice stone powder, *Kodak abrasive reducer*, *Eastman abrasive medium*, and other designations or abrasives were used to reduce density, like the etching knife, but for working in larger areas.

Silk or *diaphanous* paper for "non-permanent" retouchings. Any retouching was drawn with a pencil on the paper and fixed to the back of the negative. The negative was then printed together with this paper. All sorts of alterations could be done this way. Because this was done separately and on fragile support, they hardly survive in collections, and none was found in the selected Portuguese collections.

Mate varnish: had a similar effect as the diaphanous paper. It was obtained by adding substances to the varnish that would not dissolve or mix thoroughly, preventing a fully transparent layer. It was to be applied to the glass surface. A *Ground Glass Substitute* was also commercialized for the same effect. It was used over the entire surface to create a visual interference, resulting in a slight blur as an "instant" retouching technique.[186] It could also be colored, for example, with the New coccine in a low concentration (Figure 2.28) or, frequently found, a yellow colorant. This was done mainly to correct underexposed plates.



Figure 2.28 – Red matt varnish on glass, woman's portrait, dry plate negative, Alvão, 190? (CPF, ALV, "2037")

[186] The blurred effect was appreciated, particularly by the pictorialists. Various methodologies could achieve it: by using a particular type of lens, by photographing slightly out of focus, by using a filter or a simple thin fabric in front of the lens, or by retouching the negative, among other possibilities.

Opaque paper for masking.

Wood stump sharpened to a point or toothpicks: to remove dust or other unwanted particles

Other materials: optional and according to each person, other materials may include sandpaper to sharpen the pencils; rags to clean and apply the different liquid mediums; a large soft camel brush, like a shaving brush for overall cleaning; and a pencil to write on glass.

Advances into the 20th century

Electric pencil – *The Gilbert Electric Retoucher*, "The Little Speedster," is mentioned by Johnson (1941, p. 68) and, already mentioned, Klary had his invention the *Alenagraph* (1900, p. 34). They were vibrating machines that would automatically draw minute patterns. The vibrational movement was desired but holding it could not have been comfortable. These probably inspired the retouching machines invented in the 1940s.

Airbrush: Already known by artists, had little use for the retouching of negatives but would be the primary tool in the retouching of prints. Today airbrushing is still synonymous with retouching.

Practical retouching with examples

This section explores some practical examples of retouching techniques as described in manuals. Some images with examples are presented from the collections included in this research.

Even before negative retouching, some manipulations were possible and done chemically. While the negative is still wet, additional reduction and intensification treatments are applied locally or to the entire surface of the negative. As the names suggest, they reduce and intensify densities in the negative. That is, a dense area can be made lighter by reduction and *vice versa*. When the entire negative is under or overexpose, the process can happen in a bath. However, to change image density in a smaller area, the negative is treated with a chemical solution applied with a soft brush, a cotton ball, or a dropper.

The most cited examples for partial intensification are the landscapes. Often, they resulted overexposed in the sky, as has already been widely mentioned. Some, like in Gustave Le Gray's seascapes, were corrected by retouching and double printing. Suppose the original sky presented enough detail and an interesting composition of light and clouds worth recovery. In that case, it could be done by intensification, treating only the sky, and leaving the rest of the image untouched.

These operations needed to be done with light for better control, for example, against a window or in a tray with a transparent glass bottom. Only an experienced photographer would attempt these treatments as they are irreversible.[187]

Manual retouching would be done after that, and because each technique has its own demands and materials, they are usually performed separately and in sequence, for example, first on the emulsion side of the negative: a dye mask and dry reduction, then spotting, etching, detailed retouching using a brush and last the pencil. After that, some treatments are done on the glass side, including dye *makeup* and blocking out masks.

Dye masking

Not to be confused with intensification, dye masking is based on a similar principle. While the intensification adds contrast when there is already enough detail, dye masking blocks light. It is used to avoid loss of detail in dark areas, especially when printing with high-contrast papers.

New coccine or a similar dye is used, and diluted solutions are applied with a brush. Usually, the recommendation is to apply a weak solution several times rather than a strong solution in one brush stroke. Still, the entire process can be removed by rinsing thoroughly with water. Some tricks are suggested in manuals on how to control the work progress, like squinting the eyes or observing through a blue/greenish filter that converts the red dye into shades of gray.

Examples of this were already shown in a wet collodion negative by Jean Laurent, Figure 1.22, and a modern dry plate in Figure 2.4 from the NEG collection.

Dry reduction

Another way to reduce density in a localized area would be by mechanically removing emulsion by abrasion. This had the possibility to be a more controlled technique them reducing chemically. But while chemical reduction removes silver from the emulsion, dry reduction changes the surface texture, which might be less desirable. This is also an irreversible process and was only done by experienced retouchers. Pumice powder was usually recommended, but any abrasive could be used, like the ones

[187] In a collection, such manipulations cannot be identified by observation of the negatives. But when the negative is not rinsed adequately after treatment, they will deteriorate in time and only in the treated areas. Usually, deterioration is yellowing or fading, but it can also present changes in tone to brown, green, or other. If the deterioration affects the entire negative, it might have been caused by improper development process and not necessarily because of reduction and intensification treatments.

used to polish metals. The more straightforward way is by using a slightly wet pumice powder that could be picked up by a drawing stump. More elaborate recipes for the preparation of carrying mediums or abrasive pastes are also given in manuals, usually some mixture of petroleum jelly, waxes, and oils. It is essential to use a finely ground abrasive for smooth results, especially with enlargements. The stump is dipped in the carrying medium and then in the abrasive powder and applied in small circles on the desired areas. After that, residues need to be removed and the treated surface polished.

These retouchings are challenging to identify and worse to photograph. The most common examples in manuals are the reduction of halos formed around light sources, like streetlights in exterior photography.

The resulting polished surface does not allow any other retouching with dyes or pencil, and so, if needed, it must be previously varnished.

Pinholes & Spotting

The most common problem with the dry plate negatives was small flaws from the production process. For collodion plates, the possibility for pinholes was higher as the plates were prepared at the moment and uneven. But even with industrialization, it was frequent to find pinholes in the emulsion from tiny bubbles formed during production.

In the areas where there is a lack of emulsion, the negative is transparent, which results in black spots on the print. In the high-density regions of the negative, like the sky, the pinholes are more visible and in more need of retouching. In more transparent parts of the negative, a pinhole might be less noticeable.

A similar problem was caused by dust particles depositing on the negative's surface. Dust could settle in every step of the photographic process, and darkrooms were recommended to be kept as clean as possible. This problem persists later with sheet film, and it is addressed in technical books of all periods. For cleaning, the use of an air blower, or later a vacuum, was preferred. No matter how soft it might be, the brush was inadvisable because it could leave scratch marks on the surface. For example, this is cautioned by Johnson (1941, p. 15), and Ansel Adams gives his personal view:

> I use a negative carrier that sandwiches the negative between two sheets of glass to hold it flat. […] The two glasses provide four surfaces (in addition to the two sides of the negative) on which dust can collect. All surfaces must be carefully cleaned each time a negative is placed in the carrier. (Adams, 2006: 24)

> The film holders should be thoroughly cleaned periodically. A brush and can of compressed air (available at camera stores) may be used, although I find a small vacuum cleaner superior to a blower. The vacuum collects the dust rather than scattering it about! (Adams, 2005a, p. 40)

The remedy for eliminating pinholes is called spotting; that is, filling each hole with a spot of ink or pencil. The ideal is to fill the void without overlapping onto the emulsion and use a density similar to the surrounding area (Figure 2.29).

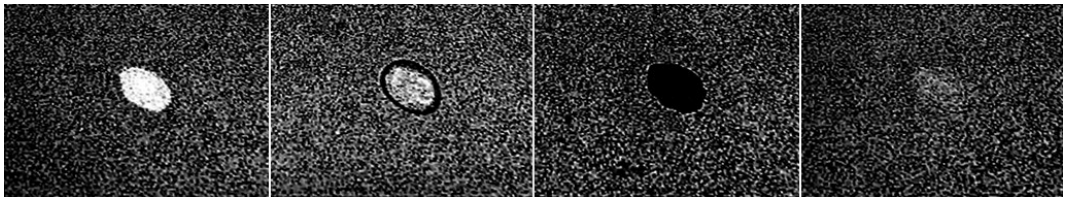


Figure 2.29 – a. Pinhole; b. low-density spotting overlapping hole boundaries; c. spotting with excess density; spotting with similar density (adapted from Croy, 1967).

New coccine or a similar dye was commonly used for spotting. It is essential to remember that the print's emulsion is also blind to red, and a high-density red spot has the same result as black. In Figure 2.30, it is visible spotting with different densities adapted to the background and the skirt.

Yellow ink was also used for less density spotting or black ink, which always results white in the print.

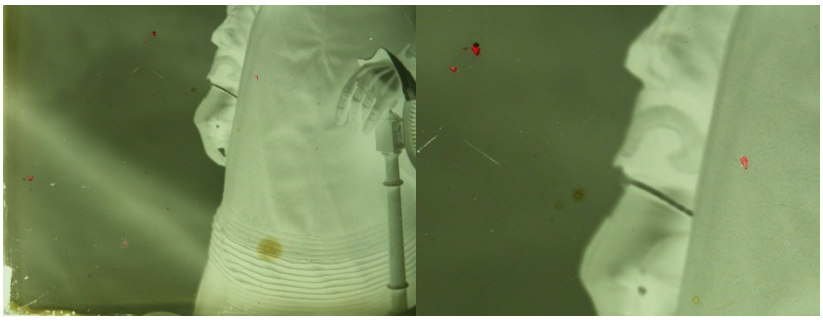


Figure 2.30 – Spotting with red ink, studio portrait, Alvão, 191? (CPF, 179 - "2034")

Even manuals that do not address other retouching techniques mention spotting. For many authors, it is not considered, in a strict sense, a retouching technique because the purpose is not to improve the image but correct a physical flaw of the object.

> The first to be corrected and the easiest to amend: is spotting or cleaning that some confuse with the retouching that we intend to explain in this book. They can be light spots of different dimensions (holes in the gelatin, scratches, etc.), and sometimes dark, not due to gelatin imperfections, but to defects during development.[188] (Cánovas, 1921, p. 38)

[188] Author's translation. Interestingly, this observation from the same author that elsewhere in the same manual considers all manipulations to be a sort of retouching.

From the conservation point of view, spotting implies using the same materials as other retouchings and consequently poses the same problems. Therefore, it is included as a retouching technique.
Dust can affect in the same way the surface of the negative during the printing process. And spotting is used similarly in the retouching of prints. Also, sometimes the spotting of the negative results too dense, which means a white spot in the print, which needs to be retouched again in the print to eliminate it completely.

Etching

Etching has the same effect as dry reduction but can be more intense, and significantly change the image, as the emulsion can be removed entirely. The tools are retouching or etching knives, smaller blades for detail work, and broad ones for large areas. To retouch a large extent, the emulsion is removed in layers and with parallel strokes (Figure 2.31c). The resulting stroke of the knife should be smooth and invisible to the naked eye.

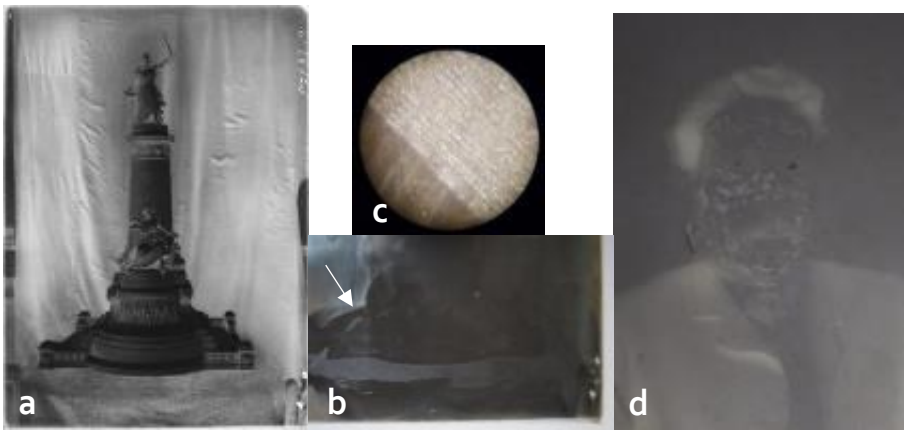


Figure 2.31 – a. Model for a monument, b. detail with etching below the model's base to erase the table where the model is standing; detail showing the etched area, c. detail viewed with a handheld microscope with 50x magnification, Foto-Estefânia (Lupa, "9096"); d. Detail from a couple's portrait showing etched pupils, Alvão (CPF, ALV, 123 "11999").

This technique can be used to remove dense spots and other unwanted features. But the knifework is similar to reducing density. That is, a dark element should not be removed using the knife as a chisel but gently scraped off until it has the same density as the surrounding area.
The retouching knife can also be useful to intensify and define outlines. In portraiture, it is frequently used to carve a small spot in the eyes to intensify the gaze. Figure 2.31d shows that a bit of emulsion was removed in both eyes to correct a small pupil. However, some authors disapprove of this technique because it can result in a vague unflattering gaze if unproperly done.

On observation, etching can sometimes be confused as pencil work, but by changing the negative's relative position or the light source inclination, they became apparent. Figure 2.31 shows how the different areas where the emulsion was removed have a distinct sheen.

Pencil and brushwork – interference patterns and drawing

The most identifiable retouching techniques in negatives are the pencil and brushwork. It could be used like drawing or painting techniques to add or highlight elements or delete details by creating interference patterns.

Despite high frequency in most portrait collections, it does not mean that they were the easiest. For beginners, the recommendation was always to practice, like learning how to draw or paint. The drawing of patterns with a pencil and studying the face's anatomy were the most recommended exercises (Figure 2.32). The first was meant to train the hand, and the second for understanding the human features that were not to be abused with excess retouching. This was why those with a background in painting would better succeed in retouching.

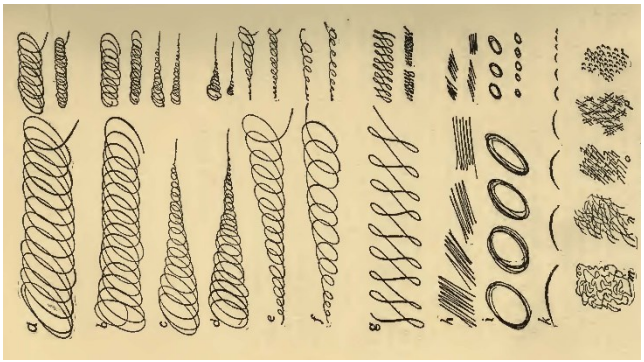


Figure 2.32 – Retoucher's stokes and patterns (Schriever, 1909).

Colorants like New coccine could be readily applied onto the emulsion surface, but as already mentioned, the pencil needed a base that was at the same time hard and rough enough to write on. This was achieved using the specific retouching varnish, the generally designated *Mattolein*, a dammar resin varnish.

Many manuals advise applying the retouching varnish over the emulsion's entire surface and again after pencil retouching as a protection layer. However, this was not found in the negative collections. Most of the time, in portraits, the varnish was only applied over the areas to be retouched. Figure 2.33 shows examples where it is visible the varnished areas over the face and hands. A more extended

varnished area is usually only observed in group portraits. None of the observed negatives presented the additional protection layer.

Although not intended as a protective varnish, it still has that capacity, and it is easily identified in aged negatives because they show deterioration only outside the varnished areas. Figure 2.33b shows the typical silver mirroring, and Figure 2.33c presents the slight yellowing of the emulsion, which becomes more apparent when viewed with transmitted light. The shape of these stains also gives clues to the application methods. As described in some of the manuals, the methodology varies and includes brushes, cotton balls, cloth, or even more solid carriers, like the varnish bottle's cork.

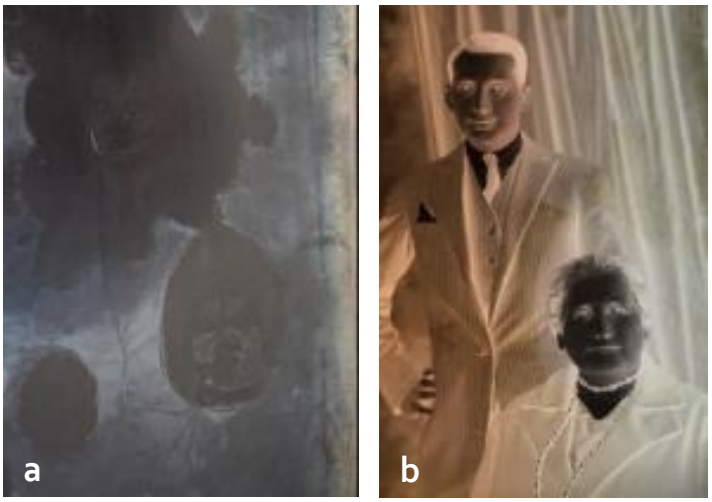


Figure 2.33 – Group portrait: a. detail photographed in reflective light showing silver mirroring in the unvarnished areas; b. same detail area photographed in transmitted light showing yellowing in the unvarnished areas, Foto-Estefânia, s.d. (Lupa, "4561")

After the varnish, the pencil could highlight, erase, or change the texture of any feature in the image. In portraiture, it was systematically used to correct and enhance a person's look, especially the skin. All wrinkles and small defects were eliminated. By creating interference patterns, any skin was made smooth and perfect.

In collections, different patterns can be perceived. When occurring in the same studio, they might indicate that several retouchers worked at the studio or that a change in the aesthetics had happened in time. Figure 2.34 shows two examples from the same studio. The first presents a very define pencil stroke pattern, while the second is smudged and undefined. These two portraits were done approximately 15 years apart, which might justify the difference in technique.



Figure 2.34 – Male portraits retouched with pencil, Alvão: a. & b. 190? (CPF, ALV, 143); c. & d. 192? (CPF, ALV, "7046").

Bright areas often cause a lack of definition; even if the negative shows some details, others are lost when printing. One way to correct it was to use burning and dodging techniques,[189] or dry reduction, for small areas. But to bring out features of white on white or black on black, a more straightforward and permanent way to correct it was to retouch (See Appendix B – Retouching types).

Similar work to that with the pencil could be done with dyes. Figure 2.35 gives two examples of dye retouching that were combined with the pencil work. The second example has faded, and now only the dye is visible. It was applied to large areas in the background, touching up with the fingertips and with a brush in spots and lines drawing the figure's contours.



Figure 2.35 – Actor's portrait, stereoscopic dry plate, Aurélio da Paz dos Reis, 190? (CPF, APR, 7334)

Retouching on the glass surface – makeup, and blocking-out

The glass surface was also retouched, adding changes without interfering with the work already done on the emulsion side. While the pencil was used to correct or alter features and texture, the dye could

[189] Burning and dodging are non-permanent masking techniques done during the printing process. See Introduction.

rectify lights and shadows in the same area without damaging the pencil work.

The glass cannot receive the pencil work, but the New coccine easily adheres if the surface is dust and grease-free. The effect is similar on the glass side described above; the New coccine acts as a filter and helps correct light and shadows, controlling the negative density.

One specific type of retouching on glass and recurrent in portraiture is the retouching of all skin areas: face, hands, arms, and legs, with dye. It will be referred to as *Makeup*. It was done to correct exaggerated shadows under the eyes, nose, and deep creases, but it was mostly used to lighten the skin tone.

Initially, this was needed due to the emulsions' limitations registering reds that resulted in exaggerated dark skin. Panchromatic emulsions corrected this. However, in the first half of the twentieth century, photographers were mostly still using ordinary or orthochromatic plates that were not sensitive to red. A pink baby would register with dark skin with emulsions that did not correspond with the truth.

Adding to that, dark skin meant a lower working class, people that worked outside and had their skin burnt by the sun. So, having light skin was also a sign of social status.



Figure 2.36 – Makeup on Men's portraits, different patterns, details of the glass surface, (CPF, ALV, 143; "7186").

Similar to the pencil work, the difference in makeup technique could also indicate a different retoucher or a difference in taste. Figure 2.36a and b show makeup retouchings applied differently. The first example was a face with a strong contrast of light and shadow that was corrected with the dye smudge onto the surface. The dye was applied with a finger, identified by the visible marks left by the fingertip's creases. Extra highlights were given with a brush along the folds on each side of the nose.

The second example, Figure 2.36c and d, shows different patterns. The face was retouched with a brush in a pointillism-styled technique, with an extra highlight along the nose. The background was again retouched with the red dye but applied with the fingertips.

Other retouchings

Multiple printing and masking

Throughout this text, several times, the double or multiple printing process has been discussed, usually associated with landscape photography. The example below describes how the process is used in portraiture to make a composite with an improved background (Figure 2.37). Using opaque paint is one possible method described in *The book of photography: practical, theoretical & applied* (Hasluck, 1905). Other methods are paper masks or the combination of both. Sometimes it is recommended to do an intermediate print, and the composition is done with scissors. Still, any method is laborious, and every manual presents its best recommendations.

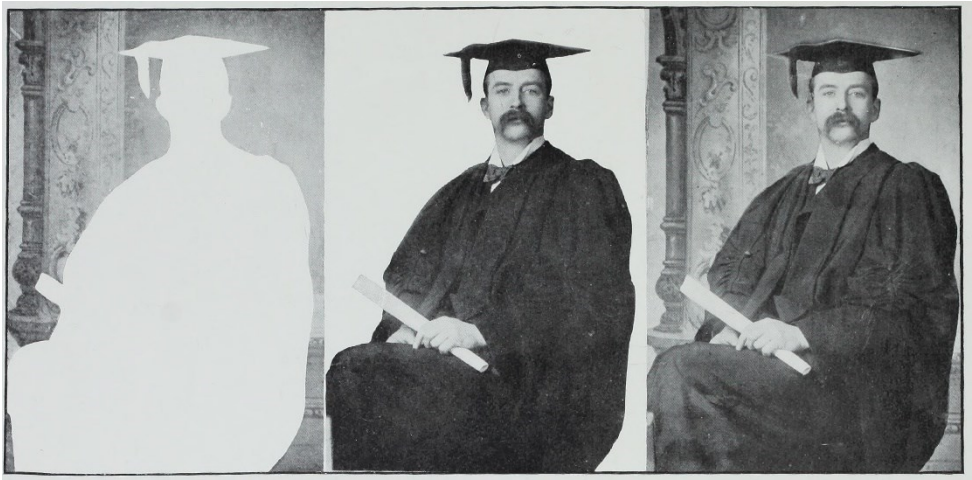


Figure 2.37 – "Example of Blocking out figure and inserting background" (Hasluck, 1905, plate 14).



Figure 2.38 – a. Double portrait, retouched to produce an individual portrait, Alvão, 192? (CPF, ALV, 124 "11948"); b. & c. Group portrait, retouched and masked to produce an individual portrait, Alvão, 190? (CPF, ALV, 160 "2044").

The red dye could also block out the image entirely to remove an undesired feature, using a higher concentration. It could also complement paper masks, reaching the more precise details along the contour. Instead of making another individual portrait, which was a luxury for many, it was less

expensive to use an existing one. Figure 2.38 shows examples of a group portrait re-used to produce individual portraits, the second example combining with a paper mask.

These masks are sometimes eliminated during conservation treatments erasing the *life* and different uses of one negative.

All techniques put together

Examples like Figure 2.39a show more elaborate possibilities of negative retouching, an illustration from Johnson's *The art of retouching photographic negatives* (1941). This case demonstrates how to obtain an individual portrait from a group portrait. The child is erased, either by abrasive powders or the etching knife. After that, the part of the shoulder that was hidden behind the child was pencil drawn. Additionally, a pencil was used as any other portrait to face and neck, and any highlight was done with a red dye. Finally, the glass side could also be retouched with the red dye in a density gradient lighter towards the center to create the vignette effect.



Figure 2.39 – a. Example of the possibilities of retouching (Johnson, 1941, fig. 15); Group portrait: b. Viewed with transmitted light, c. emulsion surface with reflective light, author unidentified, s.d. (AMLSB, NEG, 4384)

Figure 2.39b is an imperfect or unfinished example of such a process, this time with a portrait of three. The man is easy to erase because he is behind, but the rest follows what is described in the manual. Figure 2.39c shows the etched areas in a lighter sheen. The etching knife was used to erase both the child and the man. But the child in this photo covered more surface of the arm. So, the missing arm and the wool sweater pattern were drawn over the etched area in pencil – it was not possible to capture the pencil simultaneously with the etching work, but the new arm is visible in Figure 2.39b.

The image does not show, but the face also has a makeup retouching on the glass and pencil on the emulsion, as frequently done in portraits.

The red stain around the woman was applied to the glass surface and meant to produce the vignette effect. It is visibly crudely done but, possibly, would result better than it appears when printing, particularly if complemented with a mask. The distance given by the glass's thickness, which leaves this retouching out of focus, could have been enough to make it look better than what is observed in these images.

Experimenting with negatives at the AMLSB

Some retouching techniques were experimented on photographic negatives from the AMLSB.[190] The materials used were *Kodak's Retouching Fluid, Agfa neu-coccine,* and *FABER's HB* graphite *pencil-Castell.* The practice followed the manual's instructions, and the objective was not to create a perfect picture but to experiment with different pencil strokes and the effects of different dye concentrations. Bellow the images illustrate some of the results. Appendix A presents a complete image record.

It was observed that the materials are relatively easy to handle, but the author lacking the experience and training needed only achieved poor results. The negatives were print on paper by traditional methods and then digitized for comparison.

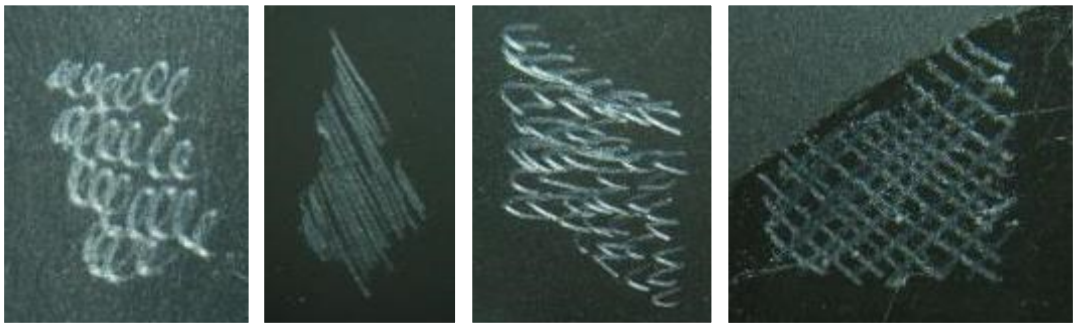


Figure 2.40 – Experimenting retouching, different pencil strokes over a varnish layer, inspired by exercises presented in historical manuals

[190] Courtesy the AMLSB archive's director Inês Viegas and conservator Luís Pavão. Printing of negatives by photographer Cláudia Damas.

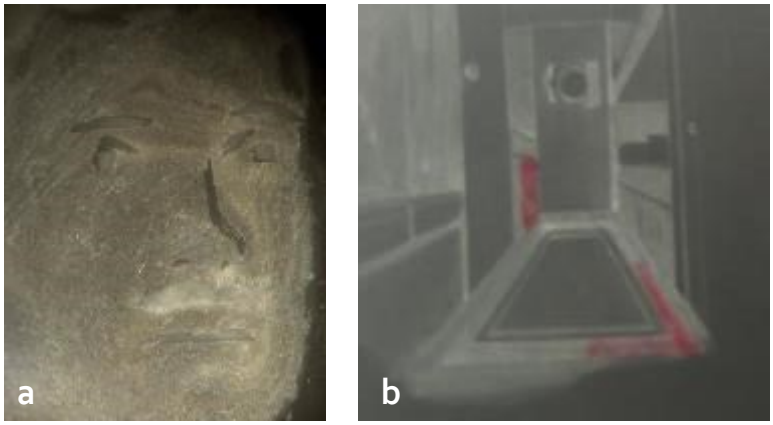


Figure 2.41 - Experimenting retouching, retouching with colorants: a. Makeup done on the glass surface with scratched features using a needle; b. dye on the emulsion side to highlight and eliminate shade areas

Final note

It was shown that despite the long list of materials identified in the previous section, they are frequently reduced to varnish (mattolein), lead pencil, and red dye (New coccine). The difference will be primarily in the intention, the retouchers' ability, experience, and imagination.

Recognized by all, only practice could make a good retoucher, and the best ones could do as much as any digital editing software that exists today, using only the materials described.

Chapter overview

In this chapter, retouching typologies were identified and will serve the conservator to know what to expect and even predict what to find in the collections.

The technical texts show that despite many recommending similar materials and instruments, the reasons for retouching and practical recommendations varied and were influenced by time and place. Portrait photography was the one type more disputed for truth, pleasing the client, and artistic license. For professional photography, preparing a perfect negative was the main reason for retouching. Negatives are more valued than the print, like matrices, as the photographer expected to print multiple copies that needed to have the same quality in each one.

Legitimacy is not discussed in the given examples, and many existed outside controversies. When retouching could not be detected in the prints, it was a sign of a job well done. Mostly they were requests from the clients, and no deceit existed or was intended.

In the digital age, retouching can only be spotted by its effect on the final image and sometimes only by comparison with the original digital file. However, the retouching on dry plates is a physical

alteration done by adding or removing material from the negative. There is no need for an enthusiastic reader to point them out. Today they exist in negative collections and tell the story of a hidden practice. The following chapter explores further the retouching materials from an analytical point of view.

3. Identification of retouching materials

The review of technical manuals and the recent studies on retouching gives limited information on the materials used in practice, and no systematic research has yet been done.

Earlier manuals were written before the generalized production and industrialization of photography. Varnishes were prepared in the studio instead of bought. Other materials were borrowed from the chemist laboratory or the artist workshop. Later manuals frequently refer to industrialized products from the major photography industries, such as Kodak, Ilford, or Agfa. While professional photographers wrote the manuals, they were intended for students and amateurs and might not reflect the professional practice.

In the twentieth century, however, photography is an established trade, and industrialized products are available. It is expected that the commercial products could have a more generalized use by professional photographers, particularly studio photographers.

The recent research is limited and focuses on coating materials, as cited, namely, the volume *Coatings on Photographs*, with several articles, edition of Constance McCabe (2005). Another reference is Mark McCormick-Goodhart's research focused on collodion negatives (1989). The research by Corina Rogge on varnishes used on tintypes (2013). These studies show that photographers frequently would use other materials aside from technical literature recommendations and the photographic industry and commerce. Particularly, Rogge's study identifies various resins that do not verify what is recommended in the historical literature. She postulates that photographers would use materials known to them in other contexts, such as painting, including resins recommended against in the manuals, favoring those they had experience working with or would have at hand. This limits the generalization of their findings and the prediction of what materials may be found in other photographic collections, deterioration behaviors, and conservation.

The biggest issue seems to be not having a big enough sample. The solution is to keep compiling data in each collection, treating it individually.

Nevertheless, finding a representative sample in a collection is also problematic. Photography studio

archives are often unorganized, even after conservation treatments and cataloging. The collections often reach thousands of objects, making any reorganization unviable, even when negatives are numbered, by the photographer. Two consecutive negatives might have been produced years apart, taken by different photographers and retouched by different hands.

Consequently, this part of the research starts from the basics, characterizing raw materials mentioned in manuals and a few selected commercial materials from the collections. Another objective was to develop a simple methodology suitable for retouching materials from historical collections.

Aims

For this research, studying several collections had the purpose of identifying commonalities and differences, but it has, as a consequence, an enormous number of reviewed objects. This precluded selecting a representative number of objects possible to handle and analyze in this research timeframe. Because many institutions rarely allow objects to go for analysis, the more viable option was to analyze samples.

For its versatility, Fourier transform infrared spectroscopy (FT-IR) was the selected analytical technique. FT-IR is one of the most widely used tools in Cultural Heritage because it is a reliable technique, and reference spectra are already available from multiple sources. FT-IR spectra have a *fingerprint region* (~1400-400 cm^{-1}) that contains absorption bands that characterize the entire molecule and all manner of the spectrum's vibrations. Even if it cannot generally be attributed to normal vibrations, it is also the region that is unique, like a *fingerprint*, to each compound and is used for identification. That is why an unknown material can be identified by assignment of the most relevant bands and comparing it with a reference compound's IR spectrum (Derrick, Stulik, & Landry, 1999; Socrates, 2001; Stuart, 2004).

One of the objectives was to compile a spectra database specific for retouching materials to be used as a reference in the future.

The analysis was conducted on raw reference materials without aging, and spectra should be considered as such. Several studies focus on FT-IR analysis of deteriorated materials used in cultural heritage, particularly varnishes and binders. They show variations in the IR spectra as the material ages, like the works by Azémard (2014), Ciofini (2016) on natural resins, or Meilunas (1990) on binders, to mention a few. The differences are mostly variations in the band's intensity and proportion between them and the appearance of new bands that relate to deterioration products. What is also taken from

these studies is that the most relevant bands are still present, and they still allow identification by comparison with unaged references.

No research was found on the identification of dyes, such as New coccine or the Crocein scarlet, using FT-IR and in the context of cultural materials. One exception is Cátia Souto's work (2010) who used HPLC-DAD-MS[191] to characterize synthetic dyes mostly in connection with textile materials, which mentions both dyes. This research does not provide much information on the colorants themselves other than their chemical structure and chemical group. However, it gives the UV-Vis (Ultraviolet-visible) spectra.

UV-Vis spectroscopy cannot be used alone for material identification. Because New coccine and Crocein scarlet have similar molecular structures and predictable similar FT-IR spectra, it can be an inexpensive and quick auxiliary way to differentiate the two dyes.

The second main objective was to analyze historical samples from negatives and, at the same time, define a suitable sampling protocol.

The analysis was carried out at the Lab[Mat], Materials Laboratory of the Department of Painting and Conservation-Restoration of the Faculty of Fine Arts at the Complutense University (UCM) in Madrid, Spain.

Samples

Reference materials

Reference materials were selected from the review of historical texts. It was also possible to sample from a few commercial retouching materials with known composition and commercially available in Portugal, specifically, *Agfa neu-coccin* (liquid), *Kodak Crocein Scarlet* (powder), *Kodak retouching medium* (liquid), and an unidentified red colorant from the Foto-Carvalho collection (powder).[192]

Kodak and Agfa colorants – crocein scarlet and new coccine – both are azo acid dyes, characterized for having azo groups A-N=N-B as chromophores.[193] They also contain sulfonic acids -SO_3H, the

[191] HPLC-DAD-MS – High-Performance Liquid Chromatography coupled with the Diode Array Detection Mass Spectrometry.

[192] Commercial samples of Agfa neu-coccin were made available by courtesy of Luís Pavão and the AMLSB and Kodak crocein scarlet by courtesy of Mark Osterman and the Eastman Museum.

[193] The chromophore is the part of the molecule that is responsible for its color.

auxochrome,[194] and aromatic rings, at least one. The crocein scarlet (type A-N=N-B_1) on one side of the azo group has two phenyl groups linked with another azo group (B_1) and on the other side a naphthalene group (a). The new coccine (type A-N=N-B_2) has two naphthalene groups as A and B_2, one of them equivalent to the one in the crocein scarlet, see Figure 3.1.

New coccine is a food-grade colorant (E124), and two additional commercial samples sold for culinary purposes were analyzed, one liquid and another in powder form. Finally, an unknown retouching red colorant from the Foto-Carvalho collection was also analyzed.

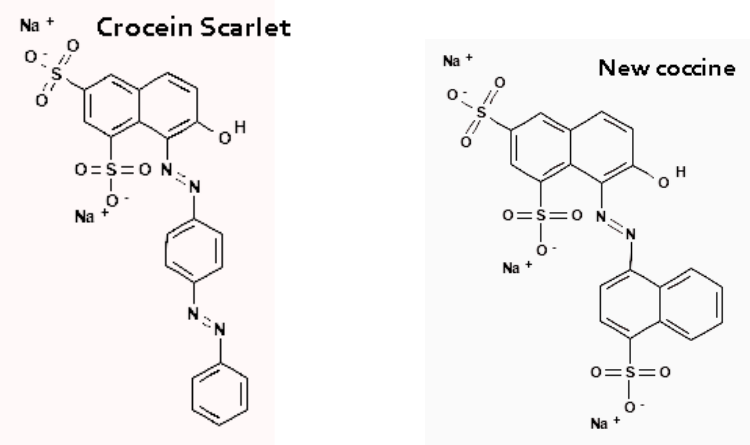


Figure 3.1 – Chemical structure for crocein scarlet and new coccine (source: PubChem).

The Kodak retouching medium is expected to be a dammar-based varnish, as are the other mattolein varnishes. Dammar is the designation given to a group of resins with similar characteristics obtained from tropical trees from the family *Dipterocarpaceae*. Dammar resin was only introduced in Europe ca. 1827. It will have generalized use, commercially replacing other varnishes, namely the Mastic varnish, for its qualities and cost, by the end of the nineteenth century (Mayer & Myers, 2002). For example, in his work, Ederites references Dammar varnish as early as 1853 (Eder, 1898, p. 286). This is also supported by the recommendations found in manuals reviewed for his research. In the first half of the twentieth century, there is high confidence that the varnish used for retouching is prepared with dammar resin. Not just for its mention in manuals and other books, but also because it was and still is a less expensive varnish and would be favored by commercial photographers looking for profit.

Dammar is a triterpenoid resin containing resinols, resin acids, essential oils, including triterpenes and related oxidation products.

[194] Auxochrome group of atoms, in this case, the sulfonic acids, that influence the ability of the chromophore to absorb light and influencing and intensifying the final color. It alters the main absorption band so that a colorless substance is transformed into a color one, in this case, the aromatic rings that alone are colorless (Allen, 1971).

A raw sample of artist-grade dammar resin was included for comparison. Other resins, commonly found as artist materials and mentioned in varnish recipes in the manuals reviewed, were also analyzed, namely, shellac, mastic, rosin, copal, gum Arabic, and sandarac. These are natural resins obtained from various plants, except shellac obtained from insects (lac insect, *Laccifer lacca*).

Table 3.1 lists the reference materials sampled, including several resins, pigments, dyes, and other materials that might be present as part of the negative, varnish, or contaminants – detailed information on each material in Appendix E.

Varnish samples were also tested. The most frequently mentioned varnishes in manuals were shellac and damar varnish, and these were prepared in the laboratory following historical recipes (Table 3.2). These materials were sampled in small quantities, meaning, in amounts visibly like those from historical negatives. Liquid samples were left to evaporate in glass containers, and solid samples were retrieved mechanically from the resulting film. The prepared varnishes were also applied to *vintage* negatives[195] and retrieved after drying following a similar protocol to historical samples – identified as MAD, listed in Table 3.3.

Table 3.1 – Reference samples.

ID	*Description*	*Observations*
Agfa	Neu-Coccine, red dye (Agfa, liquid)	Left to dry on a petri dish prior to analysis
Globo	Food grade red dye E124 (Globo, liq.)	Left to dry on a petri dish prior to analysis
Riesgo	Food grade red dye E124 (Manuel Riesgo, powder)	
Crocein	Crocein scarlet, reddish dye (Kodak, powder)	
RedETZ	Unidentified red dye from Foto-Carvalho Collection (powder)	
Kodak	Kodak retouching medium (Varnish 4, liq.)	
WhiteETZ	Unidentified white pigment from Foto-Carvalho Collection (powder)	
BlackETZ	Unidentified black pigment from Foto-Carvalho Collection (powder)	
Gamboge	Gamboge, yellow dye (Goma gutta, Manuel Riesgo, powder)	
Bitumen	Bitumen (Betún de Judea, Titan, liq.)	Analyzed in ATR mode†
Carmine	Red cochineal dye (Productos de Consevación, aqueous extract from dried insect)	

[195] Negatives bought for this purpose from antique stores and not from historical collections. Before varnishing, the negatives were cleaned only with an air blower.

Alizarin	Alizarin, reddish dye (Panreac, powder)	
MarsBlack	Mars black, iron oxide black pigment (Maimeri, powder)	
RedOxide	Red Oxide, Iron oxide red pigment (OR-1, Agroquímica dell Valles, powder)	
Dammar	Dammar resin (Productos de Consevación, pearls)	Because the resin is a hard material, it was ground before adding the KBr
Shellac	Shellac resin (Productos de Consevación, flakes)	
Mastic	Mastic (Productos de Consevación, pearls)	
Rosin	Rosin resin, also known as colophony (Productos de Consevación, pearls)	
Copal	Copal resin (Productos de Consevación, pearls)	
Gum	Gum Arabic (Productos de Consevación, pearls)	
Sandarac	Sandarac resin (Productos de Consevación, pearls)	
Starch	Starch (Quimicen, powder)	Analyzed in ATR mode‡
Cotton	Absorbent cotton wool	Fibers analyzed in ATR mode
Gelatin	Gelatin (Difco, powder)	Analyzed in ATR mode‡
Lavender	Lavender essence (Manuel Riesgo, liq.)	Analyzed in ATR mode*
Oil	Linseed oil (Talens, liq.)	Analyzed in ATR mode*
PetEth	Petroleum ether (Panreac, liq.)	Analyzed in ATR mode*
Turpentine	Rectified turpentine spirits (Lefranc Bourgeois, liq.)	Analyzed in ATR mode*
Ethanol	Ethanol 96 % (Panreac, liq.)	Analyzed in ATR mode*
TCE	1,1,2 Trichloroethane (98%, Acros Organics, liq.)	Analyzed in ATR mode*

† It is a highly viscous material that, even when dry to the touch, retains elasticity that does not disperse in KBr.
‡ It is a soft material that does not ground well and does not disperse in KBr.
* For volatile compounds, residue test was done by evaporation of 2 ml of liquid in an agate mortar, and after visibly dried, added KBr to make a pellet. The spectra obtained from analyzing the pellets did not show defining bands, and only the spectra obtained in ATR mode was considered.

Table 3.2 – Varnishes prepared in the laboratory from historical recipes.

ID	*Description*	*Recipe*	*Written sources**
Varnish 1	Dammar varnish - historical recipe	12 g Dammar resin + 75 cc (ml) Turpentine + 75 cc Benzine (Petroleum ether) + 2 cc Lavender essence (essential oil of lavender)	(Klary C. , 1897) (Frerk, 1948) (Jacobson, 1966) (Johnson, 1941) (Hammond, 1948)
Varnish 2	Dammar varnish - Simplified recipe	15 g Dammar resin + 150 ml Turpentine	(Piquepé, 1876) (Ourdan, The art of retouching, 1880) (Piquepé, 1881) (Klary C. , 1897) (Almeida, 190?) (Neves, s.d.) (Fonseca, 1905)

Varnish 3	Shellac varnish - Simplified recipe	15g Shellac resin + 150 ml Ethanol	(Piquepé, 1881) (Klary C. , 1897)
Varnish 4	Kodak retouching medium	-	-
Varnish 5	Oil-based varnish from Lupa collection (Foto-Estefânia)	Linseed oil + turpentine†	-

* Small variations are not considered; a reference is still included even if detailing different amounts or proportions. Sources that mention varnishes or resins but without describing a specific recipe are not included.
†Linseed oil + turpentine was the expected composition of the retouching varnish from the Foto-Estefânia's last owner's oral testimonies. But it is not expected to be found in any of the historical samples. It was also concluded that such varnish was not used in the observed negatives from the Foto-Estefânia. See below, chapter 4.

Table 3.3 – Samples from test negatives (MAD).

ID	*Description*	*Observations*
MAD03	Un-retouched dry plate negative	The varnish 1 was applied in all negatives and samples collected after 2 weeks, 3 months, and 1 year with a cotton swab with trichloroethane
MAD04	Un-retouched dry plate negative	
MAD05	Un-retouched dry plate negative	
MAD06	Un-retouched dry plate negative	
MAD07	Un-retouched dry plate negative	
MAD09	Un-retouched dry plate negative	
MAD18	Un-retouched dry plate negative	
MAD04_b	Un-retouched dry plate negative	Blank
MAD05_b	Un-retouched dry plate negative	Blank

Historical samples

Ideally, all analytical studies in cultural heritage are done using non-invasive, non-destructive methods, but resources are often unavailable. Not all laboratories have portable instruments, and the institutions that hold the collections are resistant to allowing objects to be removed for analysis. Sampling is an alternative, which means the removal of material. The retouched area on a negative is frequently small, and collecting, albeit a small quantity, can represent a significant alteration. This limits which objects can be sampled. So, the largest negatives and those presenting large retouching areas were selected; not many were available.

Two collections were chosen: Alvão and Foto-Carvalho. Sampling was done *in situ* for the Alvão collection, which had restrictions regarding removing negatives from the institution. Negatives from the Foto-Carvalho collection were taken to the laboratory, but for comparable results and consistency's sake, still sampled. The emphasis was on the two most common retouching materials found, varnish and red colorants.

The samples were obtained from the Alvão collection from several negatives that appear to belong to

the same timeframe (<1910).[196] Varnish samples – identified as CAV – were selected from negatives that presented either a thick or thin varnish layer,[197] including one cleaned with *Kodak Film Cleaner* in a previous conservation treatment (plate 195, sample CAV06).

This negative was cleaned in 1989, and the varnish stain is only visible for the silver mirroring formed on the unprotected surfaces (Figure 3.2). The Kodak Film Cleaner, main compound 1,1,1-Trichloroethane (TCE),[198] was tested in the Alvão collections and found to dissolve varnish effectively. No pencil retouching has survived in this negative.

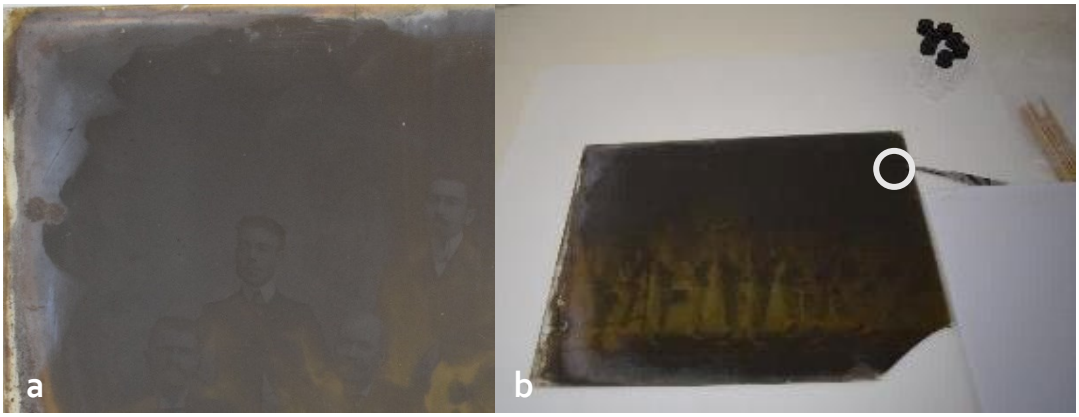


Figure 3.2 – Sampling of varnish, portrait group, dray plate negative, 24x30 cm, Alvão, 190?: a. detail of corner with silver mirroring; b. highlight of sampling area pointed out with the tip of the scalpel, vials and cotton swabs (CPF, ALV, 195 "2064").

Colored material, mostly red, was sampled from the glass surface and emulsion, from negatives with extensive retouching, including four negatives completely covered by retouching – samples identified as CAS. Two of them presented a yellowish tone, including the one in Figure 3.2, above. It was unclear if it was a yellow layer or a deteriorated red layer. Others were from makeup on glass or blocking out ink over the emulsion.

The Foto-Carvalho samples – identified as ETZ – were also taken from large-size negatives from the 1940s.[199] The reds were obtained from both the emulsion and glass surface and two additional black samples from blocking out masks.

Each sample was collected in areas near the border, fractured areas, and areas with less relevance to the

[196] It is a probable date according to numbers inscribed on the plates.

[197] It was not possible to record the negative surface for lack of lighting conditions.

[198] Trichloroethane (1,1,1 trichloroethane) is a clear, colorless liquid with a characteristic sweet odor that evaporates easily. It is also known as *Genklene* and is the main component of the Kodak film cleaner. It was commonly used in conservation for emulsion cleaning and safe for film and photographic emulsion. Trichloroethane is no longer recommended because it is classified as harmful to people and the environment. See appendix E.

[199] It is an attributed date based on clothing and the identified people.

image's main subject. Table 3.4 and Table 3.5 lists the samples for each collection, identifying if they are varnish or colorant material and if taken from the emulsion or glass surface.

Table 3.4 – List of samples from the Alvão collection (CA).

Sample ID	*Negative ID*	*Material*	*Location*
CAS01	Plate no.157 CPF-ALV	Red ink – Make-Up	From the support
CAS02	Plate no.160 CPF-ALV	Red ink	From the emulsion
CAS03	Plate no.170 CPF-ALV	Red ink	From the emulsion
CAS04	Plate no.179 CPF-ALV	Red ink	From the emulsion
CAS05	Plate no.182 CPF-ALV	Yellow ink	From the support
CAS06	Plate no.193 CPF-ALV	Red ink	From the emulsion
CAS07	Plate no."2023" CPF-ALV	Red ink	From the support
CAS08	Plate no."2009" CPF-ALV	Black ink	From the emulsion
CAS09	Plate no."2029" CPF-ALV	Red ink	From the support
CAS10	Plate no."2069" CPF-ALV	Red ink	From the support
CAS11	Plate no.114 CPF-ALV	Red ink	From the emulsion
CAS12	Plate no.115 CPF-ALV	Red ink	From the emulsion
CAS13	Plate no.122 CPF-ALV	Red ink	From the support
CAS14	Plate no.183a CPF-ALV	Red ink	From the emulsion
CAS15	Plate no.183a CPF-ALV	Red ink	From the support
CAS16	Plate no.712 CPF-ALV	Red ink	From the emulsion
CAS17	Plate no.694 CPF-ALV	Red ink	From the emulsion
CAS18	Plate no.694 CPF-ALV	Red ink	From the support
CAS19	Plate no.92 CPF-ALV	Red ink	From the support
CAS20	Plate no.92 CPF-ALV	Red ink	From the support
CAS21	Plate no.1816 CPF-ALV	Yellow ink	Border emulsion / support
CAV01	Plate no.160 CPF-ALV	Varnish (thin layer)	From the emulsion
CAV02	Plate no.174 CPF-ALV	Varnish (thick layer)	From the emulsion
CAV03	Plate no.177 CPF-ALV	Varnish (thick layer)	From the emulsion
CAV04	Plate no.184 CPF-ALV	Varnish (thin layer)	From the emulsion
CAV05	Plate no.192 CPF-ALV	Varnish (thin layer)	From the emulsion
CAV06	Plate no.195 CPF-ALV	Varnish (cleaned)	From the emulsion
CAV07	Plate no."416" CPF-ALV	Varnish (thin layer)	From the emulsion
CAV08	Plate no."2085" CPF-ALV	Varnish (thick layer)	From the emulsion

Table 3.5 – List of samples from the Foto-Carvalho collection (ETZ).

Sample ID	*Negative ID*	*Material*	*Observations*
ETZ01_r	Plate no. 27466 Foto-Carvalho	Red ink (r)	From the support
ETZ03_r	Plate no.28423 Foto-Carvalho	Red ink	From the support
ETZ09_r	Plate no.31273 Foto-Carvalho	Red ink	From the support
ETZ11_r	Plate no.5412 Foto-Carvalho	Red ink	From the support
ETZ15_r	Plate no.39190 Foto-Carvalho	Red ink	From the support
ETZ20_r	Plate no.42848 Foto-Carvalho	Red ink	From the support
ETZ10_v	Plate no.30944 Foto-Carvalho	Varnish (v)	From the emulsion

ETZ11_v	Plate no.5412 Foto-Carvalho	Varnish	From the emulsion
ETZ12_v	Plate no.39330 Foto-Carvalho	Varnish	From the emulsion
ETZ16_v	Plate no.22914 Foto-Carvalho	Varnish	From the emulsion
ETZ17_v	Plate no.27487 Foto-Carvalho	Varnish	From the emulsion
ETZ18_v	Plate no.30943 Foto-Carvalho	Varnish	From the emulsion
ETZ01_e	Plate no.27466 Foto-Carvalho	Emulsion (e)	
ETZ03_e	Plate no.28423 Foto-Carvalho	Emulsion	
ETZ09_e	Plate no.31273 Foto-Carvalho	Emulsion	
ETZ11_e	Plate no.5412 Foto-Carvalho	Emulsion	
ETZ15_e	Plate no.39190 Foto-Carvalho	Emulsion	
ETZ13_b	Plate no.25306 Foto-Carvalho	Blank (b)	From the emulsion
ETZ14_b	Plate no.28796 Foto-Carvalho	Blank	From the emulsion
ETZ19_b	Plate no.29797 Foto-Carvalho	Blank	From the emulsion
ETZ02	Plate no.6703 Foto-Carvalho		After additional consideration, it was decided against retrieving samples from these negatives as it was found that any amount would have a significant impact on the image
ETZ04	Plate no.22891 Foto-Carvalho		
ETZ05	Plate no.7188 Foto-Carvalho		
ETZ06	Plate no.26079 Foto-Carvalho		
ETZ07	Plate no.25304 Foto-Carvalho		
ETZ08	Plate no.1112 Foto-Carvalho		

Materials and methods

Sample preparation

When sampling varnishes, the primary concern was not to remove part of the emulsion along with the varnish, which might later interfere in interpreting the spectra. The varnish layer adheres closely to the emulsion surface. A mechanical technique that guaranteed just the extraction of the varnish seemed virtually impossible, with the means available, so a solvent extraction was considered.

During the research, the author collaborated with the CPF doing basic conservation treatment to the Alvão collection, such as cleaning and housing of negatives; and experimented with solvents such as water, ethanol, acetone, TCE, and petroleum ether.[200] When cleaning emulsion surfaces, it was common to use TCE (or Kodak Film Cleaner), and its properties of solubility and safety for the photographic materials are well known (Lavédrine, 1990, p. 128; Rempel, 1987, p. 83; Pavão, Conservação de colecções de fotografia [Conservation of photography collections], 1997, pp. 311-312; Cattaneo, 2012, p. 102). Even though TCE was replaced in current practice with other less toxic alternatives, the solvent is still recognized as the most effective, and it is still available in many archives.

[200] All negatives were cleaned with water and ethanol, and only the unretouched glass surfaces. Acetone was used in specific cases to remove old adhesive strips. The TCE and petroleum ether were also available at the archive, the first only used to clean and stabilize bio-contaminants.

This was the case with the institution.

Solubility tests were performed with the TCE on retouched surfaces to confirm that it dissolved the varnish and colorants without affecting the emulsion. It was found to be a suitable solvent for sample retrieval.

The colorants, for their specific characteristics – color and thickness of the layer – were easier to sample, and mechanical extraction with a scalpel was selected instead.

Each varnish sample was collected using a small cotton swab and trichloroethane from an area with ≈ 0,5 cm^2 size. This was done on peripheral areas and caring that no other retouching material would be removed as well. The cotton was stored in a glass vial, and the solvent was left to evaporate. The varnish is then retrieved in the laboratory again with solvent,[201] the cotton is removed, and the liquid is left to evaporate in an agate mortar. A similar procedure was done on unvarnished areas to produce blank samples to verify the solvent extraction selectiveness.

The petroleum ether was also considered a possible alternative to TCE because it was part of several varnish recipes. However, tests produced poor results. Following the same method, using the cotton swab as described for TCE, it was noted that the varnish layer is not as readily or entirely solubilized. It required more solvent, more time, and partial mechanical action and was, therefore, discarded.

A mechanical extraction with a scalpel was used for the colorants, retrieving a sample with an area <1 mm^2 collected to a polypropylene microcentrifuge tube (*Eppendorf* tube). Blank samples of photographic emulsion were also collected from unretouched areas.

For analysis, a pellet is prepared by adding potassium bromide (KBr) to the sample in an agate mortar. The mixture is ground and then pressed in a 13 mm anvil. Because the sample is small, the KBr was not measured and added only the minimum to obtain a solid pellet of 13 mm ∅, approximately 100 µg. Because the amounts of sample and KBr are unknown, it is only possible to do qualitative analysis; that was the main objective. All graphs presented are normalized, and the absorbance intensities cannot be compared between two samples, even between two spectra from the same material.

After FT-IR analysis, the KBr pellets were saved in glass vials for reference and used for further analysis if needed.

[201] At the Lab[Mat], the 1,1,1 trichloroethane was unavailable. It was replaced with the isomer 1,1,2 trichloroethane that proved to have similar properties regarding varnish solubility without affecting the photographic emulsion. It was used the 1,1,2-Trichloroethane, 98% Acros Organics. See appendix XX.

Analytical methods

Materials were analyzed with Fourier-transform infrared spectroscopy (FT-IR; Nicolet 380 Thermo Scientific with a DTGS, deuterated triglycine sulfate, temperature-stabilized coated detector; 4000– 400 cm^{-1}) prepared as KBr pellets (Potassium bromide, for IR spectroscopy, Merck). The equipment also has an attenuated total reflection diamond crystal accessory (ATR), allowing both techniques to be used easily. In ATR mode, there is no need for sample preparation. The spectra are obtained at 4 cm^{-1} resolution in transmission mode, in the range 4000-400 cm^{-1} from 60/64 scans, for KBr pellets and ATR, respectively, three replicates were made of each. Obtained spectra are converted to absorbance and processed with *Omnic* v 7.3 software. The material identification is made by assignment of relevant bands in each spectrum and by comparison with reference spectra and the spectra database included in the software.

Corrections

The spectra from the historical samples all have low absorbances. Interferences that do not appear in other samples are more relevant in these, for example, absorptions of gaseous CO_2 along the IR beam path. Variable concentrations relative to the background spectrum may cause under- or over-subtraction of interfering lines. The software allows some corrections, and spectra were processed for *atmospheric suppression* and *baseline correction*. However, the CO_2 bending mode absorption band at ~668cm^{-1} is not automatically corrected. This is a very thin and defined band and can be easily eliminated manually without prejudice to the spectrum. Figure 3.3 shows such an example.

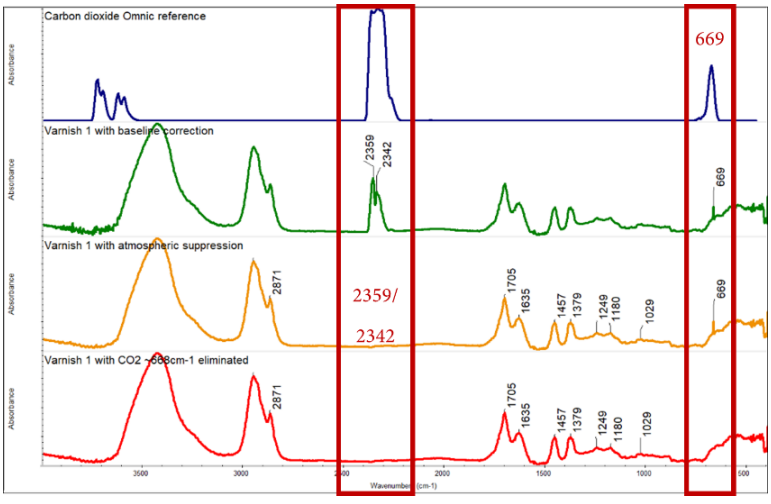


Figure 3.3 – Corrections to IR spectra: Sample from Varnish 1 prepared like a historical sample. From top to bottom: CO_2 reference spectra from Omnic database; Varnish 1 with baseline correction; with atmospheric suppression; and CO_2 ~668cm^{-1} eliminated. Highlighted are the CO_2 characteristic bands.

Results and discussion

Confirming methodology

The analysis started by testing the methodology with available laboratory-grade raw samples (such as starch and gelatin) and other reference retouching materials. Initial observations allowed for corrections and adaptations and to obtain results with a good degree of confidence.

Although all materials analyzed had a reference entry in the equipment software database, Omnic, some samples of known materials produced a different spectrum than those available in Omnic and other IR databases. Namely, the New coccine samples produced a similar spectrum but did not present the intense 3000-2800 cm^{-1} region's characteristic bands present in the software reference spectra (Figure 3.4). This IR region can be associated with aliphatic CH^{-} stretching. Further analyzing the spectra in the region <1600 cm^{-1} shows other bands present in the software spectra, which are not in the samples. Specifically, the ~1460 cm^{-1}, ~1380 cm^{-1}, and ~720 cm^{-1}, all associated with alkane spectra, CH^{-} bending the first two, and $-(CH_2)_n-$ rocking the latter. Of these, only the bands near 1380 cm^{-1} almost overlap existing bands in the samples, but the others are absent (Figure 3.5).

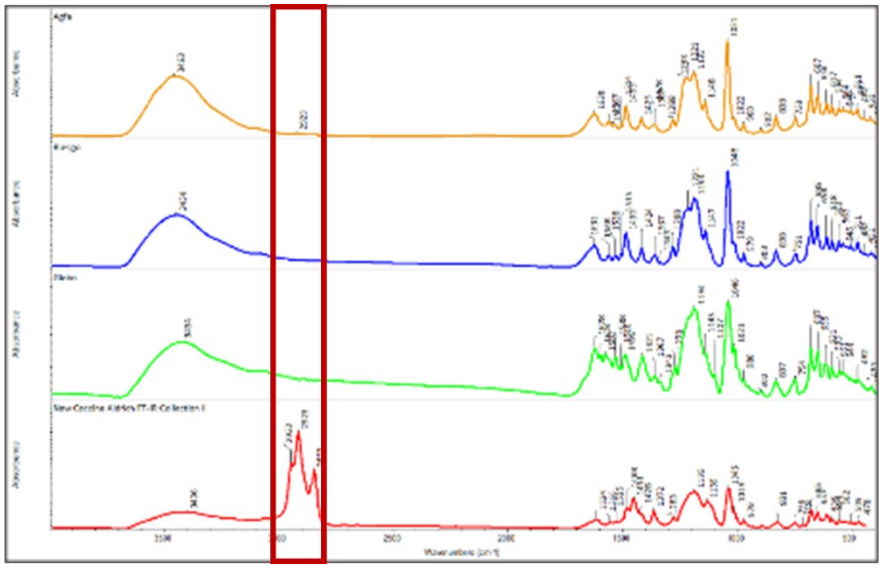


Figure 3.4 – New coccine comparison spectra, highlighted in the region between 3000-2800 cm^{-1}: top to bottom: commercial samples Agfa, Riesgo, Globo, and reference spectra from Omnic database

Different samples can have various purity degrees or types of contaminants, which might explain the difference. The reason for this difference was not undoubtedly ascertained. The databases do not provide information about the samples used to produce the spectra. However, one explanation might

be contamination from plastic laboratory ware, possibly polyethylene or polypropylene, as George Socrates suggests in what he calls "spurious bands"[202] (2001, p. 26).

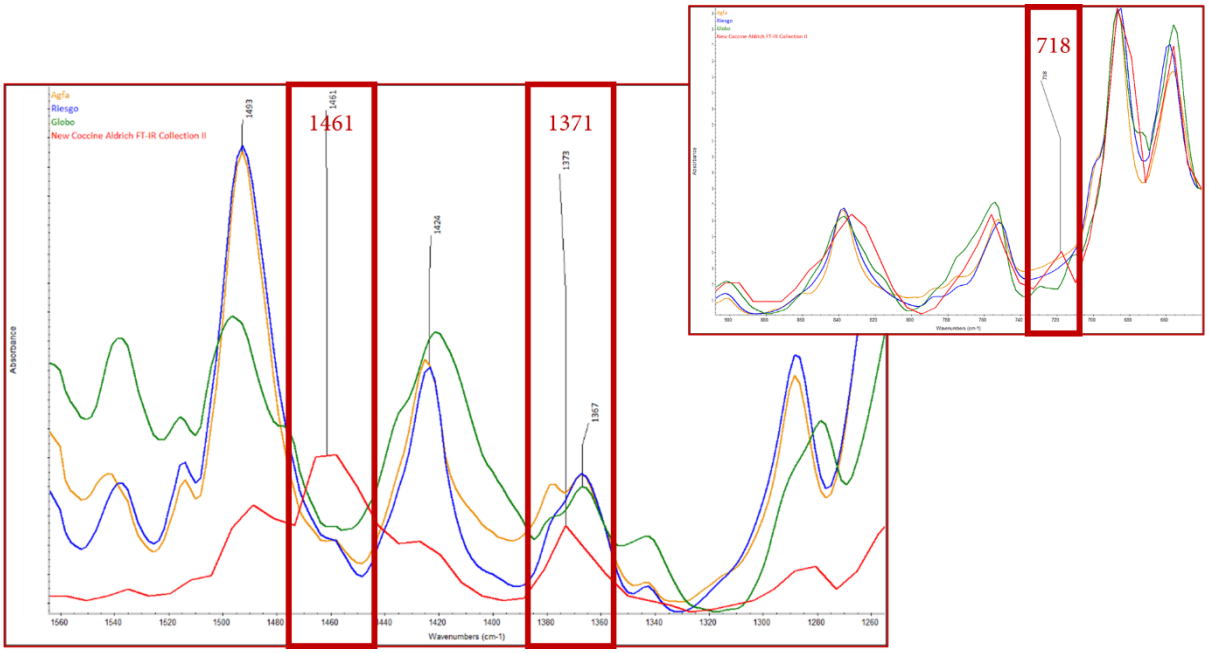


Figure 3.5 – Spurious bands IR spectra, New coccine, from top to bottom: commercial samples Riesgo, Agfa, Globo, and reference spectra from Omnic database. Two details 1560 – 1260 cm^{-1} and 920 – 640 cm^{-1}.

The discrepancies were generalized, the three available New coccine spectra from the software all presented these bands, and none of the commercial samples did. Similar observations were collected from other materials. Without more information on the software database's samples, it is not possible a definitive conclusion. It might indicate that the reference databases' spectra present significant contaminations from the sample material or sample processing. On the contrary, it also suggests that the analyzed retouching materials were not contaminated.

Solid samples frequently have water, and KBr naturally absorbs water from air moisture. The Omnic software can be configured for an "H_2O and CO_2 correction,"[203] but this feature was not functioning. So, the only way around this was to maintain samples and KBr as dry as possible.

When water's absorption bands had such intensity that masked the rest of the spectra, samples and pellets were kept on a drying oven at ≈32ºC for hours or days before analysis. Still, there is visible

[202] As defined by Socrates: "A spurious band is one which does not truly belong to the sample but results from either the sampling technique used or the general method of sample handling or is due to an instrumental effect, or some other phenomenon" (2001, p. 4).

[203] Supposedly, this is a feature similar to atmospheric suppression, which removes the CO_2 bands from the spectra in post-processing, but design to also remove water absorption bands.

interference from water in most of them, particularly the broad band ~3400 νO-H (stretching mode) and the band ~1640 δO-H (bending mode). Figure 3.6 shows the same KBr pellet's spectra, prepared with dried varnish 1 (dammar resin + turpentine + petroleum ether + lavender essence), before and after four days in a drying oven. The pellet was dry enough for over-subtraction to be observed. Water can be almost impossible to remove from some samples, and unless completely masking relevant bands, its presence is only acknowledged as other spurious bands.

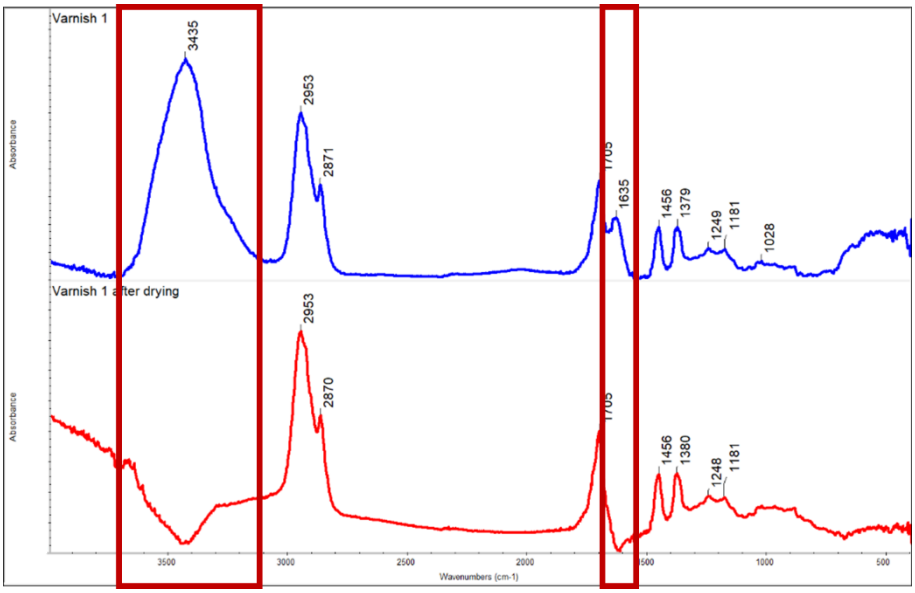


Figure 3.6 – Sample of varnish 1 top to bottom: before and after drying for four days in the drying oven, showing over-subtraction of bands ~3435; ~1635 cm^{-1}.

Additional analysis was carried out to screen for possible contaminants from the environment and conservation treatments in the historical samples. The pellet technique proved to be surprisingly sensitive. For example, rubbing the fingers on a cleaned agate mortar and then preparing a pellet adding KBr, produced a spectrum with relevant bands that could be associated with oils and collagen.

Historical samples were expected to have contaminants. Blank samples were obtained with TCE applied on unvarnished emulsion areas. The resulting spectra show very low absorptions of unidentified contaminants that were retrieved from the surface. Still, no characteristic bands for proteinaceous material were identified, confirming the TCE's selective solubility premise.

The Kodak retouching medium (varnish 4) was applied on glass slides and left to dry for two months to compare a mechanical and solvent extraction.[204] Figure 3.7 shows a comparison between two spectra

[204] Similar tests with similar results were obtained for the other varnishes.

of varnish 4 collected mechanically by scraping with a scalpel blade and the trichloroethane swab method. The resulting spectra present an identical profile, validating both methodologies.

After solvent evaporation in the mortar, an excellent dispersion of the sample material was obtained, allowing a homogeneous mixture with KBr and pellet. The solid samples from resins and dry varnishes were needed to be ground for longer. This again validates the solvent methodology over mechanical extraction that risks dragging emulsion material and requires more time preparing a homogenous pellet. Solvent extraction allowed viable varnish samples with a minimum amount of material needed, although in a comparatively more extensive area than the required for the mechanical extraction of colorants.

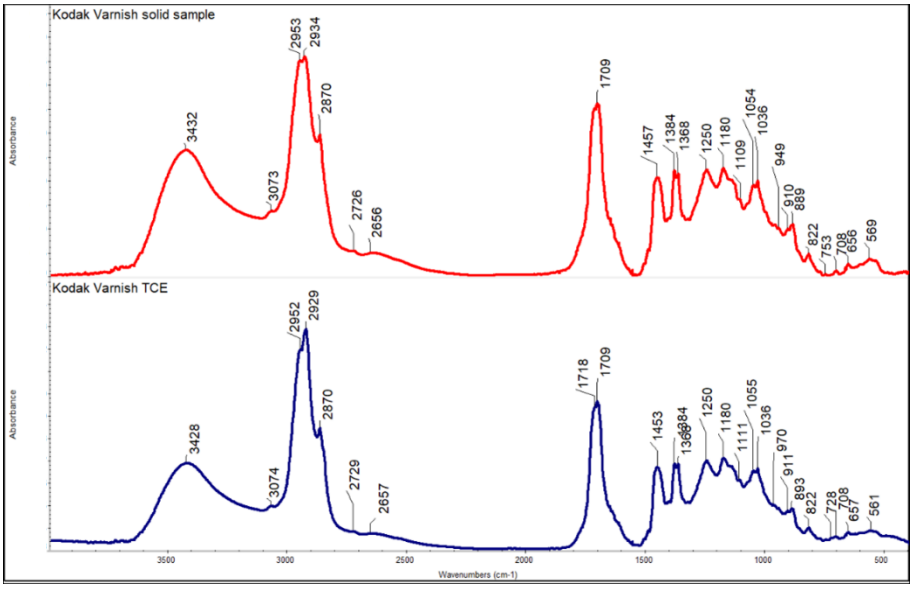
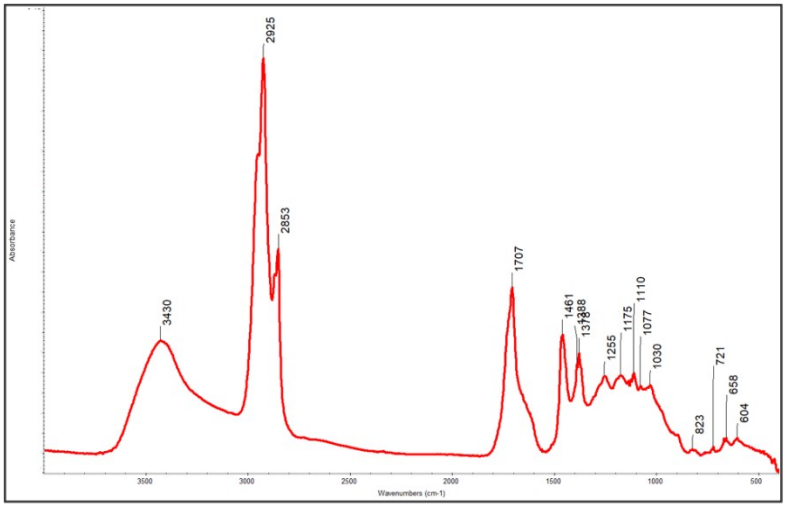


Figure 3.7 – Varnish 4 (Kodak retouching medium), identical IR spectra after drying for two months and retrieved: top to bottom mechanically and with solvent (TCE).

The small amount of colorant sample was not a problem, and defined spectra were obtained from many samples. The ones retrieved mechanically from the Alvão collection had poor results. However, the problem identified was not the sample size, but that part of the sample was lost repelled by static electricity in the plastic tube. On a second visit, samples were stored in a glass microscope slide with reaction wells covered by a second slide with no wells, both held together with adhesive tape. This proved to be a more successful methodology to preserve the sample.

The MAD samples collected from varnishes applied on vintage negatives offered successful results. It confirmed the solvent extraction methodology before analyzing the historical samples. Figure 3.8 shows the characteristic bands for damar resin, even from the small amount of varnish.





Bands (cm^{-1})	Assignment	
3430	Water ~3400cm^{-1} ν O-H; ~1640cm^{-1} δO-H	
2925; 2853	Dammar	ν(CH_3) ν(CH_2)
1707; 1461; 1378		ν(C=O); δ(CH_2), δ(CH_3)
1255		ν(C-C), ω,τ (C-H), ν(C-O-O)

Figure 3.8 – IR spectra, group portrait, dry plate negative in transmitted light, unknown author (MAD07); FT-IR of varnish sample MAD07, showing bands that can be associated with dammar resin.

All these preliminary tests indicate that the methodology is adequate, does not introduce contaminations, at least in amounts that interfere with characterization and identification. Moreover, it is sensitive enough for minimum sample quantity.

A note on the commercial retouching materials

Agfa neu-coccin and Kodak retouching medium are samples with more than 50 years old. Still, the spectra are defined and closely resemble the unaged reference materials and the Omnic software database.[205]

The Kodak retouching medium presents visible yellowing, suggesting some degree of deterioration corroborated with an absorption increase in the fingerprint region and the hydroxyl groups ~3430cm^{-1}. Similar observations were done in studies such as Patrick Dietemann *et al.* (2009), Clara Azémard *et al.* (2014), and René de la Rie and Christopher McGlinchey (1989). Figure 3.9 shows the spectra for the Kodak retouching medium, reference dammar resin, and varnish 2 (dammar + turpentine) superimposed, with the absorption increase in the referred regions.

Differences in the fingerprint region were identified between pellets prepared from dammar resin pearls and the varnish from the same resin. Figure 3.9 also shows such an example for varnish 2. This difference is explained because natural resins present impurities, and when a varnish is prepared, these do not dissolve and are removed by filtration.

[205] Aside from the discrepancies mentioned that are assigned to contaminations and spurious bands.

Less variation was expected for the Agfa sample, as new coccin is recognizably a lightfast colorant, and in collections, most red retouching does not seem to have faded. Figure 3.10 shows spectra for the food-grade red dye E124 (new coccin) from the supplier Manuel Riesgo and Agfa neu-coccin superimposed, and they have all the same bands and are almost identical.

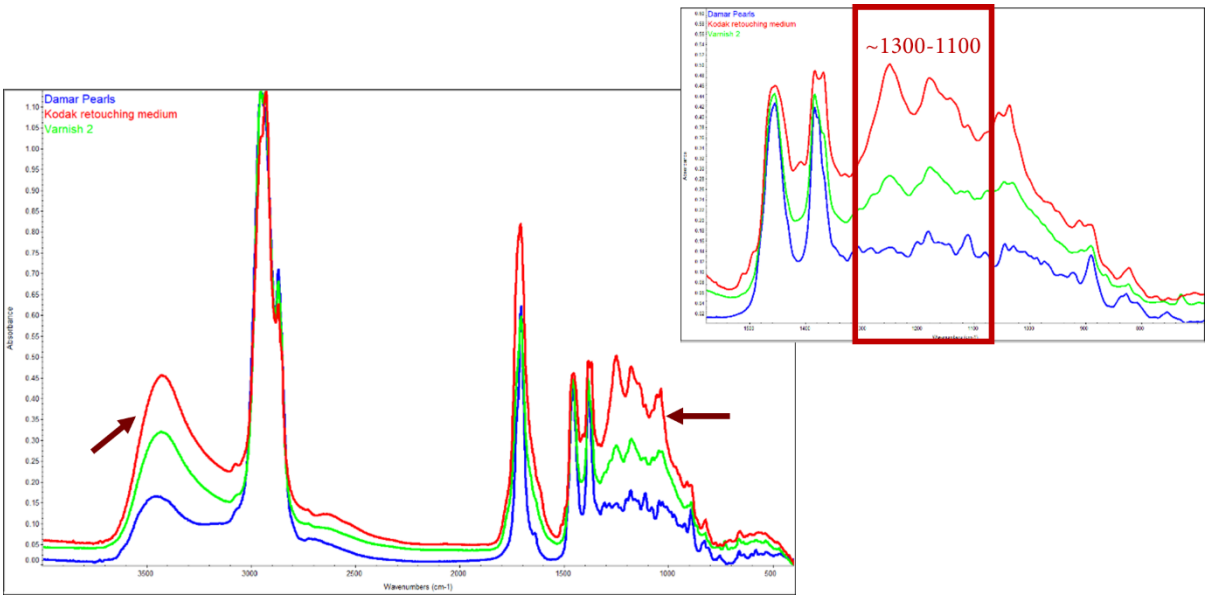


Figure 3.9 – IR spectra of dammar samples of varnish 2 (dammar + turpentine), dammar pearls, and Kodak retouching medium with increased absorptions in the identified regions; detail showing the difference between the varnishes and raw dammar in the region 1300-110 cm^{-1}.

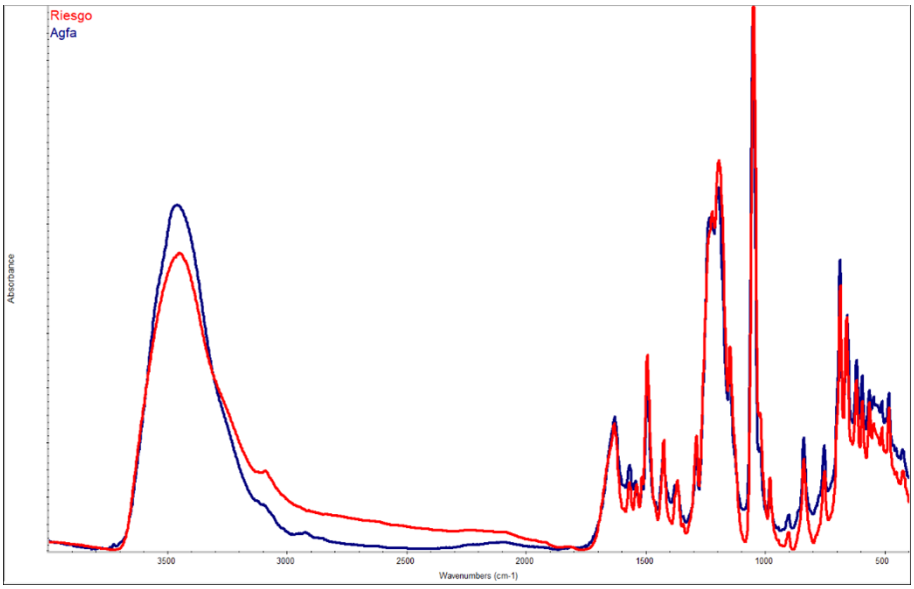


Figure 3.10 – IR spectra of new coccine samples of food-grade E124 red dye, supplier Manuel Riesgo and Agfa neu-coccin, showing the complete juxtaposition of bands in both spectra.

Samples from the collections

The historical samples have an entire and unknown history of handling and natural deterioration. And the ones from the Alvão collection had previously received conservation treatment.

Contaminants are expected to affect the obtained spectra by slightly shifting or altering the bands' shape, and the assignment of specific vibration bands was not done. The negatives' samples were identified only by comparison with reference samples' most relevant bands in the IR mid-region and fingerprint region.

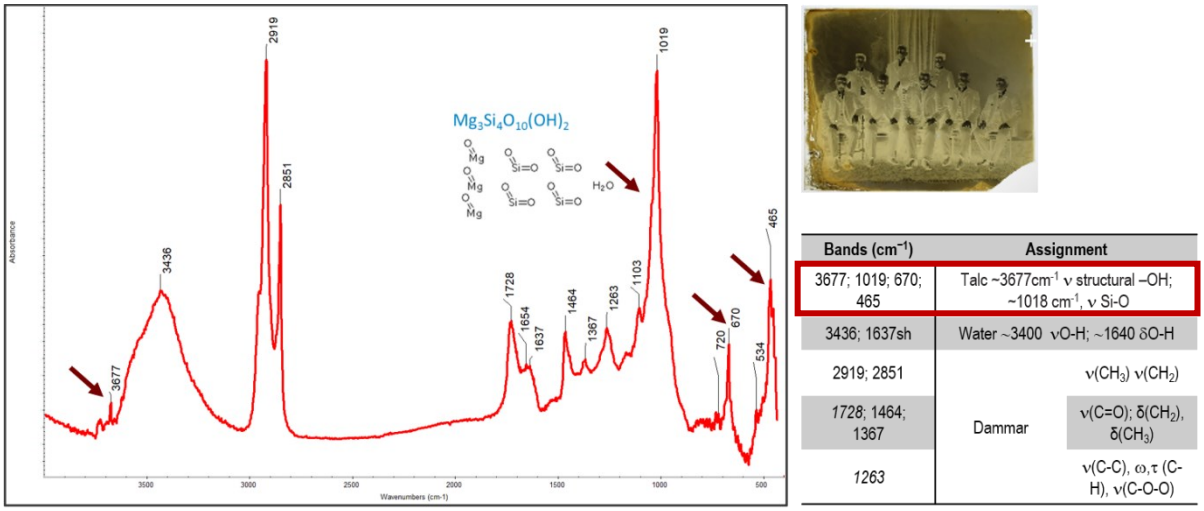
The varnish samples from Alvão and Foto-Carvalho collections were identified as a dammar resin-based varnish. This is consistent with descriptions and recipes from manuals.

The residue tests from rubbing the fingers on an agate mortar showed that it is possible to identify the presence of residues from handling the negatives by this methodology. Still, the small historical samples' sample size implicates that contaminations have such a small presence that they cannot be identified with confidence.

Table 3.6 – Identified bands in Alvão varnish samples that can be associated with talc.

Talc bands (cm^{-1})	*CAV01*	*CAV02*	*CAV03*	*CAV04*	*CAV05*	*CAV06*	*CAV07*	*CAV08*
3677						3676		3676
1018		1021	1021	1024	1028	1019	1028	1021
671	668*	669*	669*	670*		669*		669*
534		540		537		532		534

* The ~668 cm^{-1} band is also assigned to CO_2, which is not removed in the atmospheric suppression correction and so is not considered an identifier, in this case.



Bands (cm^{-1})	Assignment	
3677; 1019; 670; 465	Talc ~3677cm^{-1} ν structural –OH; ~1018 cm^{-1}, ν Si-O	
3436; 1637sh	Water ~3400 νO-H; ~1640 δO-H	
2919; 2851	Dammar	ν(CH_3) ν(CH_2)
1728; 1464; 1367		ν(C=O); δ(CH_2), δ(CH_3)
1263		ν(C-C), ω,τ (C-H), ν(C-O-O)

Figure 3.11 – IR spectra, group portrait, dry plate negative in transmitted light, 190?, Alvão (CPF, ALV, 195); FT-IR of varnish sample CAV06, showing bands that can be associated with dammar resin and talc.

An exception was the identification of talc's absorbance bands in some varnish sample spectra from the Alvão collection (Table 3.6 and Figure 3.11). The two most characteristic absorbance bands of talc are 3677cm^{-1}, stretching of the structural OH groups, and 1018 cm^{-1}, stretching of Si-O, according to Blanchard et al. (2018). These negatives received conservation treatment in 1989. Talc was often present in disposable medical gloves used during conservation treatments, which might explain its presence in the samples.

Many samples presented a wide band above 1700cm^{-1} that can be interpreted as having more than one absorption band contributing to it, resulting from different materials. The hypothesis was a mixture of resin with an oily substance as the band for the carbonyl stretching C=O of esters occurs between 1750-1715cm^{-1}. For example, lavender essence, frequently mentioned in recipes. However, when comparing reference samples of varnishes 1 (with lavender) and 2 (without lavender), and although lavender has a longer evaporation rate than other varnish's ingredients, both samples produced similar spectra after drying only a couple of weeks (Figure 3.12), and no lavender was detected. An alternative explanation could be a varnish mixture with an oil that did not evaporate, contributing to forming the varnish film. And finally, oils from the skin resulting from manipulation without gloves could also be a factor. But no other bands in the fingerprint region were identified that could verify these or other hypotheses.

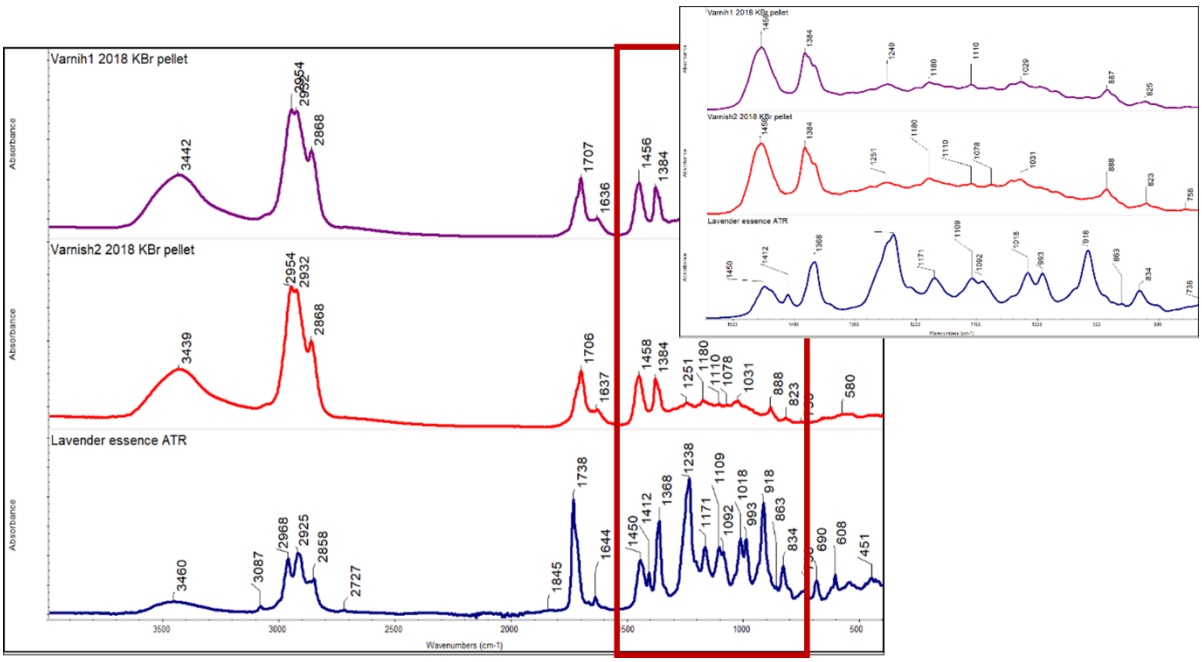


Figure 3.12 – Varnishes 1 and 2 dried for two weeks, in KBr pellet mode and Lavender essence in ATR: a. full spectra; b. detail of the fingerprint region.

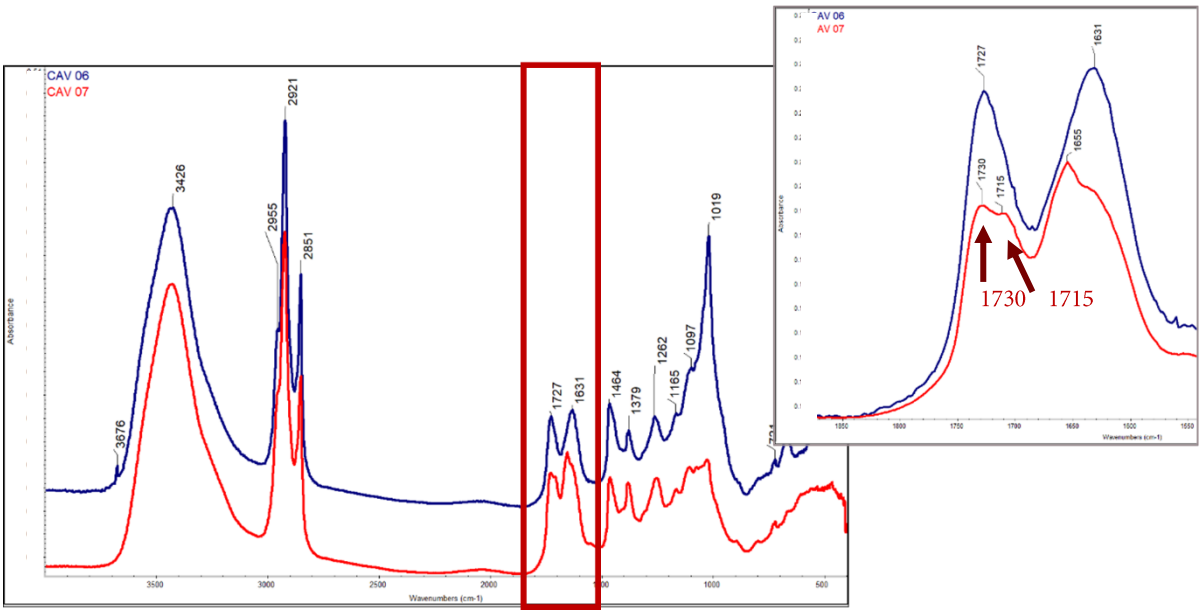


Figure 3.13 – Varnish contaminants, samples from the Alvão collection CAV06, above in blue, CAV07 below in red, detail of mid-region showing CAV07 split the first band 1730 and 1715 cm^{-1}.

The CAV07 sample from the Alvão collection is one example with a splitting band in ~1730 cm^{-1} and ~1715 cm^{-1}. This supports the hypothesis of a mixture or contamination, for example, with an oily substance, which has a characteristic band around 1740 cm^{-1} for the esters' C=O stretching band. (Figure 3.13). Although some negatives of the Alvão collection were previously cleaned with trichloroethane, which would have removed grease from handling, those with retouchings, mostly, were not. The retouched negatives were only cleaned with an air blower that only removes loose particles but would leave other residues. Figure 3.13 also compares sample CAV07, not previously cleaned with sample CAV06, cleaned with Kodak film cleaner despite retouchings, which does not present the same splitting of the bands (see above Figure 3.11).

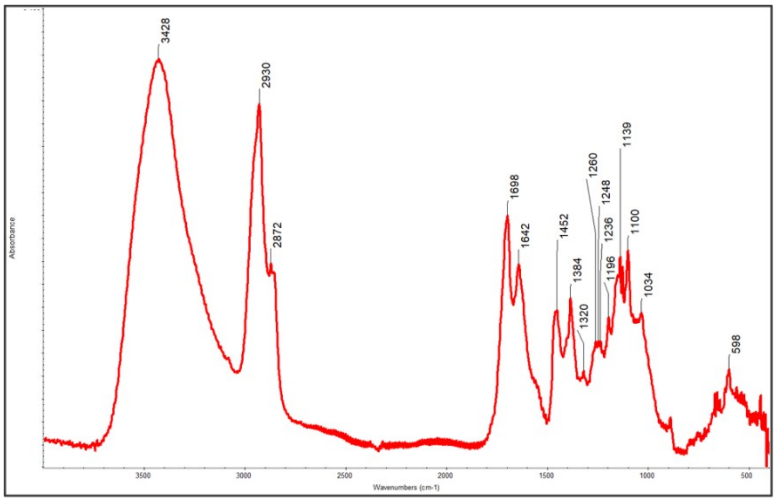
Water has a significant presence in many historical samples, even though caution was taken to keep the samples dried. The reduced sample size can explain this. While all pellets were produced with approximately the same amount of KBr, samples from the collections were extremely small, resulting in spectra with minor absorbance intensities. This also allows relative preponderance of other contaminants from external sources, such as water from air moister, absorbed by the KBr.

The colored samples from the Alvão collection did not give valid enough results for a definitive conclusion. The FT-IR spectra from those negatives with retouchings with color on the glass support suggest the presence of a resin, possibly applied to provide better adhesion of the dye. The resin was identified as dammar (Figure 3.14).

The red colorant from the Foto-Carvalho collection (RedETZ) was identified as Crocein Scarlet, similar

to the Kodak sample. Crocein scarlet was also found in some of the samples collected from the negatives (Figure 3.15). However, one sample, ETZ20, was identified as an iron oxide pigment (Figure 3.16), possibly red earth or red ocher, for the presence of bands in the region 1120-1000 cm^{-1}, which can be associated with Si-O stretching vibrations (Madejová, Gates, & Petit, 2017). This was unexpected. The purpose of retouching in this negative was to compose a double portrait from two prints, and the red pigment was applied to remove the background of both. When viewed in transmitted light, the colored area still retains some transparency, which led to the initial assumption that it was a dye. After analysis, it became evident that it was an iron oxide pigment.

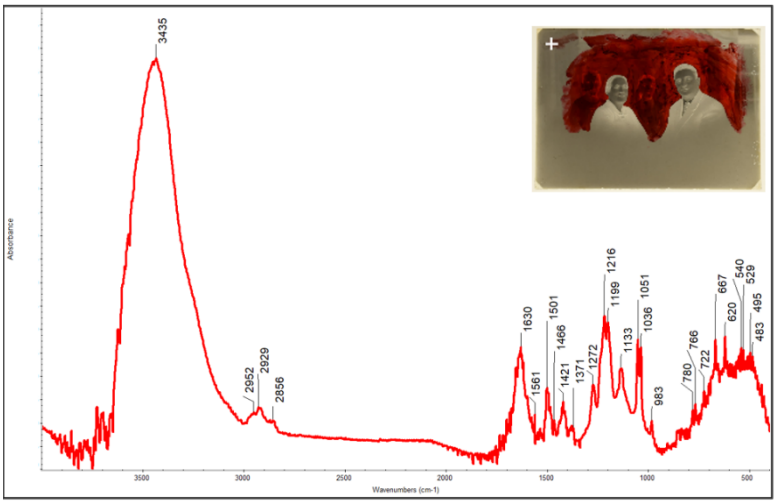
The varnish samples from the ETZ collection returned information indicating a damar-based varnish, as expected (Figure 3.17).





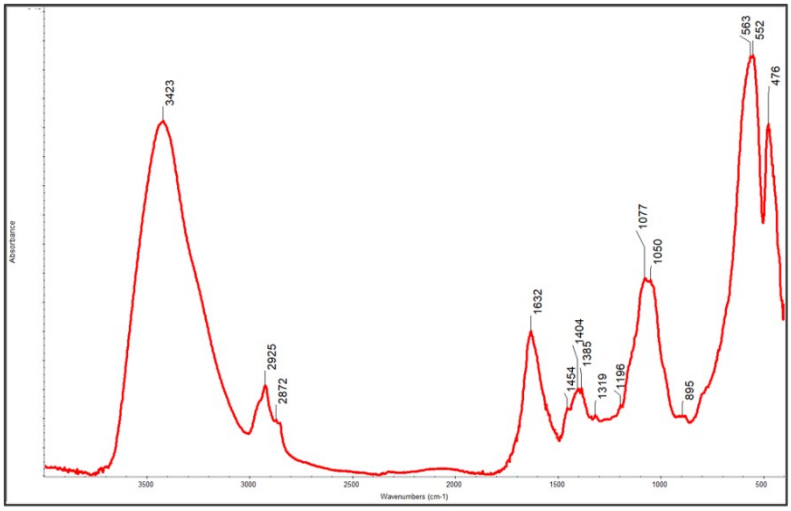
Bands (cm^{-1})	Assignment	
3428; 1642	Water ~3400cm^{-1} ν O-H; ~1640cm^{-1} δO-H	
2930; 2872	Dammar	ν(CH_3) ν(CH_2)
1698; 1452; 1384		ν(C=O); δ(CH_2), δ(CH_3)
1248		ν(C-C), ω,τ (C-H), ν(C-O-O)

Figure 3.14 – IR spectra, a girl's portrait, dry plate negative in transmitted light, 190?, Alvão (CPF, ALV, 183); FT-IR of red sample CAS15, showing bands that can be associated with dammar resin.



Bands (cm^{-1})	Assignment	
3435; 1630	Water ~3400 νO-H; ~1640 δO-H	
1501	Crocein scarlet	1620-1505 ν C=C aromatic
1421		1465-1380 ν Aromatic azo
1272; 1216; 1133; 1051		1304-1043 ν_{as} S=O (SO_3-H)
1036		ν_s S-O (SO_3-H)

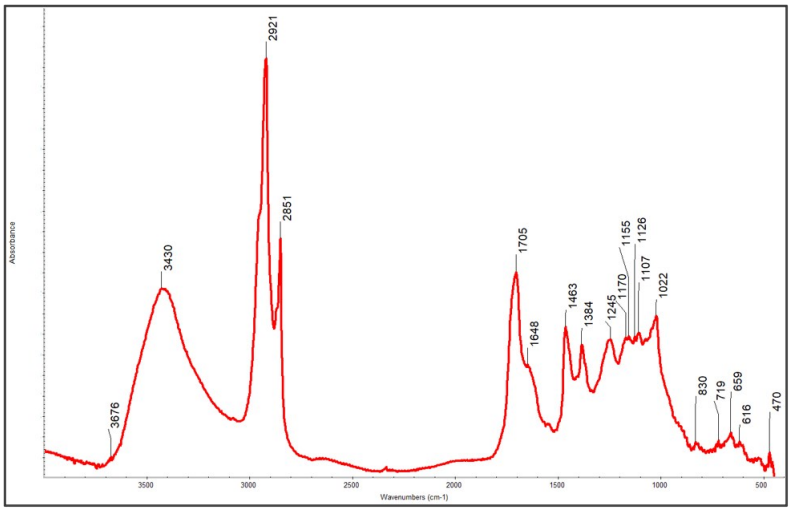
Figure 3.15 – Double portrait, from a group portrait of four people, dry plate negative in transmitted light, s.d. Foto-Carvalho (Estúdios Correia, no. 28423); FT-IR of sample RedETZ03, showing bands that can be associated with crocein scarlet dye.





Bands (cm^{-1})	Assignment
3423; 1632	Water ~3400 νO-H; ~1640 δO-H
1077; 1050	ν (Si-O)
553; 454	Iron oxide pigment ν (Fe-O)

Figure 3.16 – Reproduction of double portrait, photomontage with two prints, dry plate negative in transmitted light, s.d. Foto-Carvalho (Estúdios Correia, no. 42848); FT-IR of sample RedETZ20, showing bands that can be associated with red earth or red ocher pigment.





Bands (cm^{-1})	Assignment	
3676; 1022; 659; 470	Talc ~3677cm^{-1} ν structural –OH; ~1018 cm^{-1}, ν Si-O	
3430; 1648sh	Water ~3400 νO-H; ~1640 δO-H	
2921; 2851	Dammar	ν(CH_3) ν(CH_2)
1705; 1463; 1384		ν(C=O); δ(CH_2), δ(CH_3)
1245		ν(C-C), ω,τ (C-H), ν(C-O-O)

Figure 3.17 – Group portrait, dry plate negative in transmitted light, s.d. Foto-Carvalho (Estúdios Correia, no. 39330); FT-IR of varnish sample ETZ12, showing bands that can be associated with damar resin.

Reference samples

For the reference samples, each spectrum was compared initially with those in the included Omnic software database. The identification proceeded by assignment of the most significant absorption bands and by comparison with online databases and relevant bibliography.

All samples performed as expected, aside from the discrepancies mentioned that are assigned to contaminations and spurious bands.

These spectra were compiled as a database and served as an additional comparison reference to the historical samples. Damar was the expected resin for varnish, and this was confirmed. Still, it was felt necessary to include other resins for a reference database that can be used in the future for other

research. Other research from earlier photographic processes suggested that the type of resin would be associated with the photographer's background and availability. The hypothesis was that, in the first half of the twentieth century, there would be a uniformization of retouching materials due to the significant development of a photographic industry that supplied most of the photographic materials. Ultimately, analysis of more samples and more collections is necessary to demonstrate this.

In appendix E, all spectra are presented and identified with tables of assigned bands.

Additional analysis

Complementary analytical techniques were considered for the verification of results. In this research, HPLC UV/Vis and CG-MS were good options for colorants and resins, respectively. This was not initially planned, and the biggest problem was that the historical sample quantities would not allow more than one technique using destructive methods. All historical samples analyzed with the FT-IR were prepared for KBr pellets that consumed the entire sample. However, the KBr pellets were preserved. The solution was to find a methodology that could further analyze the samples using the pellets. After preliminary testing, both techniques, HPLC and GC, could be performed with specific sample preparation. Tests were done on reference samples of Agfa New coccine, RedETZ (Crocein Scarlet), and Dammar resin. The analysis was carried out at the CBQF (Centro de Biotecnologia e Química Fina) Analytical Chemistry Platform of the Faculty of Biotechnology at the Universidade Católica Portuguesa, Porto.

The HPLC was not affected by the presence of KBr because it would elute before the sample. And sample preparation was done by simple dilution of the KBr pellet in ultrapure water and filter using Filter-Bio PTFE Syringe Filters of 13mm adapted to the minimal amount of liquid used. The HPLC-UV/Vis analysis was conducted using a column Eclipse XDB-C18; 5 um; 4,6 x 150 mm (Agilente - Flow), and variable gradient of A:B solutions. The A solution was Sodium acetate 0,02M, pH=7 + Acetonitrile 5% (1:1); and solution B was Acetonitrile. Each run used 20µL of the diluted sample. First tests confirmed that KBr would not mask the sample. Observing the UV/Vis spectra suggested that an even easier way to differentiate both colorants was to analyze the same solution (Water and KBr sample) in UV/Vis spectroscopy. Figure 3.18 shows the UV/Vis spectra for New coccine and Crocein scarlet, as identified by Souto (2010).[206]

[206] Available at CAMEO, Conservation & Art Materials Encyclopedia Online:
New coccine http://cameo.mfa.org/wiki/CI_16255,New_Coccine,_Acid_Red_18,_LC;

The absorptions identified in these spectra are quite close to differentiate with complete certainty. However, the lower absorption bands can be used, and Table 3.7 summarizes the results with these values shaded. See also appendix E.

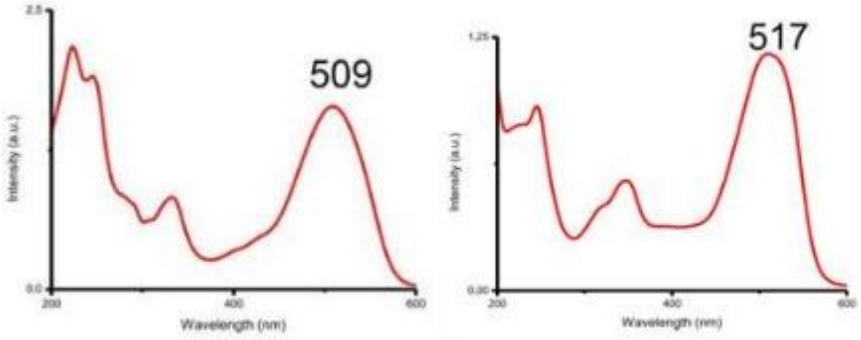


Figure 3.18 – UV/Vis spectra: a. New coccine (CI 16255,New Coccine, Acid Red 18); b. Crocein scarlet (CI 27290, Brilliant crocein, Acid Red 73) (Souto, 2010, p. 34/36)

Table 3.7 – UV-Vis, absorption results for samples: KBr, Agfa, Agfa from KBr pellet; RedETZ, RedETZ from KBr pellet.

Sample	*UC/Vis Absorption (nm)*						
KBr		223					
Agfa	216		244	326		506	
Agfa + KBr		221		323		508	
RedETZ			247	324	348		510
RedETZ + KBr		220	247	324	348		509

The resins Dammar and Mastic produce identical FT-IR spectra, and a complementary analysis is needed to differentiate both resins (Feller, 1954). GC-MS is one of such techniques that has been used for the analysis of resins in cultural heritage (Rogge, 2013; Lattuati-Derieux, Echard, Thao-Heu, & Lavédrine, 2021; van der Doelen, van den Berg, & Boon, 1998; Marinach, Papillon, & Pepe, 2004).

For the GC-MS it was also verified the possibility of analysis of KBr pellets. However, this technique would require some time to perfect and analyze that could not be accommodated in this research timeframe, aggravated by the world's health situation in 2020.[207]

The sample preparation methodology was adapted from Araújo et al., using a two-step derivatization method (2018). The most important aspect of this methodology is that the sample is solubilized

Crocein scarlett http://cameo.mfa.org/wiki/CI_27290,_Brilliant_crocein,_Acid_Red_73,_LC [Retrieved February 2021]

[207] Adding to the time needed for sample analysis was the complexity of sample preparation, which ultimately made it inviable to do, as it would require more time than that available. Sample preparation was carried out partially at the Laboratory of Toxicology, Faculty of Pharmacy of the University of Porto. After preparation, the sample needed to be analyzed before 48 hours, which complicated the process.

entirely. Because trichloroethane was used for sample collection, a solvent was chosen among those available at the laboratory, with similar properties: the dichloromethane (CH_2Cl_2).

Although the analysis using these techniques was not completed, they verified the possibility of analyzing samples previously prepared in KBr pellets. All the samples were kept in glass vials, and they can be used again in the near future.

Conclusions

Initial concerns were to retrieve a sample that was not contaminated with the emulsion. However, it was not foreseen the impact of dirt and residues from handling the negatives. The followed FT-IR methodology proved to be sensitive enough that some spectra could not be determined with certainty because of contaminants.

Although the FT-IR technique did not allow for a detailed composition of the varnish, mainly because some components would have evaporated completely after little time of application, it allowed for the identification of the main component. For the Foto-Carvalho samples, it was established that a dammar-based varnish was used. In the Alvão collection, while some samples also support a resin varnish, most probably dammar, others left open the hypothesis of a mixture. More samples would be needed to verify this.

Mastic and dammar have similar spectra, and FT-IR cannot distinguish them. The hypothesis that the varnish is indeed dammar is supported by historical information. Mastic was well known since antiquity, while dammar was only introduced in the nineteenth century. By the twentieth century, however, dammar was the most common commercial varnish and the main component of mattolein varnish recommended in retouching manuals. Although mastic varnish is still sold until this day, it was always more expensive, and commercial photographers would most probably prefer the less expensive dammar.

As a methodology for historical samples, it needs to be improved. The main problem is the size of the sample. ATR was only viable for liquid samples or when there was enough sample to cover the entire diamond cell that, despite its small size, was still too big for the historical samples. The analysis was done on 13mm size pellets, but there are anvils for smaller pellets that might improve results as sample/KBr proportion also increases.

The use of trichloroethane is a concern, the petroleum ether did not give promising results, and other solvents need to be considered. Suitable alternatives should be researched further as this methodology

could present a solution for collections with restricted access.

Compiling a spectra database from unaged samples proved not to be an issue. Although some variation may occur between recent and aged samples, the latter's spectra have similarities enough to be positively identified.

The few commercial materials sample do not exhaust all possibilities of diversity, and further research should be done to compile a complete list.

For the lack of previous reference research, this is considered initial or exploratory, that is, still establishing suitable methodologies. So, concerning solvents, it was not an objective to test different possibilities but to identify the solvent with the most efficacy. Further research should be done to find a less toxic alternative and improve other less successful aspects of the suggested methodology.

Finally, these materials need further study to understand better interaction with the photographic emulsion and material degradation processes.

4. Retouchings in historical collections

The work should be understood as a result of a techné,
of a doing, and not so much as an expression of a message.
(Schaeffer, 1996, p. 10)

Studying negative collections

The historical review showed that in photography, regarded as art or not, authors give a preponderant role to the image over the object, especially in the twentieth century.

In general, early texts are usually more technical, and materiality is part of exploring photography possibilities, the documentation of photography's strive for innovation, and assertion strategies in the art world. The twentieth century is all about the uses of photography, photojournalism, social photography, and art. Promoted by the dissemination tools, such as journals and magazines, and nowadays even more with the internet. Only the image is reproduced in the many platforms, and materiality becomes secondary.

Symptomatic of this is the many exhibitions that presented images by reproducing copies and enlargements, likewise from original prints or negatives, and presented them with equal value as an original product from its author – as was the case of Steichen's exhibition *The Family of Man*,[208] in 1955. In Portugal, more recently, two similar cases were the exhibitions about Portuguese photographer Aurélio da Paz dos Reis, *Manual do Cidadão*,[209] in 1998, and on the works by Portuguese photographer Carlos Relvas, *Um Homem tem Duas Sombras*,[210] in 2014. The two exhibitions were reviewed by Portuguese critic Alexandre Pomar on that exact point, referring to lack of value for the

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[208] *The Family of Man, was a*n itinerant exhibition, first shown in 1955 at MoMA. See also chapter 1 – *The candid-camera and the photographer's eye*. It is presently on permanent exhibition at Clervaux Castle, Luxembourg. As a testimony to the contemporary shift of object value, the original reproductions are now considered historical objects. If needed, these reproductions are restored rather than replaced with new ones.

[209] Exhibition *Manual do Cidadão Aurélio da Paz dos Reis: Fotografias e filmes de Aurélio da Paz dos Reis* [Citizen's Manual: photographs and films by Aurélio da Paz dos Reis], held from December 1998 to February 1999 at the CPF, Porto, curated by Maria do Carmo Serén, CPF.

[210] Exhibition *Um Homem tem Duas Sombras: Paisagens, (auto)retratos, objectos e animais* [The man has two shadows: Landscapes, (self)portraits, objects and animals], held from 26, April to 8, June 2014, at the Centro Internacional das Artes José de Guimarães, a joint organization CIAJG and Casa-Estúdio Carlos Relvas, Guimarães, Portugal.

original print that was, after all, the photographer's objective. With consequent re-interpretation of the photographers' aesthetics, especially when presented as artworks, in what Pomar calls "curatorial deceit."[211]

Negative collections are the majority in many Portuguese historical archives. The preservation of these objects is also dependent on public awareness.

The new century detected a rediscovery and increased interest in materiality, particularly by conservators.[212] Also readdressed in generic historical texts as reviewed, for example, Tom Ang's history *Photography* (2014), or Jacob Bañuelos Capistrán's *Fotomontage* [Photomontage] (2008).

Alternatively, in the more recent exhibitions, that recover the aura of the "original" or, as frequently refer to, "vintage" prints, and present original photographs from different collections, like *Eyes wide open! 100 years of Leica photography* (2014)[213] or *The Impressionists and Photography* (2019).[214]

A curious attempt to educate and value the negative as part of the photographic process was the exhibition *Celebrating the Negative*,[215] with photography by John Loengard in 2010. It presented [positive] prints of images showing someone's hands holding original negatives.

Presenting negatives as original objects, by themselves, either with the aid of light tables where the image can be observed in its negative form or beside an original print or positive reproduction, also contributes to their preservation. The exception of negatives shown as objects is the historical exhibitions, where the focus is given to the evolution of the photographic processes. However, it is not usually done when presenting one specific photographer's work, even if the collection comprises solely of negatives.

Portuguese photo-historiographer António Sena, while recognizing the immense value of negative collections, also complains about the exhibition of new prints made from negatives and enlargements instead of the original prints. He regrets the lack of research and improper identification of the objects presented, which in the end are not representative of the photographer or his body of work (Sena A. ,

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[211] Alexandre Pomar: *Relvas em negativo* https://alexandrepomar.typepad.com/alexandre_pomar/2014/11/relvas-em-negativo.html; *Antes e depois do CPF: 1982 - 1996 – 2001* https://alexandrepomar.typepad.com/alexandre_pomar/2011/06/antes-do-cpf.html [Retrieved February 2021]

[212] See review in the *Introduction.*

[213] An itinerant exhibition, first shown in 1914 at Deichtorhallen Hamburg, curated by Hans-Michael Koetzle, also presented in Frankfurt am Main, Berlin, Vienna, Munich, Ghent, Porto, Madrid, and Rome.

[214] An exhibition, held from Oct. 15th, 2019 to Jan. 26th, 2020, at the Thyssen-Bornemisza Museum in Madrid, curated by Paloma Alarcó.

[215] An exhibition, held from Jul. 3rd, 2010 to Dec. 12th, 2010, at the Fox Talbot Museum, Lacock Wilshire, UK, curated by Roger Watson.

1998, pp. 355-369). Bellow, are presented several examples from the APR collections where the same negative could produce different compositions.

During this research, a modest effort to show the negative object as part of the photographer's process, and not just an image, was made with the exhibition *Memória Recapturada.*[216] It presented the archive of Foto-Carvalho, one of the selected collections. The objective was to re-call the photographic studio experience. The exhibition showed new enlargements, original prints, objects from the studio, including a turn of the century backdrop (Figure 4.38) and a studio camera. It had some information on retouching, of course, and in two showcases, presented a negative on a retouching desk, fitted with artificial light, and several negatives on a drying rack and other photographic objects and books (Figure 4.1).



Figure 4.1 – Showcases at the *Memória Recapturada* Exhibition: a. retouching desk – modern replica – showing an original dry plate negative with transmitted light; b. drying rack with several dry plate negatives to the left, and other material.

For ensuring the preservation of negative collections, more needs to be done. To learn more about retouching and photography's materiality, it is not enough to read the manuals, search historical records, look at the digital images, or even identify some retouchings in a few negatives. The researcher needs to observe, in hand, the photographic object, an entire collection, or at least a representative sample. It is not just to identify typologies of retouchings but also to search connections with social practices and relevance to visual culture and history that, finally, justifies its preservation. Researchers that study photography and conservators in general know, as José Orraca says:

> To understand all aspects of the work of art you need to do more than read, you need to see. Studying one albumen print, or even ten, does not tell you everything you need to know. […] At every

[216] Exhibition *Memória Recapturada*: O retrato de estúdio na Foto-Carvalho 1936-2001 [Memory recaptured: the studio portrait at Foto-Carvalho], held from 30, September to 2, December 2018, at the Palácio dos Marqueses de Praia e Monforte, curated by this author in a collaboration with Estúdios Correia, in Estremoz, Portugal.

> opportunity my intention was, and still is, to observe and to discern by the simple act of seeing. When studying a photograph you need to keep in mind what are the succinct qualities that deserve close examination: process, tonality, surface character, presentation and the relationship of one photograph to the magnitude of a photographer's work or to the breadth of the accomplishments of a period of history. All of these qualities will give you important clues as you decide on what treatment, if any, the object requires. The sum total of what I have said adds up to that body of information that is absolutely necessary for you as a conservator to have before you intervene in a photograph, or for that matter in any other artistic or historic work – **connoisseurship**. (Orraca, 2010, pp. 588-589)

For this research, different dry plate negative collections from Portuguese archives of the first half of the twentieth century were selected. The methodology is object-centered by observing dry plate negatives from selected relevant collections following what was done in previous research.[217] At the same time, retouching typologies are identified, and information on conservation conditions is also gathered. Appendix D shows an example of the table used for recording the findings. The object and image are observed for other clues about the studio work. The collection is also considered as a whole, searching for what connects and examples to distinguish them, searching for repetitions, exceptions, intentions, uses, and effects. Collections are also characterized in their context. The findings are correlated with the historical sources, specifically the manuals reviewed in the previous chapter. Not just for the technical practice of retouching but also what might contextualize culturally and historically issues, the experience of a studio portrait, the relation between photographer and the sitter, the work inside the studio, and perceptions by the society.

The criteria for the collection's selection were already explained, which included availability and a focus on portrait studios. Portrait photography was selected as it was found to be the one type more frequently retouched, either inspired by truth, as seen described by authors like Hermann Vogel and others,[218] motivated by social constructs, or vanity, of the client or the photographer. Other criteria relate to the specific characteristics of each selected collection. Table 4.1 summarizes the information on each selected collection.

The first one included was the *Fotografia Alvão*, the archive of a renowned photography studio of Porto's city in the twentieth century. The Fond of Fotografia Alvão is housed at the CPF in Porto. Aside from being a prolific studio, it is also known for its commission work. Notedly, a photography study on the Port Wine was ordered by the *Instituto do Vinho do Porto* [The Port Wine Institute, today

[217] Study of the collection at AMLSB.

[218] See chapter 2.

renamed as The Port and Douro Wines Institute], in 1933. In 1934, the *Fotografia Alvão* was officially tasked to record the First Colonial National Exhibition held at the Crystal Palace in the City of Porto.

A second collection is the archive of a small-town studio archive, nonetheless, a prolific one and with significant impact in its community, the *Foto-Carvalho*, working from 1936 until 2001, in the town of Estremoz, Portugal. The archive is now privately owned. The primary characteristics for its selection were the use of dry plates later in the century, until after the 1950s. And because it was the primary, and at times, the only working studio in a smaller community.

It was also included a collection that reunites negatives from several unidentified sources, the *Coleção de Negativos e Provas* (NEG) [Negatives and Prints Collection] from the Arquivo Fotográfico da Câmara Municipal de Lisboa (AMLSB) [Photography Municipal Archive of the City of Lisbon]. This collection was already considered in previous research.[219] At the time, some prints were made from the original negatives that are now useful for interpretation of uses, intentions effects, and preservation of the retouched negatives. Since then, new information was gathered that allowed the identification of authorship of some of the images. Also, the collection was made available online via digitization, and some data is also useful for comparison, complementing the previous study.

A third studio was added that operated in Lisbon, the *Foto-Estefânia*. The surviving archive is now privately owned, donated by its last photographer, and includes few materials and retouching equipment that does not usually survive in other collections.

Finally, two other collections were included, one from the Natural History and Science Museum of the University of Porto, which adds the dimension of retouching scientific photography used as a teaching aid and research. And a second by the amateur photographer Aurélio da Paz dos Reis, working from the city of Porto, it is a collection of Celebrities' Portraits, in stereoscopic format, also housed at CPF.

Table 4.1 – Summary of the selected collections.

FOTOGRAFIA ALVÃO

Owner:	Centro Português de Fotografia (CPF) [Portuguese Center for Photography]
Type of institution:	National public archive
Place:	Porto, Portugal
Type:	Fond
Selection:	1837 dry plate negatives, mostly 13x18 cm, 88% studio portrait.

[219] Research, mentioned before, started in 2009 and published the following year (Pereira C. , ECR, 2010).

Production dates:	1902 – 191?, and 1920s (selected negatives)
Selection criteria:	Important National studio with heterogeneous work mostly portraits and commissioned exterior work. The leading photographers of this studio were also recognized as art photographers. Main intervention area: Porto, but with national influence. Still preserved most of the continuous studio production. Most negatives had not yet received conservation treatment. There are records for those negatives that did receive conservation treatment. These treatments were performed about 20 years ago and served as a comparison with current practice.

Foto-Carvalho

Owner:	Estúdios Correia
Type of institution:	Private owner. It is also an active photography studio, which uses the collection commercially.
Place:	Estremoz, Portugal
Type:	Collection
Selection:	Sample of dry plate negatives with various sizes. Studio portraits c.4000 objects.
Production dates:	192?-1940s
Selection criteria:	Important regional studio. Negatives still in their original archive drawers and not yet subject to any conservation measures. Being implemented in a small town, it was possible to locate original prints and compare retouching techniques with final effects, even if not possible to show many examples in this text, due to image rights, It has a continuous production which allows the study of several examples within a time frame.

Foto-Estefânia

Owner:	Lupa - Luís Pavão Lda.
Type of institution:	Private owner. It is also a company dedicated to the preservation and dissemination of photography cultural heritage.
Place:	Lisbon, Portugal
Type:	Collection
Selection:	71 dry plate negatives 18x24 cm format (complete collection)
Production dates:	The 1930s and 1940s
Selection criteria:	A complementary small example to the other studio collections for the region of Lisbon. The collection also includes some retouching equipment and materials that are absent in most other known collections from this period. The last studio owner shared with the current collection owner some of the specificities of retouching. This information was shared by the current owner for the benefit of this research.

Colecção de Negativos e Provas (NEG)

Owner:	Arquivo Fotográfico da Câmara Municipal de Lisboa (AFCML) [Lisbon's Municipal

	Photography Archive]
Type of institution:	Regional public archive
Place:	Lisbon, Portugal
Type:	Collection
Selection:	4445 negatives, all the negatives in the collection.
Production dates:	1890-193?
Selection criteria:	The collection was already the subject of previous research by the author (Pereira, 2010) and now complements the current research. Since then, the collection was subject to more conservation treatments, including digitization. The previous observations are now complemented with new knowledge gathered through time. It also shines a light on relevant issues about established conservation practices, digitization, and how negative collections are being disseminated to the public.

Celebrities' Portraits – Aurélio da Paz do Reis (APR)

Owner:	Centro Português de Fotografia (CPF) [Portuguese Center for Photography].
Type of institution:	National public archive
Place:	Porto, Portugal
Type:	Collection (within the APR fond)
Selection:	130 stereoscopic negatives (retrieved after preliminary research using the term "retoque" [retouching] on the online database); later, a few others were added that presented retouchings, to a number of 164, out of 221 portraits, from a total of 342 observed negatives.
Production dates:	ca. 1900-1910
Selection criteria:	to differentiate the technical and aesthetical retouchings as a type of control group. Self-proclaimed amateur photographer who did not work on commission but published his photographs commercially. Studio-type portraits done without a studio. Selected for the observation of retouching techniques and uses by a photographer unbound by client's demands. Portraits of public figures who are not subject to legal limitations and can therefore be shown in a positive form.

Anthropology and Zoology collections (MHNC-UP)

Owner:	Museu de História Natural e da Ciência da Universidade do Porto (MHNC-UP) [Natural History and Science Museum of the University of Porto]
Type of institution:	Public Science Museum
Place:	Porto, Portugal
Type:	Collections
Selection:	221 dry plate negatives selected from the photography collections of the Anthropology and Zoology departments.
Production dates:	[1890s - 1930s] estimated

Selection criteria: Compilation of negatives produced for scientific purposes. This collection was selected for potentially offering a counterpoint to more aesthetic retouchings and further pursue the subject of truth and retouching in photography.

The search for intentions and understanding of uses, then, and value, today, needed the support of more than technical manuals and generalist history books. It required a cultural context that will also be addressed in this chapter, and that, ultimately, sets the order by which the collections are presented here.

Visual culture discourses

The need for a visual culture approach

By its nature a photo belongs to the world of visual fact.
(Avedon & Rosenberg, 1976)[220]

As seen, photography has a plural history, and the conclusion is that it cannot be told following the art history books alone. History does not explain all, including that of what is known on retouching. In the history of photography, science, technology, practice, and uses have importance to understand its birth and evolution, but for the interpretation of the images, how they affect one's lives is not enough. Likewise, the many uses of retouching cannot be listed with the descriptions of the techniques alone. These explain how it affects an image, but its uses are bound by intentionality that then escapes the realm of the practice to that of perception, culture, and social significance. One does not exist for the other, but they are bound and influence each other.

The multiple significance of the visual outside a *techne* is not limited to retouching but photography in general. As photography entered society, a shift occurred in the way people express themselves and communicate. Not just because it captured reality in detail, it was also the experience of seeing. Daguerre had the big dioramas but would be the handheld images that would forever change the cultural experience. Photography changed how people experienced reality and the world, as noted early by many, including Schriever:

> Back in the 70's of the [19th century] – not so many years ago, after all – photography was in its infancy and but little practiced by the general public. Photography as applied today to the arts and sciences was unheard of. Now (…) it is an Art; it is a part of every science. It has revolutionized the art of printing. The magazine and book illustrations, (…), are all the result of photographic process as

[220] Essay by Harold Rosenberg included in the catalog *Portraits*, by Richard Avedon (1976) [unpaginated].

> applied to printing. Its products are the only universal language, understood by all the people of the earth. (Schriever 1909: vol. I 7-9)

An image was no longer to be admired, to be looked at, but also to be used. It established general rules for a new way of communication deemed to be the most complex. It refers to the importance of visuality and the need to be included in a cultural framework. To understand it better, it was necessary to go into detail into its uses and mutability. And as one characterizes a culture as part of an identity, for its language among other aspects, now it would exist a visual language, a visual mode of analysis, a *Visual Culture* that could explain society through its images. Unknown and unrecognized, retouching has been a part of such visual culture.

But even if it is a universal language, being part of a culture also means that it does not represent a universal culture. Each aspect in visual culture is bound by the time within it is considered, but also geographically. And it is unescapably included, although not hermetically sealed, in the larger group of the Western culture, in some respects, and other observations are necessarily limited to a Portuguese context and as viewed from inside.

To consider a visual culture approach to photography is not recent, and it is a well-established field of study. Many books on photography, including history books, have, for some time now, included in their titles the words *Seeing*, *Cultural* and *Visual,* or other variations to indicate just that.

The term Visual Culture is also used to designate areas of study. They connect to media, social or gender studies, and all that is studied and explained through images. It would not be possible to review all areas of visual culture studies where retouching would have significance and presence. Still, some will be explored, as they were evident in the findings of this research. And hopefully, it will open new avenues of study connecting retouching to the visual culture of any time and society.

The conservator's need to search for intentions

Jean-Marie Schaeffer states that intentionality is secondary (1996).[221] It is not true for the conservator, as preserving intentions can be as important as preserving the object itself. However, this is not stated as a disagreement. In the end, the general idea is the same for both. Schaeffer argues that photography is not merely a message, but the result of a *techné*,[222] of multiple choices and circumstances that

[221] First published in 1987: Schaeffer, J.-M. *L'image précaire: du dispostif photographique.* Paris: Éditions du Seuil.
[222] See the quote at the beginning of the chapter.

culminated in its production and its status as a print (1996, p. 14).

In today's digital reality, talking about a print is becoming obsolete. Still, Shaeffer's remarks still stand if one considers the print the photographer's objective, the final intended version of the image. Before digital, it was easier to identify because it existed as an object that physically represented the image. But now, the photographer's image can exist in digital form. The objects produced by the photographer can be digitized and stripped of their materiality. Finally, objects that were never the "print," the objective of the photographer, now appear in digital form as if they were,[223] with consequent loss of accurate representation of the photographer's body of work. Such is the case of negative collections that are presented on-line, frequently, as digitally converted positives. The negatives are matrices, a completely different object to the print, and not just substitute support for an alternate version of the photographer's intended final image. It will be argued that these images are being stripped not only of their materiality but of their original intentions. They are not or ever were prints, the final objective of the photographer. And it has an impact on future interpretation and distortions in the understanding of its value and significance in visual culture.

With its "pragmatic flexibility," photography can be a lie and truth and interpreted and meaningful just by choosing how it is communicated (Schaeffer, 1996, p. 10). And the negative gains also with this new exposure in positive form. But the conservator's job is to preserve the object without adulteration, and those interpretations and uses fall outside his purview.

It is recognized that an amount of interpretation is unavoidable as each conservator works within his knowledge and experience. Ideally, this means preserving the object, its image, and its original intention as a negative, assuring that any interpretation is possible without a previous filter.

Schaeffer says:

> My methodological approach has a corollary: any aspect of materiality that is not taken into account by the pragmatic construction of the image is devoid of descriptive relevance at the level in which I stand.[224]

By that corollary, materiality, and its significance as part of the photographer's process, it is relevant. And a pragmatic part of the construction of the image is the retouching.

From a conservator's point of view, retouching exists. It is part of the object. For the preservation of

[223] In a later chapter, the subject of digitized collections is considered further as it pertains directly to collections' conservation.
[224] Author's translation. Although the book referenced is a Portuguese translation. The quote was translated from the original French – viewed online in limited access - to minimize a double translation loss.

the negative, any retouching needs to be preserved as well. The conservator does not argue its legitimacy within the photographer's choices but searches for its reasons. For that, it needs to be understood and valued.

It is recognized that statements such as these are presented to fit a personal view or agenda. Terry Barrett, in his text, *Criticizing Photographs: An introduction to understanding images,* describes that art theory has different approaches: by critics, by photographers, by historians, and by curators (2000). Here it is, of course, a view on photography by a conservator. And the agenda is to advocate for the materiality of photographic collections, particularly those composed of negatives, as cultural objects and not just a medium for images. It is in visual culture that the conservator finds some of his answers. The conservators start from an object-centered approach that this research will try to reconcile with the image-centered visual culture approach.

Would Barrett consider adding "Theories and conservators" to his list?

Retouching truth and science – Natural History and Science Museum of Porto University[225]

"The sensitive photographic film is the true retina of the scientist,"
declared the astronomer, P.J.C. Janssen in 1888."
(Hannavy 2007, p. 1255)

Before art, there was science

Knowledge about photography was first shared through scientific publications and among those in science academies. Scientists were the first to recognize every potential in photography. At the same time, new areas of science were also being explored. The History of Portuguese photography in science is well described in the works of different authors (Nunes, 2005) (Peres I. M., 2013, pp. 265-272) (Costa & Jardim, 2014).

In the last quarter of the nineteenth century, photography was limited to a privileged class of lovers of novelties and technical progress. But, as Nunes noticed, photography was not just a matter of an

[225] Information on the collection and the findings on retouchings practices was already presented as a poster at the *I Colóquio de Investigações em conservação do Património* [First colloquium on heritage conservation research] held at Fine-arts Faculty of the University of Lisbon, Sep. 29-30, 2016. It was published as Cortes Pereira, C. L., Barata, C., Gaspar, R., & Castro, L. (2017). Retouching Scientific Photography – The Glass Plate Negatives Collection at the Natural History and Science Museum – University of Porto. *Ge-Conservacion*, 12, 101-110. https://doi.org/10.37558/gec.v12i0.540

individual; several National Scientific societies and institutions started implementing their own photography departments (2005, pp. 7-8). Like it was happening internationally, as a testimony to the importance given to the practice of photography in science.

With the advances introduced by the dry plate process, it was witnessed a significant development in the uses and dissemination of science through photography into the twentieth century. A historical recognition by the Portuguese scientific society was presented in 1940. It was a compilation of communications organized by Augusto da Silva Carvalho (1861-1957), a medical doctor, professor of Medicine, and distinguished elected member of the Lisbon Academy of Science. These communications were published with the title *Celebration of Photography Centennial,* a special issue in the *Memoires of the Science Class of the Lisbon Academy of Science* (Carvalho, 1940).[226] The invited participants, among them António Augusto Mendes Correia (1888-1960), anthropologist and medicine doctor, were an elite of Portuguese scientists. The communication that Mendes Correia submitted was read by Carvalho and mentioned different works by others as examples of photography in anthropological studies (Correia, 1940).

Peres, in her work, *Fotografia científica em Portugal, das origens ao séc. XX* [Scientific photography in Portugal, from its origins to the twentieth century], does not deal with anthropology in particular but includes a chapter on the relation of Photography with the practice of teaching and scientific research (2013, pp. 519-627). It is important to realize that photography was being used for research documentation and was simultaneously and continuously used as a teaching tool and means for the illustration of scientific publications.

Born in times of Positivism, photography was its most perfect tool as it was believed to be the only *true* and objective form for recording the *real* without the influence of the observer, as a mechanical process, as unadulterated mechanical truth.

Talbot, Daguerre, and others recognized its potential for science. Still, the landmark for the birth of scientific photography, celebrated by Augusto da Silva Carvalho, can be set in France with the work by Alfred Donné presented at the Academy of Sciences in 1840. Along with Léon Foucault, Alfred Donné would publish an atlas where photography would document the world as never before, in his words:

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[226] Author's translation. Carvalho, A. S. (1940). Comemoração do centenário da fotografia: subsídios para a história da introdução da fotografia em Portugal – separata da memórias, classe de ciências [Commemoration of photography's centennial: subsidies for the history of the introduction of photography in Portugal – offprint of the Memoirs of the science class *of the Lisbon Academy of Science*]. Lisboa: Academia das Ciências de Lisboa.

> [with photography] so to speak the object itself will be placed before the eyes and in the hands of the audience. (Foucault as referred by Hannavy 2007, pp. 1255-1256)

And Matos adds:

> Photography was not just a means to make a record of something, but also of inventing it. (…). The value of photography of this time, as a document, was socially constructed, since the image was not taken as a representation but as the reality itself.[227] (Matos, 2014, p. 62)

This acknowledgment of photography more than documenting, substituting the object was an idea that came with the wonder of the invention. Soon it was realized that that was more than one way to photograph one object, and how could all of them be the truth? And as experience taught the shortcomings in photography, retouching also enters the scientific practice.

One of the selected collections was included to explore retouching in scientific photography, the collection of dry plate negatives from the Natural History and Science Museum of University of Porto (MHNC-UP), from the former Dr. Mendes Correia Anthropology Institute, and the zoology archive by Augusto Nobre (1865-1946), zoologist, and 3rd Dean of the University of Porto (1919-1926). It is an important collection that accompanies the evolution of the institution from the 1890s to the 1970s.

New Natural History and Science Museum - University of Porto

The Natural History and Science Museum of the University of Porto (MHNC-UP) was created in 2015 and resulted from the merger of the former Natural History Museum and Science Museum of the University of Porto. These inherited the archives from different departments and laboratories created and extinguished in a long history that would lead to the present Faculty of Sciences of the University of Porto.

The first period represented in the archive documentation refers to the Polytechnic Academy activities, just before the University of Porto was created in 1911. In 1887, a group of former and very active students of the Academy founded the Carlos Ribeiro Society, responsible for the scientific periodical *Revista de Ciências Naturais e Sociais* [Magazine of Natural and Social Sciences]. Noteworthy among these are Ricardo Severo da Fonseca e Costa (1869-1940) and Artur Augusto Fonseca Cardoso (1865-1912), key promoters and contributors of the archaeological and anthropological studies at the end of the nineteenth century and the first decade of the twentieth century. The society reached its end in

[227] Author's translation.

1898, and so the magazine (Silva A. S., 1997). The same group continues the work, and in 1899, without a formal association, they began another publication, the *Portugália, Materiais para o estudo do Povo Português* [Portugália, Materials for the study of the Portuguese People] that achieved a significant role in scientific dissemination nationally (Matos, 2012).

In 1911, the University of Porto and its Faculty of Sciences were created and in the following year opens the Anthropology Laboratory and Museum by the hand of António Mendes Correia. He will be the Anthropology class regent and responsible for the Anthropology and Ethnography Portuguese Society and its periodical the *Revista da Sociedade Portuguesa de Trabalhos de Antropologia e Etnografia* [Magazine of the Portuguese society for works in Anthropology and Ethnography], founded in 1918. Following his predecessor's work, Mendes Correia was essential in the anthropology studies' growth at the University of Porto and was responsible for the subsequent Anthropology School of Porto. In 1923 the Anthropology Laboratory became the Anthropology Institute with the recognized status of a Scientific Research Institution.

The museum and Institute were prolific in disseminating its research either in scientific media or to the public; also, they developed their research closely with the Faculty of Science's teaching activities. This is testified by the collections and archives now reunited in the MHNC-UP.

Other departments also maintain small museums, and chief investigators held their own archives. It is highlighted the Augusto Nobre's office, which would be the starting point for the Zoology museum, and now is integrated into the MHNC-UP.

Photography and Anthropology

Of the relationship between photography and Anthropology, there are good references by Patricia Matos relating to Mendes Correia and the Anthropology Institute of the University of Porto of his time (Matos, 2012) (Matos, 2014). Anthropology, she explains, since its beginnings, resorted to measurements and observation of *types* that would give keys to the characterization of physiognomy; and photography was soon used as a method to make a record of such characteristics. The practice of turning the "living in the still and the subject into an object" accomplished employing photography was fundamental in defining anthropology as a science. Photography allowed:

> Objectiveness and so establishing Anthropology comparative methods (…) and the establishment of methods reinforce and validate Anthropology's status as a Science.[228] (Matos, 2014, p. 45)

[228] Author's translation.

In her thesis, Patricia Matos refers to Mendes Correia's works and emphasizes his recognition of the importance of photography as a recording tool in the research process and for printing the research results. Photography was used in the class of Anthropology taught by Mendes Correia. In the class program, dated from 1915, emphasizing how photography was included and was an essential teaching tool, a to-do list describes:

> (…) 2. a living anthropologic observation (descriptive characters, anthropometry, photography profile and frontal view, conclusions); (…) 7. study of a skull (description craniometry, photography, conclusions).[229] (Matos, 2012, p. 99)

The records studied by Matos also revealed that when presenting a project for funding, Mendes Correia would always include a request to buy photographic equipment and a person just for the photographic record (2014, pp. 48-49). She also mentions that often it was the Professor's brother, Humberto Mendes Correia, an engineer, who would be the photographer in the projects and in charge of collecting and processing the images. However, it is not clear if there was a photographic laboratory in the department or if it was always a contracted service.

The MHNC-UP photography collection

The MHNC-UP holds a vast collection of specimens rather, a compilation of collections from several scientific areas of the Faculty of Science of the University of Porto. The most relevant for this study were Archaeology, Zoology, Ethnography, and Physical Anthropology. These collections are supported by a rich archive of textual, graphic, and photographic documentation produced by the investigators that collaborated over the years.

From the Anthropology archive, a part of the photography collection relates to the Polytechnic Academy period. The most significant portion is linked to both the laboratory and the Institute of Anthropology activity until the 1970s. From this collection, the dry plate negatives were studied and bear witness to how photography was used to register data as part of the scientific activity, illustrate scientific publications or exhibitions, and visual aids in the classrooms.

The MHNC-UP photographic collection is not yet organized and processed. It is dispersed in several boxes of different shapes and sizes and scattered in the museum facilities, with little annotations. Also, there are no complete records of how many objects there are, respective dating, and identification of

[229] Author's translation.

subjects. Negatives, transparencies, and photographic prints are stored together in envelopes, boxes, albums, and, in some cases, with no protective enclosures. Drawings, maps, and other documents are also found because objects in the same envelope often relate to a specific topic or were separated for one publication.



Figure 4.2 – MHNC-UP, stationary found in the MHNC-UP collection, from photographic studios working in Porto the first half of the 20th century: a. stamp on a photographic print from Fotografia Guedes; b. envelope from Alvão & Co.; c. Teófilo Rego stamp on a photographic print; d. stamp from an envelope from Bazar Foto-Amador; e. Order for 25 prints 9x12 format for the "Instituto Antropologia" [Anthropology Institute].

It was noted that at one point, an effort to identify the photographic objects was made but the task was not completed, and the known records are incomplete and little information can be cross-referenced. The possibility to work alongside the collection's curator allowed for the identification of subjects and to make connections with the work of the former Anthropology Institute. It was also possible to do a rough estimate for the production dates set from the 1890s to the 1930s.

After the first overview, the identified retouched dry plate negatives sum up to less than a hundred specimens; they were, therefore, all selected for this study. Other photographic objects were also considered for context, which were those included in the same envelopes and boxes that stored the retouched negatives. It corresponded to little more than 200 objects, including negatives, prints, and lantern slides (positive transparencies). All of these received, during this research, basic preservation treatment and were re-housed in conservation boxes in individual envelopes.

The following purposes for the photography collection were identified:

- Research tool - for record-keeping in the laboratory or fieldwork.

- Classroom resources.[230]

- Illustrations of scientific publications and exhibitions.

- Record of researchers' participation in social and scientific events and exhibitions.

The collection includes commission work and collections acquired from National and foreign scientific institutions and commercial photography studios. It also shows evidence that, at least sometimes, services were requested from professional studios. Particularly for the printing of images designated for publication. Several of the envelopes holding negatives and prints include other documents, like order receipts addressed to the Anthropology Institute. Other envelopes have logos and advertisements from several photography studios of Porto, such as Alvão & Co. (Fotografia Alvão),[231] Bazar Foto-Amador, Fotografia Guedes, or Estúdio Teófilo Rego (Figure 4.2).

Retouching science – some selected examples

Some examples of retouched negatives are presented below to illustrate types of retouching techniques found and their relation to the photographic objects' original purposes.

The first two examples, Figure 4.3 and Figure 4.4, are two portraits of Mendes Correia found among several other images on different topics meant to illustrate an unidentified publication of Mendes Correia's biography, as written on the envelope.

Figure 4.3 shows a negative with tears on the emulsion, probably due to improper handling. These tears were retouched using a red dye on the emulsion side. Its appearance suggests that the dye was applied with a fine brush (Figure 4.3c).

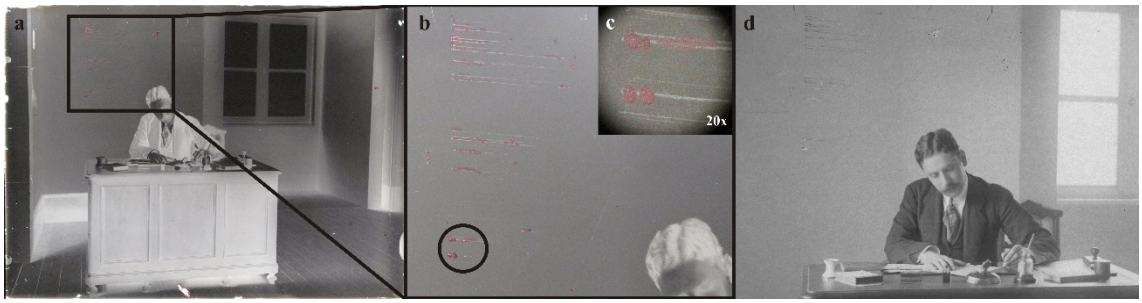


Figure 4.3 – MHNC-UP, portrait of Mendes Correia at his desk: a. negative; b. detail of the highlighted area in a; c. detail of the highlighted area in b observed on a stereomicroscope 20x magnification; d. digitally converted positive. (FCUP-IA-AF-243)

[230] The preliminary survey to the collection revealed hundreds of positive transparencies on glass and film, specifically identified as "classroom resources."

[231] The Fotografia Alvão fond also includes three negatives on film identified as work done for the Anthropology institute. If there were more and were lost, or if it was common practice to surrender the negatives with the prints, it is unknown.

In the second example, Figure 4.4, the negative was retouched with a powdery red material on the glass surface, using the fingers. The creases of the fingertip are visible on the surface, probably it was followed by scrapping off the outline of the arm. It was done to achieve a better contrast between the arm and a shadow in the background. In this example, there are signs of deterioration with large areas of lost material. Pencil retouching is not present in both examples, despite being portraits. It might not have seemed necessary, because they are slightly out of focus.

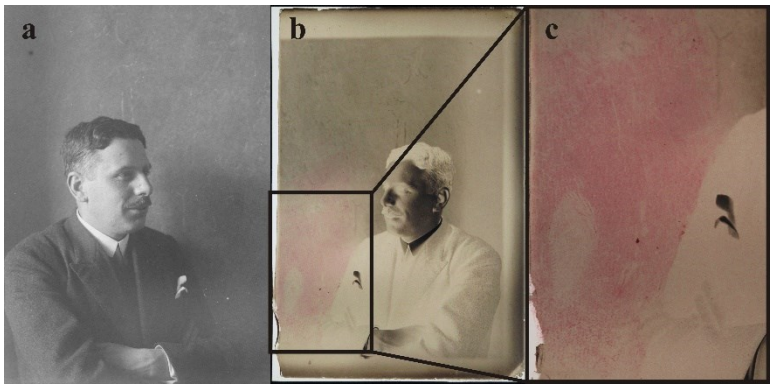


Figure 4.4 – MHNC-UP, portrait of Mendes Correia: a. digitally converted positive; b. negative; c. detail of the highlighted area in b. (FCUP-IA-AF-229)

The institute frequently included photographic records of bones for archive purposes and the illustration of scientific publications. It is believed that this type of record was done during classroom activities or field research by the students and institute researchers that collaborated closely with the Faculty of Science. The example shown in Figure 4.5 represents three skulls from population anthropometric studies. In this case, retouching was done to lighten shades. Even if the negative shows detail in the high-density areas, in the negative, they may not register when printing on high contrast paper or for a publication where there would be a smaller contrast range. The eyes and mouth's cavities were retouched with reddish material to lighten underexposed areas, applied with the fingertips, and the hole in the emulsion, indicated with an arrow, was filled using a liquid red dye applied with a brush.

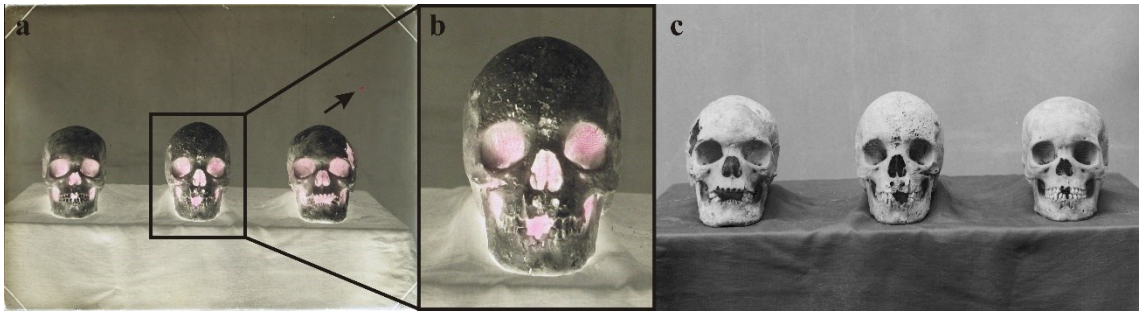


Figure 4.5 – MHNC-UP, Osteology, three skulls, frontal view: a. negative; b. detail of the highlighted area; c. detail, digitally converted positive. (FCUP-IA-AF-98).

Other examples show Images made for the illustration of scientific publications. Similar retouchings are found in Figure 4.6 and Figure 4.7, this time from a group of images cataloging shells. It is a group composed of 38 negatives and is particularly interesting because they have their corresponding vintage prints. And it is known where they were published – two studies by Augusto Nobre, *Moluscos terrestres de Portugal* [Terrestrial mollusks from Portugal] (1930) and *Moluscos marinhos de Portugal* [Marine mollusk from Portugal] (1931-36).

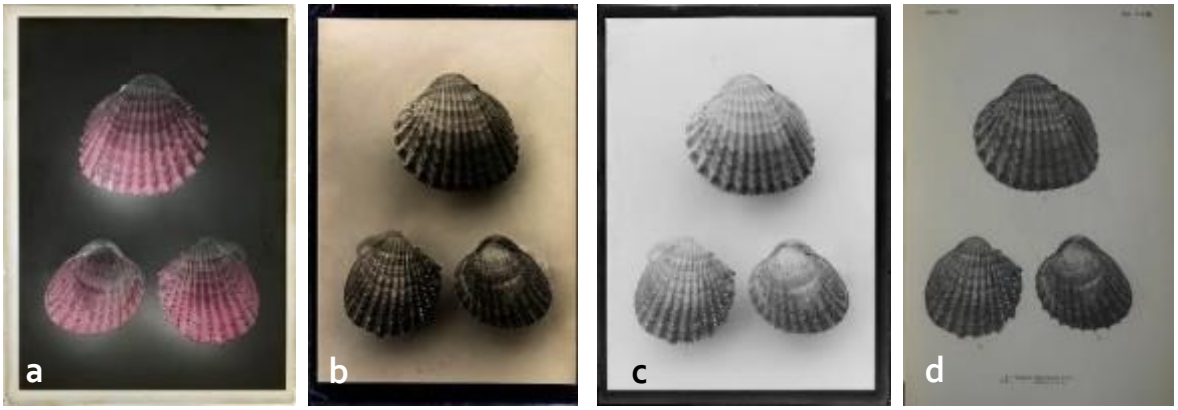


Figure 4.6 – MHNC-UP, Zoology, marine mollusks from the genus *Cardium*: a. original negative with retouching; b. Vintage print; c. Digitally converted positive from original negative; d. Plate LVIII, *Moluscos marinhos de Portugal*, Augusto Nobre, 1932 (FCUP-IZ-AF-29; FCUP-IZ-AF-39)

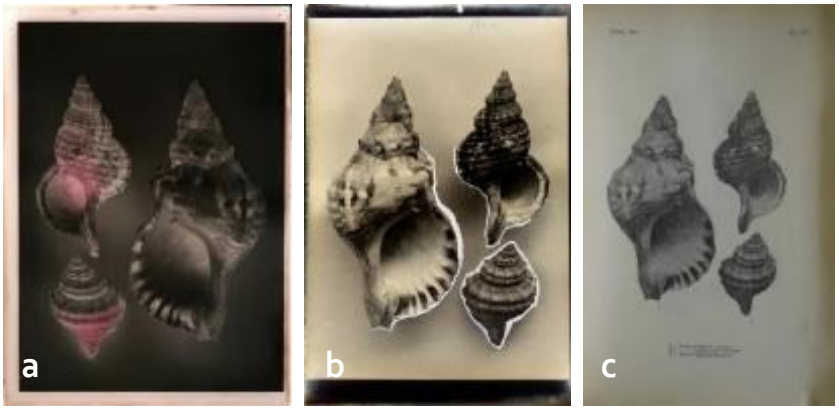


Figure 4.7 – MHNC-UP, Zoology, marine mollusks from the genus *Triton* and *Ranella*: a. negative with retouching; b. Vintage print; c. Plate LVIII, *Moluscos marinhos de Portugal*, Augusto Nobre, 1932 (FCUP-IZ-AF-33; FCUP-IZ-AF-43)

Figure 4.6 shows the difference between a digitized vintage print, corresponding digital positive obtained from the original negative, and the publication page. A similar comparison can be observed in Figure 4.7. This example also shows that the print received retouching with white ink, suggesting that the image in the publication was made from the print and not the negative.

Figure 4.8 and Figure 4.9 are images from a collection of Bronze Age ceramic objects from the Tachoal

Necropolis (Alpiaraça, Portugal). According to written notes in envelopes, these objects were kept in Mendes Correia's office at a time when the Anthropology Museum already existed for its 2nd year. This set was used in an article by Mendes Correia for the journal *O Archeologo Português* in 1916,[232] one of the major Portuguese publications in the field of anthropology of its time. What stands out most about these negatives are the visible etched marks indicating cropping lines, what were the selected images and objects, and the order they should appear, suggestion contrary to the previous example that the publication was made from the negatives. The piece marked with "fig. 2" in Figure 4.8a can be recognized in the inverted image of the top right object of Figure 4.8c. The same negatives also include objects used not as photographs but as drawings done from the photographs (Figure 4.9). In the drawing, the objects lose scale, and the fourth, the larger one in the photograph, appears to be of the same size as the others.

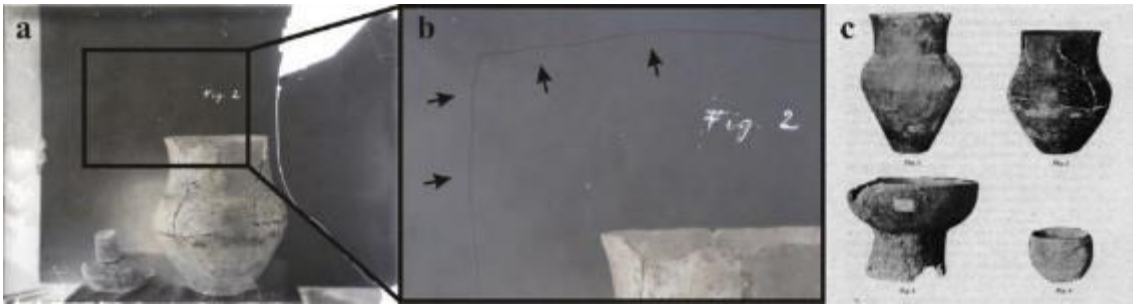


Figure 4.8 – MHNC-UP, Archeology, a. Negative showing Bronze Age ceramic container, Tachoal Necropolis; b. Detail, the area highlighted in a, the arrows point the etchings that identify the piece to reproduce and order of publication (enhanced digitally for contrast); c. Details of the printed page with the corresponding piece, top right (Correia, 1916, p. 332). (FCUP-IA-AF-185)

It is now given a small note about anthropometric studies that correspond to some of the negatives. Physical anthropology and anthropometry were privileged research areas at the Anthropology Institute of the University of Porto in the first decades of the twentieth century. These studies are based on the principles of identification and classification of *types* according to physical features. The idea was that human characteristics, such as the length and width of the ear or nose, or other measures of the skeleton, could be used to identify types, or human groups, such as ones prone to criminal behavior, mental diseases, race, and others. As photography started to be used to catalog criminals, an

[232] Correia, A. A. M. (1916). Sobre alguns objectos protoistóricos e lusitano-romanos especialmente de Alpiarça e Silvã [About some proto-historical and Lusitano-Roman objects]. *O Archeologo Português, 21*, 331–337. http://www.patrimoniocultural.gov.pt/static/data/publicacoes/o_arqueologo_portugues/serie_1/volume_21/331_objectos_protohistoricos.pdf. [Retrieved February 2021]

anthropometric post was established at the civil prison and the courthouse of Relação[233] of the city of Porto, in 1902 (Matos, 2012). The photographic records consist of at least a double portrait, sometimes done on the same plate, with frontal and profile views.

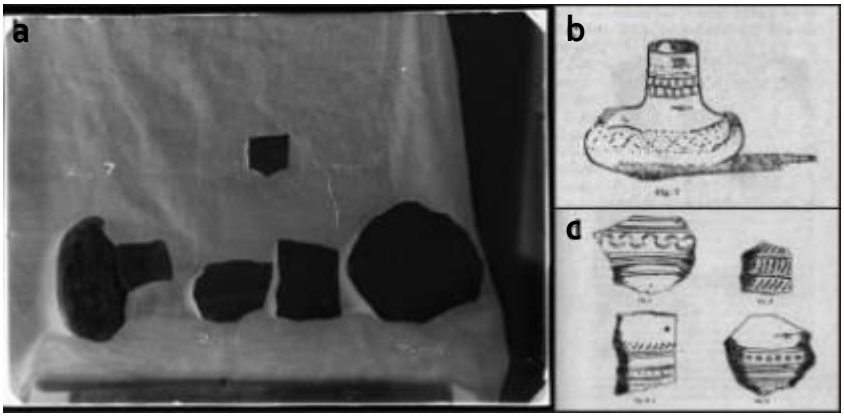


Figure 4.9 – MHNC-UP, Archeology, a. Negative showing Bronze Age ceramic objects, Tachoal Necropolis; b and c. details from page 333 and 336, respectively, with drawings from objects shown in b. (Correia, 1916). (FCUP-IA-AF-187).

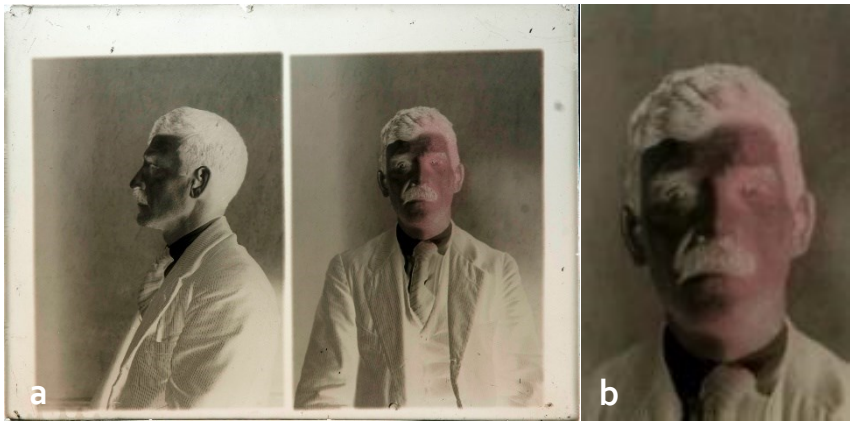


Figure 4.10 - MHNC-UP, Physical Anthropology, a. front, and profile; b. detail showing red makeup (FCUP-IA-AF-153).

These are a particular type of portrait meant as a true record of the person's physiognomy, but still, it was found that they were retouched. They were not retouched for aesthetical reasons, and none found to have pencil retouching, but only the red makeup used, not to lighten the skin tone, but to compensate for contrast. The red dye is applied only to half of the face to compensate for the shadow. The makeup does not cover the mustache, eyes, and eyebrows, similar to what was also found in studio portraits (Figure 4.10).

Figure 4.11 shows the Anthropology Institute's showcases at the first Portuguese Colonial Exhibition,

[233] It is known as the Cadeia da Relação the building that today houses the Portuguese Center for Photography, which also holds most of the anthropometric post archives.

held in 1934, in Porto. The images show that several posters use photographs. In particular, one presents types, with profile and front images, of indigenous people of Angola, a Portuguese colony at the time.



Figure 4.11 – MHNC-UP: a and b. Anthropology institute showcases at the 1st Portuguese Colonial Exhibition, 1934; c. One of the posters in image b. "Anthropological documentation on indigenous people in Angola, Fot. Capt. Fonseca Cardoso" (FCUP-IA-AF-158; FCUP-IA-AF-159)

Collection review

The importance given to photography by Mendes Correia and other scientists is noticeable when surveying the MHNC-UP photography collection. It was possible to identify uses and intention for retouching and how they relate to each photograph's particular use.

The retouchings on the glass surface have heavily deteriorated. The type of retouching applied over the glass surface is also the most fragile. It is a powdery substance with evidently little binding material, and deterioration occurs mostly due to the abrasion and some presented water damage.

Some similarities were found with other retouching seen in studio portraiture, but the aesthetical component is reduced or absent.

As expected, the use of different retouching techniques is restricted in overcoming limitations or correcting flaws from image processing or improper handling, although some are extensively retouched. Most of the negatives reviewed were used to illustrate publications, and it was noted that the contrast adjustment was the type of retouching more commonly found. The images were possibly treated even further in the print, and during the printing process. This is inferred from the printed images, which look flat, with low contrast. It is the sort of retouching that is considered excessive and condemned, for example, in portraiture. Still, in this case, the drawing-type appearance of excessive retouching might have been the intended effect and not at all a retouching failure.

Retouching the third dimension – Celebrities' Portraits from the Aurélio da Paz do Reis archive (APR)[234]

Divorced from matter – experiencing sight.

A painter shows us masses; the stereoscopic figure spares us nothing – all must be there, every stick, straw, scratch, as faithfully as the dome of St. Peter's, or the summit of Mont Blanc, or the ever-moving stillness of Niagara. (Holmes, The stereoscope and the stereograph, 1872, p. 148)

Stereoscope images were sought after as wonders, as collectibles, and even before the *carte-de-visite*, they were a commercial and cultural success for the educated upper-class society. They were a form of entertainment and entered people's homes, viewed at family gatherings, and marked presence as social pastimes.

Above, it was described some of the aspects of the invention of photography and the reactions and expectations of those who first saw a photograph. However, nothing compares to the wonder of seeing a stereoscopic photograph for the first time, as many stereograph lovers would assert. One of the first to leave it in writing was Oliver Wendell Holmes;[235] in his text, *The stereoscope and the stereograph*, first published in 1859, that it is a reference essay on photography[236].

Holmes saw the potential of photography where:

> Every conceivable object of Nature and Art will soon scale off its surface for us. Men will hunt all curious, beautiful, grand objects, as they hunt the cattle in South America, for their *skins*, and leave the carcasses as of little worth. […] The time will come when a man who wishes to see any object, natural or artificial, will go to the Imperial, National, or City Stereographic Library. (Holmes, 1872, p. 162)

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[234] Information on the collection and the findings on retouchings practices was presented in an oral communication at *III Jornadas sobre investigación en Historia de la Fotografía: La fotografia estereoscópica o en 3 D, siglos XIX y XX* [III Conference on Research in History of Photography: Stereoscopic or 3D photography, 19th and 20th centuries], held in Zaragoza, Oct. 23-25, 2019. And corresponding proceedings as: Pereira, C. C., Castro, L., Barata, C., & San Andrés, M. (in press). Retouching the third dimension – The Aurélio da Paz dos Reis stereoscopic negatives archive. In J. A. Hernández Latas (Ed.), *Proceedings III Conference on Research in History of Photography: Stereoscopic or 3D photography, 19th and 20th centuries.* Zaragoza: Instituición Fernando El Católico.

[235] Oliver Wendell Holmes (1859–1863) was an American physician, poet, and writer. His interests were varied, including photography, particularly stereoscopy. To his credited the invention of a stereoscope viewer, ca. 1861, the *Holmes-stereoscope*, because he did not seek to patent it, his invention was a generalized success (Hannavy, 2008). Different versions of it were produced well into the twentieth century, and along with the Brewster stereoscope, they are the most recognized viewing devices for stereographs.

[236] In reference to the edition from 1872, a collection of texts by Holmes, including two others on stereoscopic photography, with the title *Soundings from the Atlantic.*



Figure 4.12 – The stereoscope, American model (Osborne, 1909, fig.6).

He was in some way predicting a visual culture society of travel books and museum catalogs, online image databases, where documentation, history, and communication takes place and is defined by visible representation, by photography. However, stereoscopic photography went even further than the simple photograph.

A true *divorce from matter*, as Holmes says (1872, p. 161), occurs in an image hanging in space, the product of a double image combined through a stereoscope (Figure 4.12). Only the hand that reaches and grabs the stereoscopic card is the reminder to the brain that the image is, in fact, a flat object, in his words:

> A stereoscope is an instrument which makes surfaces look solid. All pictures in which perspective and light and shade are properly managed, have more or less of the effect of solidity; by this instrument that effect is so heightened as to produce an appearance of reality which cheats the senses with its seeming truth. (Holmes, 1872, p. 140)

The invention, or better maybe the discovery of stereoscopy, is given to Charles Wheatstone (1802-1875), an English physicist and inventor, even before photography! He was experimenting for several years when in 1838, one year before Daguerre's announcement, he formally presented his results, a stereoscope, to the Royal Society.

Until then, many would probably think, as Albert Osborne noticed in his manual, that having two eyes was a matter of "a wise provision in case one is lost" (Osborne, 1909, p. 37). Instead, Wheatstone's revolutionary discovery demonstrated that the perception of a solid is in the combined images that both eyes receive (Figure 4.13a, c). Opposite, that one image cannot produce, or a person with just one functioning eye cannot perceive, the same perception of solidity, depth, distance, that now is referred commonly as the third dimension (the illusion of three-dimensional space, or 3D); and he cannot perceive images and the world stereoscopically. For such people, the sense of depth is learned by other visual cues like the superimposition of one object over another or shadows.

But for most people, the same way that a person perceives the world can be replicated in photography by two images, one for each eye. To obtain these images, like the eyes, two cameras were needed or a camera set twice, with a short distance between each shot, or better still, a camera fitted with two lenses side by side that captured the two images simultaneously.

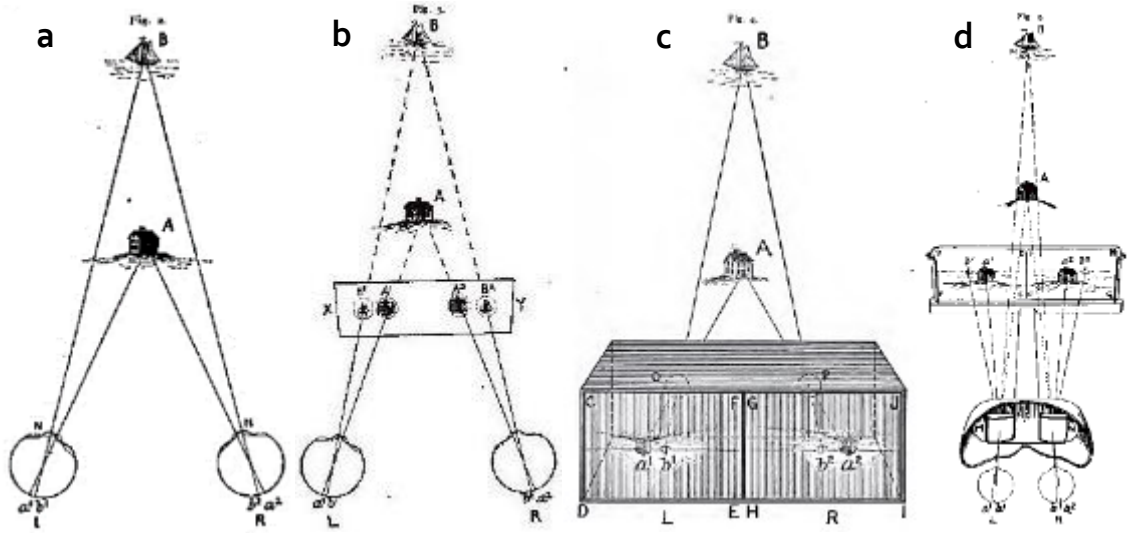


Figure 4.13 – L-left eye, R-right eye, house A-near object; boat B-a more distant object, N, O & P-lens; C-J corners of each negative: a. "the processes by which we see near and distant objects with two eyes"; b. view plane of correspondent stereograph "six inches before the eyes" (≈15 cm); c. The image inside stereoscopic camera and projection as is in the negative; d. Superimposed natural and stereograph views. (Osborn, 1909, fig. 2, 3, 4, 9)

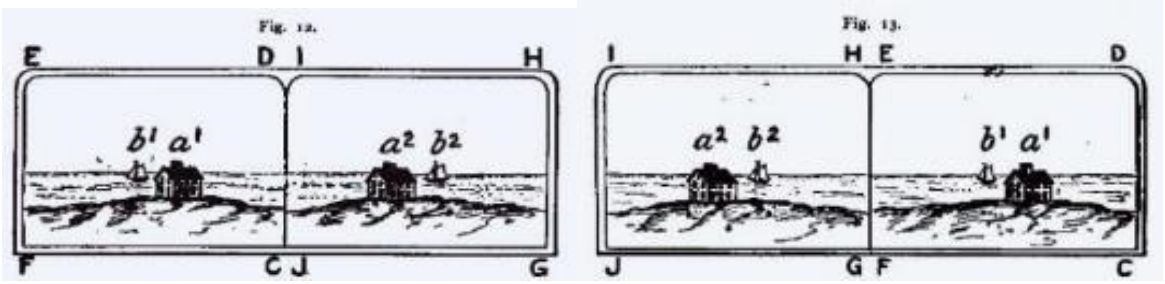


Figure 4.14 – Left. Stereograph mounted correctly; Right. Pseudo-stereo inverse mount of a stereograph. C-J corresponding corners to Figure 4.13c negative (Osborne, 1909, fig. 12, 13)

In this way, the negative holds the two images with a slight difference intended for each eye (Figure 4.13b). The print of such a negative is an inversion or pseudo-stereo because the inversions in camera obscura need to be corrected. The print is cut, and the two halves are swapped to the correct position (Figure 4.14a). Failing this and observing the stereoscope, the image shows the close object as if they are farthest and vice-versa (Figure 4.14b).

The success of stereoscopic photography, aside from its collectible aspect, was the augmented visual experience. The lenses amplified the images that could be observed in great detail. The stereoscope gave the individual an intimate experience of the voyeur. The *carte-de-visite* craze contributed to a decrease

in the interest in stereoscopic photography, which would, however, resurge at the turn of the twentieth century.

The London Stereoscopic and Photographic Company (ca. 1854-1922) in the UK and later Underwood & Underwood (ca. 1881-1920) in the US were at one point the largest companies dedicated to the production of stereoviews, with catalogs in the thousands of and production in the millions each year. In Portugal, never in such magnitude, several photographers produced stereoscopic photographs. Of reference, at the turn of the century, the amateur photographer Aurélio da Paz dos Reis photographed and published an extensive collection of stereoviews under his commercial brand *Estereoscopio Portuguez*.

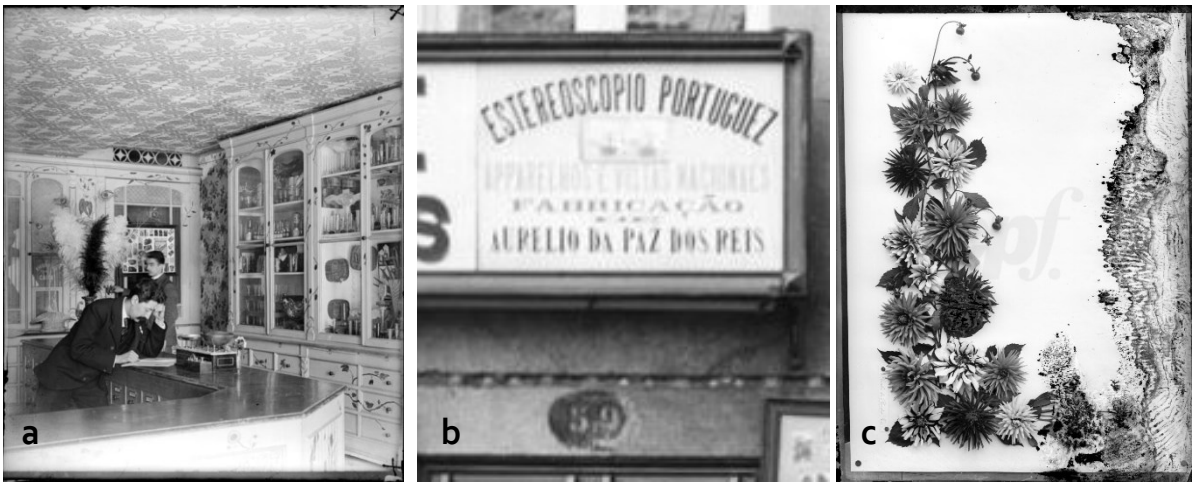


Figure 4.15 – APR, Flora Portuense a. Interior (CPF, APR, 7777); b. Detail of the signboard above the doorway announcing the sale of stereoscopic views and apparatus (CPF, APR, 8679); c. Flower garland with Dahlias, the composition used on the cover of the flower store's catalog (CPF, APR, 8877).

Aurélio da Paz dos Reis – a man with many denominations

Aurélio da Paz dos Reis (1862-1931) cannot be defined just as a photographer, and his photographic work shows that his life had many facets. Born and established in the city of Porto, he was a family man, very active in the political society, but his primary occupation was as a florist. Aurélio da Paz dos Reis had a shop in the center of Porto, named *Flora Portuense*, that sold flowers and seeds of his production in gardens and greenhouses at his residence and nearby properties. He was particularly fond of the Dahlia flower and even developed an award-winning strain of the variety *Cactus*. The Dahlias are featured in several of his photographs. One of the negatives in the collection has an arrangement with his Dahlias, which was used for the cover of the catalog for the flower shop (Figure 4.15d).

History books record him as the *Father of the Motion Picture* in Portugal. A recognition only for being the first Portuguese to produce moving pictures in Portugal and not for his body of work or influences on others. It is believed that he first learned about motion pictures through the Lumiere Brothers and Edwin Rousby's works (CPF, 2020; Serén et al., 1998). His oldest surviving film, and possibly his first production, is dated from 1896, with the title *Saída do Pessoal Operário da Fábrica Confiança,*[237]and it replicates Louis Lumiere's first motion picture, *Workers Leaving the Lumière Factory.*

As a photographer, he did mostly stereoscopic photography that he would sell under his brand, the *Estereoscopio Portuguez,* at his flower shop (Figure 4.15).

Aurélio da Paz dos Reis also had photojournalist credentials but was more of an enthusiast than a professional photographer,[238] in the sense that he did not have a studio open to the public nor sold his work systematically to newspapers or magazines. However, because he had a continuous presence in public events, some of his photographs were sought and published by magazines, namely, the *Ilustração Portuguesa.*[239]



Figure 4.16 – APR, digitally converted positives, a. People sheering from the balcony, republican parade, c1910 (CPF, APR, 1874); b. Portrait of Actress Laura Cruz, before 1910 (CPF, APR, 7146).

In his spare time, the images from his archive show that he attended outdoor activities such as bullfights, various sports, other popular and religious festivities, traveling, or just enjoying the company of his friends. His images show different leisure travels to Spain, including Pontevedra and Salamanca, registering local traditions, monuments, and views. He also traveled on various occasions to France and Brazil on business and to further develop his interests in photography and motion picture.

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[237] Roughly translates to *Workers Leaving the Confiança Factory,* and it shows such workers leaving at lunch hour. He would do public viewings of this and other "quadros" (possible translation: frames or scenes) under the commercial name of *Kinetógrapho Português.* The *Confiança* factory produced shirts and a variety of white clothing items.

[238] Aurélio da Paz dos Reis considered himself an amateur photographer because although he did sell his work, he did not work on commission. He is often referred to as such in the credits of his images.

[239] When published in *Ilustração Portuguesa,* although they are originally stereoscopic images, only one half of the image was printed. In the credits, both Aurélio da Paz dos Reis's name and his brand *Estereoscopio Portuguez* are mentioned.

While most of his photographs are street photography, depicting the moment, often with elements blurred and out of focus, he also did portraits. The interesting thing is that his portraits are set outside but have a studio-like feel; the image is arranged using a backdrop, and objects and flowers, like other ordinary studio portraits in his time (Figure 4.16).

The Aurélio da Paz dos Reis Fond at the Portuguese Center for Photography

The Aurélio da Paz dos Reis (APR) fond is held at the Portuguese Center for Photography (CPF) with production dates between 1882-1949. The fond consist of a myriad of documentation, including cameras, coloring pigments, chemicals, notebooks, various personal objects, and almost 12.000 photographic documents, of which more than 7.000 are stereoscopic negatives.

With no formal organization, most of the negatives arrived at the institution in original negative boxes, some with inscriptions relating to its contents, but not all were identified (Figure 4.17).

The APR fond is in the institution since 1997 and was officially donated to CPF by Hugo da Paz dos Reis, APR's grandson, in 2016 (CPF, 2020; Lacerda & Gravato, 2007).

The overall collection is well preserved, but some negatives present signs of fading, probably due to poor processing; and others present highly deteriorated margins by wear and water damage.



Figure 4.17 – APR, stereoscopic negative boxes, Aurélio da Paz dos Reis collection (Author's image)

At the CPF, there are two surviving Mackenstein stereoscopic cameras, both with magazines for several plates. A smaller one, model *Kallista*, with integrated round metal masks. These masks would result in a round image, and none of the negatives at CPF seem to have been produced with this camera.

The second camera is a *Jumelle Photographique Stéréo-Panoramique*, which holds larger negatives (8x18 cm). It also allows being quickly converted into a panoramic camera using the same plates. Many negatives in the collection have this size, including several panoramas and long vertical images. Also,

some panoramic and stereo images have the same viewpoint and were visibly taken within a short interval, which indicates that the camera conversion between panoramic and stereoscopic could be done with some ease. An example is shown in Figure 4.18, where it is possible to see that similar plate holders were used, that left the same double black lines, visible at the top right corner, in both images. Other negatives have a slightly different size (9x18 cm) that could not have been made in any of these cameras. Aside from the stereoscopic negatives, there are a few negatives in other formats. These look different technically, making it uncertain if they were all produced by Aurélio da Paz dos Reis. In a small number, the fond also holds original stereo cards and some test prints.



Figure 4.18 – APR, Happy Holidays, a. stereoscopic negative; b. panorama, the images show details beyond the backdrop indicating that the images were taken outdoors, 1904 (CPF, APR, 6049/48).



Figure 4.19 – APR, inscriptions in stereo cards of Aurélio da Paz dos Reis, *Estereoscópio Portuguez*: a. evolution of left margin; b. evolution of right margin and right margin of the tissue views; c. *Flora Portuense* logo, and stamp.

The cards that support the prints exist in different colors and show an evolution in the presentation (Figure 4.19). The older ones are possibly those with no markings, followed by ones with the "Estereoscopio Portuguez" inscription on the left margin and "Aurélio da Paz dos Reis – Phot. Amador / Porto" on the right. These are probably from the nineteenth century and before his participation and recognition with silver medals at the Universal Expositions of Paris in 1900 and St. Louis in 1904. After that, the designation of "Phot. Amador" [amateur photographer] would disappear, and, on the left, stamps of medals and reference to the exhibitions were included. On the right, the logo of *Flora Portuense* is included and added "Portugal." The latest type of cards known have reference to the participation and recognition with gold medals at the International Exposition of Panama-Pacific held in San Francisco in 1915, and later the Universal Exposition of Rio de Janeiro in 1922-23. Also, although in a smaller number, some images are printed as colored tissue views. These have no identification text or logos, except some with a small cropped stamp[240] with the text "Aurélio da Paz dos Reis / Porto."

The photographer

A review of the collection gives the most relevant information on Aurélio da Paz dos Reis' work as a photographer. Aside from a necessary darkroom, the images show that he did not have a "permanent" photographic studio. Many of his portraits with painted backdrops look like studio photography but were set outside in his garden or other places. Noticeable, in many of them, by the changes in the type of floor or other elements caught beyond the backdrop, such as plants or architectonical features (Figure 4.18b).

His work is best known for the record of social, political, and other current events and how society participated in them. He also produced numerous images from his travels abroad that were also published and sold with the *Estereocopio Portuguez* brand.

Crowds on the street and social places are abundant themes in Aurélio da Paz dos Reis' photographs. A characteristic of these images is the feel of a candid snapshot, frequently blurred as people move and get out of focus. He would also photograph his own family in relaxing settings, showing everyday life. The number of images in the collection that include Aurélio da Paz dos Reis himself shows that he would encourage other people to take on his camera, at least his children and wife. These images,

[240] These stamps have different colors and appear to have been cut from the *Flora Portuense* stamp, as the superior margin has no indentations.

however, were not the candid pictures they seem to be and have an intentional composition. Aurélio da Paz dos Reis had a strong sense of what a family should be and frequently portrays intentional messages in his images (Serén, 1998). For example, in Figure 4.20, there is more than just a couple in their garden. By placing specific objects in the scene, this composition conveys what he considered to be an exemplary family, spending time together, reading current events, and sharing an interest in subjects outside the household themes, in this case, science.[241] Each year, he would make a composition to be sent as new year greetings also with symbolic elements, often including a written message in the image or a fake cat (Figure 4.18). The compositions were done with the entire family or frequently with only his daughter using the stereoscopic camera in panorama mode or set vertically.



Figure 4.20 – APR, a. digitally converted positive of stereoscopic dry plate negative; Aurélio da Paz dos Reis and his wife Palmira de Souza Guimarães having coffee in the garden of Nova Cintra House; 1900 (CPF, APR, 002326); b. The cover of *Tom Tit La Science Amusante*, the book held by Paz dos Reis in the photograph (Tit, 1922).

Aurélio da Paz dos Reis was not a brilliant photographer, and most of his images are lacking in technical quality.[242] However, this is balanced by his persistence and ubiquity, leaving a legacy of many great photographs and, overall, a collection with significant historical, cultural, and documental value.

Celebrities' portraits

Aside from the photojournalism, Aurélio da Paz dos Reis also produced studio-like portraits, done with time and care. These are done outdoors but with studio backdrops and other props, such as chairs or handheld objects, frequently flowers. Most of these portraits show celebrities, actors, political figures,

[241] There are other versions of this composition where Aurélio da Paz dos Reis and his wife Palmira change roles and another, including their daughter at a young age with a doll, standing between the two.
[242] This assertion is made by observing the images and negatives at CPF and not of the final published prints.

and other personalities from society. Some actors are represented several times with visible age difference, confirming a close relationship with the photographer.

These were probably sold as collectibles, a practice inherited from the *carte-de-visite* and common among studio photographers. Some of them were published as a series of *Artistas Portugueses* [Portuguese Artists] postcards in non-stereo format by editor Arnaldo Soares – J. N. B[243] from Porto. And in Lisbon, another series of similar postcards were printed by the Pap. e Typ. - Paulo Guedes & Saraiva Aurea, 80 -Portugal-Lisboa (Figure 4.22).



Figure 4.21 – APR, Portuguese actress Palmira Torres by Aurélio da Paz dos Reis, a. stereoscopic negative viewed in transmitted light; 190? (CPF, APR, 7167); b. Palmira Torres Illustration (*IP*, no. 50, Feb. 4th, 1907); c. Postcard, no. 184 Portuguese artists, J. N. B. – Editor Arnaldo Soares (courtesy José Manuel Ferreira).



Figure 4.22 – APR, Actress Adelina Abranches. 191?. A. digitally converted positive from stereoscopic negative; b. postcard of Portuguese actors, no. 38 (CPF, APR, 4155; AMLSB BPI-0704).

At least one of them was found published in *Ilustração Portuguesa* (no. 50, Feb. 4th, 1907), and another example on the cover of the self-defined, Humorous, theatrical, and charadistic weekly *O Casmurro*

[243] Not much is known about the Arnaldo Soares publishing house. It published a relatively small series of postcards and books. It was also a reseller of other national publications, books, and magazines. It was situated at Praça D. Pedro, no. 137, near the Aurélio da Paz dos Reis' shop, Flora Portuense, which might justify the connection. It is not known what the acronym J.N.B. stands for. From the general series numbers, 171 and 182-201 have images by Aurélio da Paz dos Reis.

[colloquialism similar to Pig-headed], suggesting that others were also published in other local papers and magazines, that were not reviewed in this research. The same image, from Ilustração Portuguesa, is found as the no. 184 postcard, J. N. B. - Arnaldo Soares editor. The thing of note about this particular negative is that it is the reflected face that is retouched. Most of the studio-like portraits are retouched, unlike the rest of the negatives in the archive. Notable exceptions, and only in a few examples outside portraiture, are spotting with red dye and the correction of contrast using a powdery form of the red dye applied in larger areas with the fingertips.

Retouching practice in APR celebrities' portraits collection

Because Aurélio da Paz dos Reis did not have a complete photography studio, and there is no known record of employees hired to do photography work, it is unclear who did the retouching of his negatives. If it was him, he could have learned from other photographers. The collection at CPF shows that he knew several professional photographers and had access to their studios.

Figure 1.38, of King Manuel II of Portugal posing for a portrait, was taken by Aurélio da Paz dos Reis inside the studio of Photographia Perez. Figure 4.24, of Italian actress Mimi Aguglia on stage, shows two similar images. A photographer from studio Foto Guedes caught Aguglia when she is posing for Aurélio da Paz dos Reis.[244]



Figure 4.23 – APR, Hilda da Paz dos Reis with friends, by Aurélio da Paz dos Reis; tissue stereograph; a. front view, with reflective light; b. back view with reflective light; c. half, view with transmitted light (CPF, APR, Album 10).

He is known to be a reader of different types of books and magazines, including science and technical books on photography (Serén, 1998), that might have also been a source for learning retouching. A retouching desk exists, now in a private collection. It was likely used for the retouching of negatives

[244] Photographia Perez and Foto Guedes were photography studios operating at the beginning of the century in Porto. Aurélio da Paz dos Reis also knew professional photographers in his related family.

and color the prints, particularly the tissue prints that would show color only when viewed with transmitted light (Figure 4.23). Because these are stereoscopic photographs, both halves of the image need to be retouched.



Figure 4.24 – APR Sicilian actress Mimi Aguglia, a. half stereo dry plate, digitally converted to positive, APR, 1910 (CPF, APR, 4118); b. detail; c. Cliché Andonard, Barcelona 190? (*IP*, no. 201, Dec. 27th, 1909); d. detail; e. stereo dry plate, digitally converted to positive, APR, 1910 (CPF, APR, 4119); f. glass plate negative, Foto Guedes, 1910 (AMP, 301903/F-NV/FG-M/9/403)

Almost all retouching found in Aurélio da Paz dos Reis' collection is limited to studio-like portrait photography and close-up portraits without a backdrop setting. Notable exceptions, but only in very few examples, presented spotting and the use of a red dye to compensate extreme contrasts.

Comparatively to a typical studio portrait of the same period, the overall retouching observed has minimal effect. That is, wrinkles are only minimized, and stray hair is left astray. Figure 4.24 shows several portraits of Sicilian Actress Mimi Aguglia (1884-1970). A comparison is given between a professional studio portrait and one by Aurélio da Paz dos Reis.

On observation, the retouching work seems similar to that found in other collections, but the effect is less intense, resulting in a more natural, seemingly untouched feel. Nonetheless, the retouching found was not done only to correct technical flaws and extend to an esthetic purpose.

In general, it includes the treatment of the skin with a lead pencil to attenuate wrinkles and expression

lines and to give an overall smooth look (Figure 4.25a). This was done on the emulsion side over transparent varnish applied over the areas to be retouched. The varnish acts as a protective layer, as explained, and now easily identified by the voids left in the silver mirroring. In Figure 4.25b, it is possible to locate varnished areas in correspondence with the head and hands in the image, and the stain suggests that it was applied with a cloth or cotton ball.



Figure 4.25 – APR, a. Actors portrait, detail with retouching over the face with pencil (CPF, APR, 7348); b. Stereoscopic negative showing silver mirroring deterioration except on areas treated with varnish (CPF, APR, 7257)



Figure 4.26 – APR, a. Stereoscopic dry plate negative with red make-up applied on the glass surface over the face; b. detail of the same negative showing retouching scraped off over eyes and mouth; actress' portrait (CPF, APR, 7215).

On the glass side, red makeup was applied over the faces to lighten the skin. The color was applied with the tip of the finger, recognizable by the pattern of the fingerprint left on the surface. Any excess or areas that needed to be kept dark, such as eyes or mouth, are scraped off with a needle or a knife (Figure 4.26). Because the colorant is applied with a little binder, these retouchings are very fragile. In Aurélio da Paz dos Reis' collection, many portraits were found with only a residue of this material.

Fashion dictated that an elegant woman would have an hourglass silhouette. The example in Figure 4.27 shows how Aurélio da Paz dos Reis gave a little help by covering part of the body with a more concentrated red ink to block the area completely. As explained, these areas resulted in white and

needed to be retouched again in the print. Examples such as these that change the image more dramatically are scarce in the collection.



Figure 4.27 – APR, a. stereoscopic dry plate negative with red ink covering waist area; b. detail of digitally converted positive, showing the result, Actress Maria Pia de Almeida, 190? (CPF, APR, 7215).

Experimenting compositions

Proof prints in the collection also give insight into some aspects of printing and the effects of retouching. Some show experiments with cropping, the vignette effect, or coloring the prints. Others show more complex editing – for example, double printing, like Gustave Le Gray, adding clouds to his seascapes. In the collection, there are several negatives with different garlands and proof prints showing that Aurélio da Paz dos Reis experimented with different compositions. Photography suppliers would sell readymade negatives with garlands, like the one in Figure 4.28, or other motifs.

These and other compositions found in the collection were digitally arranged and tested to verify the 3D effect.[245] The portrait in Figure 4.28a and the garland in Figure 4.28b could be viewed perfectly in 3D. However, the portrait is not aligned correctly with the garland in the composites, and it does not give a good 3D image. No example of such compositions was found mounted. The portrait used in these test prints was found without the garland and without vignetting, included as the *no.171 of Portuguese artists series by J.N.B. – Arnaldo Soares editor*. The corresponding negative is only retouched with pencil in the face and arms, and it does not have any masks. None of the negatives present ink or paper masks for the vignetting effect, suggesting that the effect was achieved with non-permanent masks.

[245] The result 3D images were presented by the author at a conference where the audience had special glasses to view the presentation with the 3D Effect. Oral presentation Pereira, C. (2019). *Retouching the third dimension – The Aurélio da Paz dos Reis stereoscopic negatives archive*, III Conference on Research in History of Photography: Stereoscopic or 3D photography, 19th and 20th centuries, Instituición Fernando El Católico, Zaragoza, Spain



Figure 4.28 – APR, half of stereographs: a. garland, digitally converted positive, unknown author (CPF APR, 2237); b. actress Delfina Cruz, digitally converted positive; c. test-print, composite (CPF APR, 7195); d. postcard, collection Artistas Portugueses, no. 181, Arnaldo Soares - J. N. B. (courtesy, José Manuel Ferreira).

Collection review

Aurélio da Paz dos Reis was a dedicated photographer. Although he considered himself an amateur, he made his photographic work and the "Estereocopio Portuguez" brand a reference because of his entrepreneurship personality. Today, he is an important figure in Portuguese history, not just as the father of cinema but also in stereoscopic photography.

The APR's archive at CPF shows that he registered every moment of his life and the events happening around him, leaving us a valuable historical and cultural legacy. The opportunity to study this collection is an essential addition to the research project on retouching techniques and their particular use in stereoscopic photography.

Although it is unclear who did the retouching of the portraits, it was not expertly done. The negatives show the same basic retouching techniques found in other portrait collections and described in manuals but to a less extent. The retouching was done to compensate for exaggerated features and other defects or aberrations introduced by the camera or caused by the photographic emulsion limitations. A small number shows a more complex retouching, and all portraits were retouched to correct skin tone overall and not just shaded areas. Although not intensively retouched, as done in typical portrait studios of his time, APR's images show that the retouching goes beyond overcoming technical difficulties.

The expectation was that both images should be retouched in the same way, but this was not confirmed. Each image is treated individually, and differences are found between the left and right images – differences in the pencil, brushwork, and in some cases, the size of the retouched area. Digital images from the original negatives were converted in positive stereo views (corrected left and right) and studied with a stereoscope for visible effects of retouching. It was found that only in cases like the

example in Figure 4.27, with part of the image completely erased by retouching, would the retouched areas be noticeable. In this situation, a "ghost" unfocused area appeared that distracted from the 3D effect. The assumption is that the retouching is made imperceptible after printing and would not interfere in the 3D image, even if unequal on both sides, as first hypothesized.

Even as an amateur photographer, Aurélio da Paz dos Reis felt the need to retouch the portraits. He takes the time to retouch them, but not the rest of his photography. This relates to an idea of what he thought a photographic portrait should look like, which in turn was influenced by the generally accepted aesthetics of his time. At the same time, he left the rest untouched, reaffirming the exceptional condition of the portrait among all other photography types.

Truth and vanity – Re-valuating archives of studio portraits

The studio portraits and archive

The original purpose of most of the work from portrait studios was not to document social conditions, like the well-known commission work done by Walker Evans or Dorothea Lange (1895-1965) documenting the American Great Depression. Studio portraitists did not document current events like in photojournalism, and they are not a *straight* social document. The portraits were a service bought by the individual, for himself, of himself or a relative, and its primary purpose was that of remembrance and prestige.

As popular as photography had become, and the large number of studios working at the turn of the twentieth century[246] to do a studio portrait was still expensive and only available to part of the society. This has implications considering these portraits as social and historical documents since not all society is equally represented. Most of the people would have their portrait done only once in their life or a little more. In more practical terms, it also had consequences. Instead of doing another sitting, the clients would buy a second print.

So, it was common practice in photography studios to keep an archive of the negatives produced that could be used later at a client's request.

However, these archives do not include all of the studio production. The photographer would do several negatives in each session and then choose the best, the ones not selected were frequently

[246] Records show that almost a hundred existed in Lisbon alone in the 1910s (Pavão, 1990), larger cities in other countries would have even more.

discarded. The negatives selected were also the only ones retouched.

The "good" negative was a valuable commodity and was usually kept well stored and protected from dust, and frequently each negative was protected in individual envelopes. It was typically numbered in the margins of the emulsion in a way that was not erased during processing, allowing easy identification of the negatives and its client. The prints would have the same identification number to facilitate the pairing with the negative at a later date if requested by the client. Besides identification, it is frequent to find other annotations on the negatives with instruction on the requested size and type of print or the number of copies. On the envelopes, the identification was repeated, and more annotations could be added.

With the introduction of digital photography, many studios became obsolete and had to close doors or were forced to adapt their business to the new needs of their clientele. From some studios, what remains of their practice are the negatives, preserved in museums and archives, or private collections, for there gained historical, cultural, and social value. Studios also kept proof books with test prints presenting examples of the many poses, types of processing, and finishing. These were available to help the clients decide on the portrait they could have and advertise the studio capabilities. But the studios rarely kept final prints as they were produced only in the amounts to be sold to the client.

These institutionalized collections, despite the recognized value, are often left forgotten and less studied. One reason is that just one photograph is not representative unless it is the portrait of someone famous. This leads to the second reason, the size of the collections. For a relevant study, the collection should be considered as a whole that frequently reaches thousands of photographs, information from which it is not easily managed.

A third reason is legal. In Portuguese law, for example, a person has a right to their own image. The law provides that the portrait cannot be exhibited, reproduced, or commercialized without the person's consent. The exceptions are for public figures or portraits taken in public places or during public events (according to the Portuguese Civil Code, article 79º).[247] In fashion and advertising campaigns, for example, it is customary for the models to sign a consent or a photo release waiver. However, the images in these archives were produced as a personal service and for personal use. Although it is often found online entire studio portrait collections, most of them would have such legal restrictions. Therefore,

[247] There is also an exception of uses by the police forces, and in the course of jurisprudence, or for scientific, academic, and cultural purposes. Even in these cases, a person can object if it feels damming to his honor, reputation, or decorum. On image rights: Article 79.º - (Direito à imagem) – Código Civil Português. *Decreto-Lei n.º 47344 - Diário do Governo n.º 274/1966, Série I de 1966-11-25.* https://dre.pt/web/guest/legislacao-consolidada/-/lc/34509075/view [Retrieved February 2021].

they should not have been published, online, or in any other format without the expressed consent from each individual, portrayed, or their descendants. If someone finds his portrait online or that of a deceased family member, he can demand the images be removed. As a measure of caution, some Portuguese institutions, even with cultural missions such as museums and archives, do not usually publish online individual portraits from photography studios or amateur family photos. With older collections, what happens is that there is no one left to recognize and complain about a photograph of a family member. That is less probable in the case of collections from the twentieth century, such as the ones selected for this research.

Finally, these collections are left forgotten, at least until recently, because a portrait studio was the most common thing, not considered of cultural or historical interest, or to be included in history books. The exceptions were those managed by historical figures or artists, like André-Adolphe-Eugène Disdéri or Félix Nadar.

These studios recorded individuals, families, unknowns, and celebrities, recorded secular, religious, and military ceremonies. Each has remembrance value for those portrayed, their family, and friends. Now, these collections, objects, and images are gaining interest as they hold the studio's memory and are testimony of behaviors, cultural and social habits, representations of mores, taste, and fashion. These collections set an interesting comparison to other social documentary photography of the time.

Pose and social portraiture inside the studio

The history of portraiture is a gallery of poses. (…)
Stable societies consists of an array of
types that repeats themselves generation after generation.
(Avedon & Rosenberg, 1976)[248]

Put four or five choice portraits together,
and they can reflect changing social values
and notions of identity over time (Hoy, 2005, p. 64)

The idea of a portrait perdures in people's minds. It was to be done following social and cultural mores.

[248] Harold Rosenberg is found misquoted repeatedly from a quote that Richard Brilliant credits to him. Rosenberg wrote an essay, *Portraits, A meditation on likeness*, included in Richard Avedon's *Portraits* catalog, from 1976, that includes the quote above. Nevertheless, Brilliant's quote completes the one by Rosenberg: *Portraiture involves a consensual ritual encounter which is both trusting and wary: the subject submits to the artist's interpretation while hoping to retain some control over what that interpretation will be. The history of portraiture is a gallery of poses, an array of types and styles which codifies the assumptions, biases, and aspirations of the society.* (Brilliant, 1991, p. 91).

People would go to the studio and asked to be portrayed as they had seen in other portraits. They expected their portraits to compare with the ones most distinguished of their time. Kings, high society, and stage artists, and who else was a celebrity were the models.

The pose was established by others and not reinvented with each portrait. Consciously or not, even today, people identify a pose and make inferences on period and social status.

To better understand how the pose is a construct in the person and society's mind, it is necessary to go back a few years when speed demanded social portraiture to be done inside a studio. It is generally accepted that the difference from other portraiture was that social photography was unposed. Others would argue that it also means untouched or unmanipulated. By now, it is evident that these images are not unretouched, but if and when retouched, it was in a way that did not alter any aspect of the physiognomy. Frequently the scene is artificially composed, and stance also plays a part, which can be considered some category of manipulation.

Social photography, like anthropology, is associated with the depiction of types, like the miner, the fishmonger, the criminal, the mentally insane, a type of beauty. Many *carte-de-visites* were printed with "types" and sold as collectibles. One such example was photographer Jean Laurent. His studio catalog includes types from all of Spain, such as the one in Figure 1.21. They were not the same as the celebrities' portraits. Types were unknown people, possibly actors, posed in scenic representations and frequently included props relating to the action or profession they embodied.

Arthur J. Mumby (1828-1910), a British solicitor and poet, reunited a curious collection.[249] A particular example in his collection illustrates well the idea of the pose in studio portraiture. Several portraits show the same woman, Ellen Grounds, a coal worker from the Wigan, Greater Manchester, England.[250] Mumby himself commissioned the portraits, and he is depicted in one of them. They were all taken in the same studio, R. Little, as imprinted at the foot of the card. (Figure 4.29).

One of the images shows Ellen Grounds in work clothes, as *a pit brow woman*, another with *everyday-clothes*, and two others in *Sunday clothes*. But it is not just the clothes that change. In the Sunday clothes portrait, she adopts a typical feminine serene pose, seating, the hair perfectly in order, and with a neutral expression.

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[249] The Arthur J. Munby archive, which includes his diaries and photographic collection, is now at Wren Library in Trinity College, Cambridge. Biographic information was retrieved from the online archive records. https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD%2FGBR%2F0016%2FMUNB [Retrieved February 2021].

[250] These workers were referred to as the *pit brow lasses*, as they were not allowed to work inside the coal mines and worked on the surface doing several tasks at the coal pit, or brow.

In another one, with everyday clothes, she adopts a stance as if sweeping the floor, smiling. The one with Munby, with work clothes, she casually stands with one hand using a shovel for support and with the other hand on her hip. Either directed by Munby, or by Ellen Ground's choice, with her best clothes, she adopts the typical pose of a *respected* woman in her time. The one with Munby is just a relaxed image, by today's standards more of a social photograph than the others.



Figure 4.29 – Ellen Grounds portraits, carte-de-visite, detail with retouched eye pupil, R. Little studio, c1873 (Trinity College Library, Cambridge; Richmond, 2013).

The one with the broom can also be considered as the image of a *type*. It is not meant to represent Ellen Grounds, but a typical respected woman worker. Vivienne Richmond also studied these images on the subject of *Clothing the poor in nineteenth-century England*. While discussing "The struggle for respectability," Richmond recounts, from Munby's diaries, how Ellen Grounds got amused when doing the portrait with her everyday dress. The dress was completed with a long clean apron, necessary to be considered respectable, unlike her work clothes, which included trousers (Richmond, 2013, p. 123).

The image is not about the individual, and any retouching done does not relate to the idea of self; more than avoided in the pursuit of truth, aesthetic retouchings, in these images, would be irrelevant and unnecessary. Deterioration, however, betrays the retoucher, and at least the print was retouched. As the image fades, the intensification of the eye has a noticeable dark-gray tone that would match the original unfaded image. Just a guess, of course, but the negative was probably retouched too Figure 4.29e.

This example clearly shows that studio portrait archives do not reflect the entire society, as everyone is in their best Sunday outfits. And poses are a direct reflection of socially established mores. Nonetheless, what was once just a family portrait has gained in time cultural and historical relevance. Poses that were standard then, now are evidence of its visual culture and recognizably different from today.

When this change of value occurs was pinpoint unexpectedly as a result of the organization of the exhibition *Memória Recapturada*. The exhibition was organized using the archive from studio Foto-Carvalho, from the town of Estremoz. It displayed portraits from original prints and enlargements from digitally converted negatives. These were individual portraits, and to overcome the legal limitations, the people of Estremoz, and nearby villages, were invited to identify and offer their photographs from Foto-Carvalho. The studio was open from 1936 until 2001, and the initial plan was to show one room for each decade so people could see an evolution. This initial project was abandoned because of an inconvenient flood that destroyed, years before, the more recent archive. Also because no one would come forward with original prints with less than 50 years old. When asked if they did not have any, because surely they did, the answer was that those were not historic enough to be included in an exhibition.

Of course, this is an anecdote, but it illustrates how the public also attributes historical value to these collections and recognizes differences from what is and what was (clothes, hair, pose) and what makes a standard portrait in different periods; and at what point a portrait becomes historical.

People also identify what is a standard, respectable portrait in their own time. Even for an amateur photographer, to do someone's portrait was different from a snapshot, as seen in the APR collection.

Relation with the client



Figure 4.30 – Advertisement for Fotografia Alvão, 1900s

[Portraiture] is one of the few artistic genres in which both the subject and the artist insist on our attention. Each image refers to a real individual and documents a relation between two people. (Hoy, 2005, p. 63)

The portrait photograph is never accidental, never something found by accident. It is arranged, agreed upon. (Homberger, 1992, p. 115)

Many studios and portrait photographers described their work as artistic photography, but client demands foil their intent in making their work art. Henisch & Henisch, in an interesting study on studio portraiture in *The photographic experience, 1839-1914: images and attitudes* (1994), describe:

> Studio portrait photographers – or photographists, as they often liked to be called – have always been the most long-suffering members of the photographic community, anxious to leave their artistic mark on the scene, while being totally dependent on the patronage and taste of philistine clients. From the very first, customers clamored for miniature portraits in the style of paintings, taken with a minimum of fuss, and sold at a fraction of the price. And yet, the photographer never enjoyed the latitude extended to the practitioners of the more ancient art. (Henisch & Henisch, 1994, p. 11)

Figure 4.30 shows an advertisement to Fotografia Alvão; it says, "Artistic work," "the most perfect portraits," "The preferred studio of the fine society." However, the success of the studio does not exist only in the ability of the photographer. A portrait includes at least a second person, the sitter, and his expectations. (And as the principal function of the portrait is remembrance, it includes a third element that observes the result but does not contribute directly to the portrait.)

This relation between photographer and sitter and the success of the result has been the focus of several authors, like Harold Rosenberg (1976), Richard Brilliant (1991), or Eric Homberberg (1992). They argue their points of view with examples of success and failure of what is essentially summarized in Photographia Alvão's promise: the relation with art, the client, and what makes it perfect.

In American photography and cultural history, there is a fairly known story about the portrait of the capitalist J. P. Morgan, by the photographer Edward Steichen, in 1903. The sitter was known to be a particularly difficult man, and Steichen made two plates in three-minute time, realizing that extending the visit would not result in convincing the sitter to follow his suggestions for a better pose. Morgan had a large deformed nose, but knowing about Morgan's fierce personality, Steichen ponders if it should be retouched. It is repeated the quote presented in the Introduction:

> What kind of man was Mr Morgan in this respect? If I should retouch the nose, he might be angry about it. […] So I took the negative that I had made for Encke and retouched that nose as much as I dared. On the good negative that I made for myself I did very little retouching, except to make the nose a little more vague and remove spots that were repulsive. When I took the proofs to Morgan, he thought the one I had retouched for Encke was fine, and he ordered a dozen prints. Then he looked at the other print that I had made for myself. He said, 'Terrible', and tore it into shreds. (Steichen in Homberger, 1992, p. 118)[251]

Eric Homberger retells this and other stories to illustrate that a portrait meant a relation between photographer and sitter (1992), that is to say, a clash of wills between the camera/photographer, social and cultural construction of the self, and self-awareness.

Homberger's text is part of a collection of essays on portraiture, most about artist photographers

[251] It was originally published in Edward Steichen, A Life in Photography (1984), ch.3 (unpaginated).

(Clarke G. , 1992). As an art object, the pendulum of wills between sitter and photographer inclines towards the artist. But the most common studio photographer might not have the same claim or power, and less important clients might still demand the more "perfected" portraits like J. P. Morgan did.

Richard Brilliant, in his text *Portraiture* (1991), gives a slightly different analysis. Instead of battling forces, the client and the photographer share a dialog in constructing the portrait. Even if Brilliant recognizes that the dialogue might not always be successful, as the intended expression of one, the that Brilliant calls impersonation, might not be well interpreted by the other:

> Sometimes, the impersonation shown does not suit the programme of artistic representation, although it may be difficult to determine whether it is the subject or the artist who is principally at fault. (Brilliant, 1991, p. 90)

In other instances, it is, however, a successful dialogic that justifies the success of the portrait. It is identified, for example, by Paulo Baptista in the relation between Portuguese photographer Silva Nogueira and actors, particularly actress Luísa Satanella. Baptista argues that a close relationship between the photographer and the actress, which he classifies as symbiotic, is the reason for the portrait's expressiveness. And also the "perfect transposition of all the scenic resources of the actress directly from the stage to the photographer's studio"[252] (2015, p. 248).

Homberger and Brilliant's point of view, although applicable to many situations, particularly art or specific portraiture, like propaganda, they do not fully explain the dynamic inside a portrait studio. In Steichen's example, Homberger does not account for the retouching in the second portrait and refers to it as untouched.

Behind these stories, it is also the retoucher, in this case, Steichen himself.[253] A copy from the second negative was done by Steichen a bit out of spite after the encounter. The copy was given to Alfred Stieglitz and is now in the Museum of Modern Art in New York. At first, the client's will was dominant; after all, he was paying. But Steichen had his victory later when J. P. Morgan tried to buy the second portrait. J. P. Morgan only wanted to buy it after it was recognized and exhibited in the museum, and at that time, Steichen had the opportunity to refuse him. The artist's will won in the end.

Steichen's personal preference later seems to be to retouch only to overcome technical flaws. However,

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[252] Author's translation.

[253] Of note, later in the text, Homberger refers to the second portrait as "unretouched," despite clearly stated in his description that Steichen did, in fact, retouched the second negative to make the nose "more vague." The idea that these "untouched" images were not retouched, as already demonstrated, is a fabrication by misrepresentation and influenced by the historians' personal views on the subject. An invisible and a wide gray area exists, between what is genuinely untouched and what might be considered over-retouching, that is, when retouching alters the physiognomy.

as a studio photographer, he was bound by the client's expectations and his own vanity.

In the second J. P. Morgan's portrait, the less retouched negative, Steichen still did extra aesthetic retouching as he felt the nose repulsive. Either recognizing or not, the photographer's personal concept of aesthetics influences his work, and his own vanity bounds him. Should not true untouched photography include all the repulsive noses? Rosenberg remarks:

> We have seen that the "realistic" portrait, too, is a "fiction," resulting from the conflict between the sitter and the portraitist. But the sitter's fabricated expression is an attempt to present a self satisfying or socially impressive version of himself; (…) the portraitist [does not] strive to unmask the sitter but to interpret. Aren't the artist's motives under suspicion too? (Rosenberg, 1976)

The artist's motives are not expressed just in the camera angle chosen or lighting; they include all manipulations that in a studio are divided by many hands.

To those that have read Jane Austen and reach the end wondering who is *Proud* and who has *Prejudice*, mirrors in this situation where one can wonder whose vanity is in question when retouching portraiture? "The sitter" seems to be the obvious answer. Weighing the other characters, they are also proud and have vanity in their work. They include the photographer and all the less remembered, like the retoucher.

This added element to the dynamic is identified in records and the negative itself. The first questions are: does the client asks for "untouched" portraits? Does he care for it? How much of the studios or the sitters are reflected in the final product? When the intention or the personality of the sitter is not known, how much of this dynamic can be identified or inferred?

No "do not retouch" notes were found in this research, but only the negatives from the Foto-Carvalho archive remain organized in their envelopes where such notations would be written. Still, some notes were found that suggest they were a request from the client and not just a note between photographer and retoucher:

> Negative no. 28659 "Do a tie."
>
> Negative no. 29928 "preserve 1st mole, the one in the middle of the chin."

Retouching was being discussed among photographers and in the circles that discussed art photography but possibly unknown by the common client. More probably, if the retouchings were not so exaggerated that removed resemblance, they would not ask how the portraits were done. They expected, however, to look good. And *the most perfect portraits* would be at the meeting point of all parties' expectations.

Inspiring and defining beauty

At the same time that photography has reached the masses, it was no longer being done by high-society, wealthy amateurs, and scientists. In the first decades of the twentieth century, the studio photographer still had a high status in the society, but only if he also distinguished himself with quality work, and necessarily artistic. Photographers like the Portuguese San Payo would do artistic portraiture. He controlled the entire process, and each portrait might be said a work of art, but he would do only a dozen portraits each month.

The rest of the studios could not survive on that. City studios would not be the place for the avant-garde portrait. They produced a relatively inexpensive product that could only be viable in the numbers, quick response, and high volume of portraits each month. There was not much time for innovation. A change would enter, not as the inspiration of an artistic mind, but inspired by illustrated magazines and portraits by other photographers, that history shows gradually replaced paintings as inspiration sources.

Portraits were traded as *carte-de-visite*, collected in magazines, and then in the moving picture. It was photography inspiring photography. But not just the portrait of someone specific and outside sociology and anthropology research, they were also presented to the public as types.

Types appear in magazines as curiosities from foreign lands or picturesque views from the countryside and beauty standards. A type was like a landscape or a picture of a monument. They show how people look and dress differently in distant, or not so distant, lands.

Resorting yet again to *Ilustração Portuguesa* for examples in its pages is possible to find many representations of types. First, they were drawings, but then photography takes over, and they are produced like the ones with Ellen Grounds.

In the twentieth century, the depiction of types will be a pursuit of the artists, foreshadowing, modern social photography, not just a document, but as an artistic endeavor. Figure 4.31 shows Portuguese rural types; the first image is just a collection of images like *carte-de-visite*. But the others were done with artistic intent. The shepherd is depicted with all its wrinkles and little manipulation, but still in a studio-like scenery. Although apparently caught in the moment, the *Woman from Maia* is known to be an arranged composition by artist-photographer Alvão. The three already show an evolution.



Figure 4.31 – Rural types: "Popular Portuguese types"; "Nacional types – a shepherd," "Women from Maia" (*IP* no. 94, De. 9th, 1907 and 401, Oct. 27th, 1913).



Figure 4.32 – Foreign types: "An Israeli beauty, Mlle. Zagury"; "The phycology of the Japanese woman - a type of beauty"; "Elegant Americans in Lisbon" (IP, no. 185, 194, 166 - 1909).



Figure 4.33 – Actresses and beauty: "Types of beauty and people from the arts," "The American Woman, the actress Billy Burke"; Rejane (IP, no. 99, 258, 129, 363, 94 - 1907-1913)

Other types show more glamourous portraits as they are intended to show modernity. Figure 4.32 shows several examples. The labels in the portraits specifically identify them as "types of beauty." But they are no longer the social/anthropologic type. The models pose unconventionally, distinguished

photographers did these images, and they would inspire the new poses.

The sitter also made a difference. Stage artists always had more familiarity with the camera. Eventually, they would set the standard for the new poses, and the ever-changing concepts of beauty, in the twentieth century. Celebrities are also types, and their lives are explored as curiosities, and glamour shots of actors accompany biographical notes. Although they have more relax or more dynamic poses, they always look their best (Figure 4.33). They are perfect portraits that some photographers would specialize in, "glamour" photographers like George Hurrel.



Figure 4.34 – Fashion and beauty, "Women in 1909" – Modes Redfern and Badin; "The feminine elegance in 1910"; "Fashion" – by Rivain & Co.; Winter fashion – creation by d'Alphonsine (IP, no. 144, 228, 187, 245 - 1908-1911); retouching with red ink over the glass: The perfect silhouette (CPF, ALV, "12033").

Advertising, specifically of cosmetics and fashion, defines beauty aesthetics for every season. Fashion is more than clothes, like today, the models are also beauty types, and their silhouettes and poses are also copied in photography (Figure 4.34). Portuguese photographers are visibly inspired by glamour and fashion photography. For example, Silva Nogueira would photograph Portuguese artists in the 1930s and became himself the inspiration for others.[254]

The standards of beauty were further encouraged by advertising. In Portuguese magazines, photography takes longer to enter advertising. Several examples show specific definitions of what is considered beauty, that was a lightened and un-wrinkled skin (Figure 4.35).

The purpose of advertising and fashion photography is to sell something. Beauty is sold as perfection, and likewise, the images are perfect. It is revealing the constant mention of light-toned skin. Perfection is young wrinkleless faces, which has not changed to this day. A few examples from the collections

[254] See above, chapter 1 – Silva Nogueira – The glamour in the theatre.

illustrate some of these aspects. Red ink over the faces is constant, not just in women but in everyone (Figure 4.36). And not just in the name of beauty, to have lighter skin also means higher social status. Models are presented with a thin corseted waist that defines the ideal silhouette and directly relates to retouchings observed in collections (Figure 4.34).

And a military man not only has dress codes, but they also have grooming standards, and the official photograph cannot be less perfect. After women, the military men are the portraits retouched with more detail (Figure 4.37).

Even if it was photography inspiring photography, the tendency inside the studio was the persistence of the previous models, particularly the official portraits. Novelties entered a slower rate; still, skilled photographers always found a way to distance themselves from the rest.



Figure 4.35 – Advertising beauty, "Wrinkles gone, she looks 30!"; "I whitened my skin dark and ugly - 3 tones in 3 days"; "10 marriage proposals in a month – *Tokalon* Powder gives the skin a wonderful beauty, and that is why men fall in love."

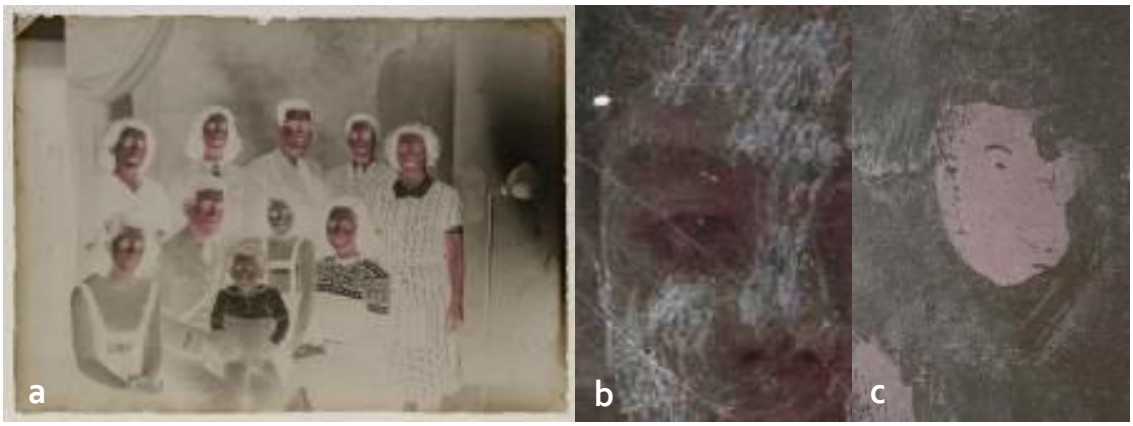


Figure 4.36 – Retouching for beauty; a. makeup with red ink on glass, only the pale little girl is left untouched, Foto-Carvalho, group portrait: b. retouching with pencil, detail, macro-photography, c. detail of makeup viewed with reflected light, macro-photography (Estúdios Correia, "6703").

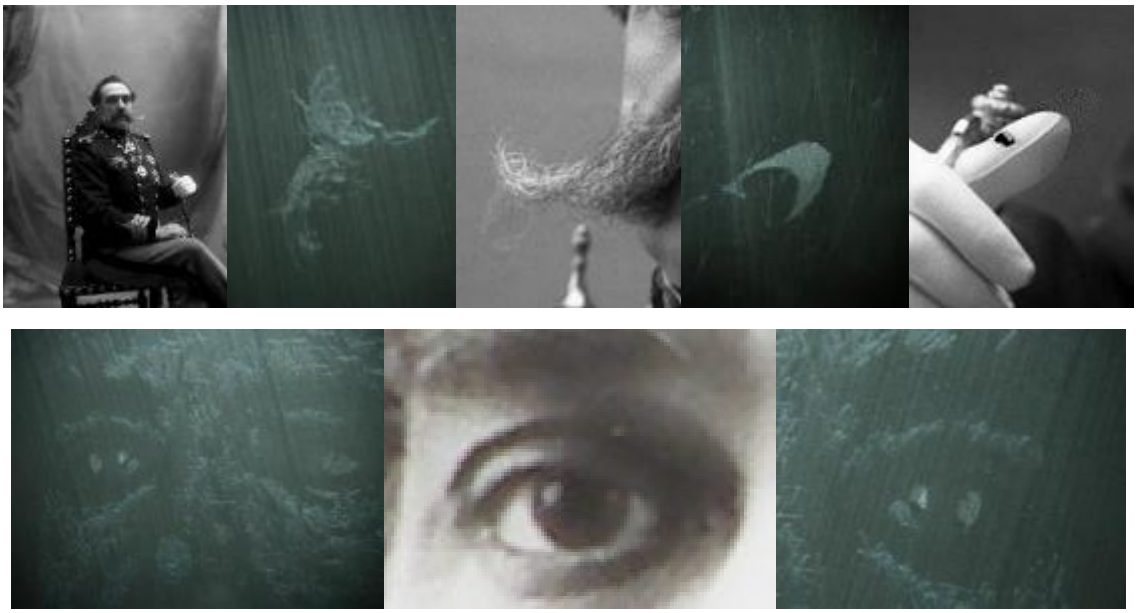


Figure 4.37 – Retouching for perfection, all details matter for a military man: one symmetric mustache, the glove's finger in the proper size, authoritative gaze, etching and pencil, Councilor Joaquim José Machado, by Arnaldo Fonseca, 190? (AMLSB, NEG-0335).

The retoucher

Most city studios had the support of several workers to manage a high volume of clientele. The smallest studio or most independent photographer would still have at least one assistant to help carry and prepare equipment and the glass plates outside the studio. And in the studio, a person at the desk greeted the clients while the photographer was occupied with another. Someone would work in the darkroom, and others did the finishing steps, including retouching the negative, retouching the prints, or coloring.

Retouching is not the work of light or the photographer, it was the work of the retoucher, and the skill needed, every author agreed, demanded an artist. Not in the broad sense as understood nowadays but, the artist that learned the academy teachings understands the human figure and movement, understands materials, color, light, and shadows, and can imagine the final object in the first stroke of the pencil.

Many photographers indeed did their own retouchings, mostly from the will to control the entire process. Some examples described in chapter 1 suggest exactly that, like George Hurrell with his glamour portraits,[255] and Manuel Alves San Payo and his psychological Portraits. Even if limited to a

[255] Hurrel did his own retouching and was relunten to show his process, guarding it as his trade secret. However, at one point, Hurrell was forced to hire other retouchers to respond to the high volume of his work. See above chapter 1 – George Hurrell – Glamour Portraits.

minimum, just to overcome technical difficulties, like Ansel Adams, and even if they did not enjoy it, as it was in Edward Weston's case.[256]

However, retouching was a different skill set to that of the camera, and many times the work was given to a professional retoucher. Historically the first to be contracted to alter the studio portraits were miniaturists who already had the artistic ability to compose a portrait and recognize and understand anatomy. By the twentieth century, in photography studios and socially, the retoucher was a skilled laborer. If not an artist, he was an artisan who learned drawing in a technical school or entered the studio as an apprentice.

Inside the studio and in portrait photography, the retoucher is not a forger. He is not a faker of photographs. His job is not to deceive but to meet expectations, that of the photographer and the client. Successful or not, that would depend on his skills. To be a good retoucher meant that his work was invisible, changing an image without changing the sitter's character. Each work was to be considered and adapted to the physiognomy of each face. It was not to be a repetition of the same type of retouching with every face, as done by some retouchers, which was the source of many criticisms against retouching.

While the photographer was the creator of the image, the retoucher also helped shape it, more than light and shadow, to shape visual and social perceptions.

Studying these collections gives insight into their work. Even if it is not always possible to identify who the retoucher was, it is possible to find out if there was a retoucher or the photographer himself who did the work. Some clues are found in the small messages left in the negatives and on the original envelopes, instructing the retoucher on what to do, like the example in Figure 4.40 from the Foto-Carvalho archive.

Others have a more ambiguous message. They could be just a reminder of a request from the client. Some examples found on envelopes at the Foto-Carvalho archive:

> Negative no. 28157 "Remove the spot on the neck."
>
> Negative no. 28315 "Fix the stray hair."
>
> Negative no. 28595 "Fix missing tooth."

In a photography studio with a significant volume of work, more than one retoucher was employed simultaneously. At one point, both Fotografia Alvão and Foto-Carvalho had at least two retouchers

[256] In the published *Daybooks* Weston often complains about the need to please the client and the retouchings work he feels obligated (Weston, The daybooks of Edward Weston: California, 1961).

working simultaneously, and the photographers also did part of the work. As seen above, the Nadar studio is reported to have had at one point six negative retouchers (Newhall, 1982, p. 69).[257]

Retouching was a demanding profession, not only the skills needed but the strain that was put on the body and eyesight, for the long hours working in the same position and week light. A manual by Antoine Schaeffner (2nd Ed. 1888, p. 94) has a section on health safety measures for photographers – *hygiène du photographe* – including one note for retouchers where he mentions that, at that time, it was already frequent for retouchers to present "weakening" of the eyesight, and he would recommend the use of big and good quality magnifiers.[258] And the manual on retouching by Veronica Weiss has a chapter on "health tips for retouchers," including a series of images depicting "recommended exercises" (1986, pp. 139-150). Re-calling on Edward Weston, one of the entries in his daybooks, comment on the fact that he stopped retouching because he felt a "maddening tightness" as a result of overwork and that after a week without retouching, he was no better (Weston, The daybooks of Edward Weston: California, 1961, p. 71).

Foto-Carvalho – a studio from Estremoz[259]

The Estúdios Correia, a photography studio, owns the archive from studio Foto-Carvalho, and for a time, both studios existed concurrently. The collection was made available courtesy of Paulo Correia, photographer, and co-owner with his sister of the Estúdios Correia.

The studio and archive

The Studio Carvalho first opened in Lisbon, in Rua Gilberto Rola no. 67, 1º, in the Alcântara area. According to Luís Pavão's survey on *The photographers of Lisbon from 1886 to 1914* (1990), the studio Carvalho is only listed since 1911.[260] It was owned by Teodósio de Carvalho (1875-193?), photographer

[257] See above chapter 1- *Gaspard-Félix Tournachon – Nadar*.

[258] It is interesting to find that the retoucher was an established profession by this time and for enough time to be worthy of mention for health concerns on work-related injuries. (errata: In a previous publication on this research, the same work is mentioned, but the pages were mistakenly identified as 86, 87 (Pereira & Castro, ECR, 2016).

[259] Part of the collection was presented as the subject of an exhibition, an oral presentation, in 2018, and published in two articles in 2019: Exhibition *Memória recapturada: O retrato de estúdio na Foto-Carvalho 1936-2001* [Memory recaptured: The studio portrait at Foto-Carvalho 1936-2001], held from Sept. 30th, 2018 to Dec. 2nd, 2018 at the Palacio dos Marqueses de Paria e Monforte, Estremoz, Portugal, curated by Catarina Pereira with the collaboration of Paulo Correia and Camara Municipal de Estremoz.

[260] Pavão links Teodosio de Carvalho's studio and Photographia Phenix, which was directed by Maria Carvalho. However, it is just a coincidence of names, and they are not related.

and freemason, code name, *Daguerre*. Although his presence in the history of photography is discrete, like many other photographers, he also had, at least, a couple of photographs published in *Ilustração Portuguesa* (issues 387, Jul. 21st, 1913 and 389, Ago. 4th, 1913). It is unknown when or why he closes the studio in Lisbon and moves to the town of Estremoz.[261] There Teodósio de Carvalho continues to work as a photographer and opens the studio Foto-Carvalho, in 1936. At the same time, he has two other businesses, a pastry shop and a restaurant also named Carvalho.

The studio was registered in the name of his daughter Beatriz Alda de Carvalho that was its director, until she died at an unknown date but without ever working as a photographer.

The main photographer of this studio would be Rogério de Carvalho (1915-1988), Teodósio de Carvalho's son. Inheriting from his father the aptitude for photography, Rogério de Carvalho will complete his training in Évora, at the Foto-Nogueira studio, before settling permanently in Estremoz.

Foto-Carvalho was the most important photography studio in the region for several decades. It had several apprentices who would go on working as photographers in nearby towns. One of the apprentices, Olímpio Ferreira, started working at Foto-Carvalho at the age of 13 and would grow to be the studio manager and then co-owner with his wife, after Rogério Carvalho's death. In 2001 the studio finally closed doors, failing to adapt to digital photography.

Another surviving employee is Esmeralda Cavaco, the last retoucher of the studio. With a brief stay working in the pastry shop, most of her life was working at Foto-Carvalho. During this research, there was the opportunity to gather firsthand stories from Olímpio Ferreira and Esmeralda Cavaco.[262]

The Foto-Carvalho studio did only black and white portraiture. Exterior work would sometimes be in color, in later years, and the studio provided color photography services for amateurs. However, the developing and printing in color was outsourced. Glass plates were used in portraiture until the late 1940s, and after that, for reproductions.

The owner of Estúdios Correia[263] bought the Foto-Carvalho archive and studio shop in 2001. Before this, most of the laboratory equipment had been sold to other private interested parties, including the oldest wooden studio camera and possibly a wooden retouching desk, that were used since Lisbon's

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[261] It is known that Teodosio de Carvalho was a widower, at the time, with a son and a daughter, and he probably had family in the Estremoz's region, as he was born in a village less than 25 km (< 15 miles) away, named Azaruja. Archival research courtesy of Diogo Vivas and Professor António Ventura.

[262] Information on Foto-Carvalho and the studio work were collected in 2017 from informal conversations with Olímpio Ferreira, Esmeralda Cavaco, Rogério de Carvalho's descendants, and former clients.

[263] A photography studio in Estremoz, since the 1980s More information See chapter 1 - *The digital studio.*

studio. While the camera still exists in private hands, the retouching desk was discarded, as its use was not recognized.

The negative archive is mostly preserved in original wooden drawers divided by size and number corresponding to the order of production (Figure 4.38).[264] However, some negatives are dispersed and out of order, in cardboard boxes, possibly because they were requested for reprinting at some point and never return to their place.

A flood destroyed part of the archive, mainly affected the outdoors photography and later work on film. Other negatives from outdoor work, such as weddings and other celebrations, were done in haste, the developing steps rushed, and gradually but quickly they deteriorated and were disposed of. Other objects preserved from the studio include a painted backdrop, in the old style, originally from the studio in Lisbon (Figure 4.38).



Figure 4.38 – Foto-Carvalho, one of the original archive drawers, for negatives 10x15 cm; view of the room with the restored backdrop mounted and a portrait of Rogério de Carvalho for the exhibition *Memória Recapturada*.[265]

Impressions with Olímpio Ferreira and Esmeralda Cavaco

The first interview was with Esmeralda Cavaco, who was surprised that someone was studying retouching. She never met anyone else before, outside the Foto-Carvalho studio, that even knew what *Matoléne* [Mattolein] was. At first, she was afraid the interview's intention was for her to teach how to retouch. She explained what a demanding job it was and how it had ruined her eyes, but adding that it was what she like best to do "alindar as pessoas" [beautifying people]. She told tales about Rogério de

[264] The archive also includes the work from a secondary studio from the town of Redondo, which was not considered for this research because it is all on film support.

[265] During the exhibition, people had the opportunity to get near the backdrop and take photographs themselves. A photography session was organized by Paulo Correia, where visitors could have their portrait done professionally in black and white and receive a print and a digital copy.

Carvalho, how he was the one who taught her how to retouch, and why he never changed to color photography. For him, "only black and white was art."

Esmeralda worked in a room with others, and while someone retouched the negatives, others cut and framed the photographs, retouched, and colored the prints. She only remembers using artificial light. To limit all the other lights in the room, Esmeralda Cavaco would sometimes cover the head with a dark cloth, like how it was used with the camera, to help focus. She remembers working in an old wood-carved retouching desk. To her, it was the only of that kind she ever knew, and she knew it came from the Lisbon studio.

She did not remember applying the red ink on the glass surface over the faces, implying that the final image was not retouched just by one person but almost like an assembly line. She also retouched the prints but did not color them. She recalls Rogério de Carvalho scolding her for excessive retouching, but she liked to see everyone beautiful.

The most tedious job was spotting, and Esmeralda Cavaco recalls spotting a photograph with more than 1,5m high, which took her an entire day. In the end, she was quite proud of that because it stood permanently in front of the studio's entry door.



Figure 4.39 – Foto-Carvalho: a. Olímpio Ferreira with camera and bag of dry plates, entrance to an olive oil mill, Veiros, Estremoz, by Rogério de Carvalho c1949 (courtesy of Olímpio Ferreira); b. Studio in the late 1930s, with Teodósio de Carvalho and the receptionist (courtesy Natalino Guilherme and Maria Luísa Guilherme); c. Studio in the 1940s (courtesy of Olímpio Ferreira); studio in the 1960s (Estúdios Correia).

Olímpio Ferreira shared more information on other workers. For instance, unlike Esmeralda Cavaco, at least one other retoucher, Manuel dos Santos, had learned retouching in a fine-arts academy.

As a thirteen-year-old boy, Olímpio Ferreira was quite proud to be a photographer's apprentice; unlike other boys his age, he got to wear a jacket to work, which made him distinguished among the others (Figure 4.39a).

Rogério de Carvalho was known for being difficult as a photographer, but Esmeralda Cavaco and

Olípio Ferreira, both recount Carvalho's generosity as an employer. He would encourage each employer to learn about every aspect of the work in the studio. Then each one would end up doing the task they like/fit best. Esmeralda Cavaco started as a receptionist. Likewise, Adelina became responsible for preparing the chemicals. And Olímpio Ferreira, after a short absence, for military service, returns to become the main photographer. The first task Olímpio had to do as an apprentice was to sweep the floors and scattered wood shavings to keep the studio free of dust – it was an essential task because it reduced the need for spotting negatives and prints.

Retouching practice in Foto-Carvalho collection.

Information about retouching and general studio work can be found by observing the negatives and reading the annotations scratched into the emulsion and written on the enclosing paper sleeves (Figure 4.40). The writings also show how retouching materials suffered genericization and became part of the studio workers' lexicon. *New coccine,* referred to as "cocim," is the red dye, despite what material was used; and "matoléne" is the denomination for any retouching varnish, *mattolein* or not. Figure 4.40b reads: "This plate is not as I would have it, but the client chose it, to improve it give some of *cocim* in the background for better contrast."

In Esmeralda Cavaco's old work orders box, a bottle of Kodak retouching varnish and another with a red powder still survived. The red powder was identified as Crocein scarlet, a similar dye to New coccine.[266] Esmeralda Cavaco also mentioned using retouching colors in solid pans. Olímpio Ferreira also remembers preparing varnish from raw materials but could not identify what they were, only that the solvent had a non-alcoholic, strong odor.

Most of the portraits are typically retouched on the face and hands, with a pencil on the emulsion side and a red colorant on the glass side. Varnish was applied on the emulsion side, strictly over the areas to be retouched and never on the entire surface. Either young or old, men or women, the portraits show whitened faces and softened skins that became characteristic of the Foto-Carvalho work and its time.

Some images show the use of a vignetter; it is always out of focus, as it was supposed to. From the shape, it is possible to infer that it would be similar to the one shown in Figure 1.3. It was a telescopic stand with replaceable cards to give straight or more curved shadow profiles, as seen in Figure 4.40d and Figure 4.44. Many portraits show crop lines etched onto the surface at an angle that is indicative of a

[266] See chapter 3 - *Identification of retouching materials.*

modern skew way of compositing a portrait. This is found in celebrities' portraits of the time and since the late 1930s, namely by photographer San Payo, and in magazines.

The portraits that were visibly retouched with more care were portraits of military men and women. The town has military quarters for the Portuguese Army (the 3rd Cavalry Regiment), and many of the military men would go in groups to the foto-Carvalho studio to have their portrait done in uniform. Unfortunately, there is no portrait record of the past military groups, and no comparison could be made with original prints.

Outdoor portraits often present the same type of retouching as studio portraits. The studio also produced postcards, not printed in the studio, and negatives show particular annotations and other manipulations, such as crop lines, masks (Figure 4.42). The example in Figure 4.43a shows the use of the red dye to recreate clouds on an otherwise blank sky.

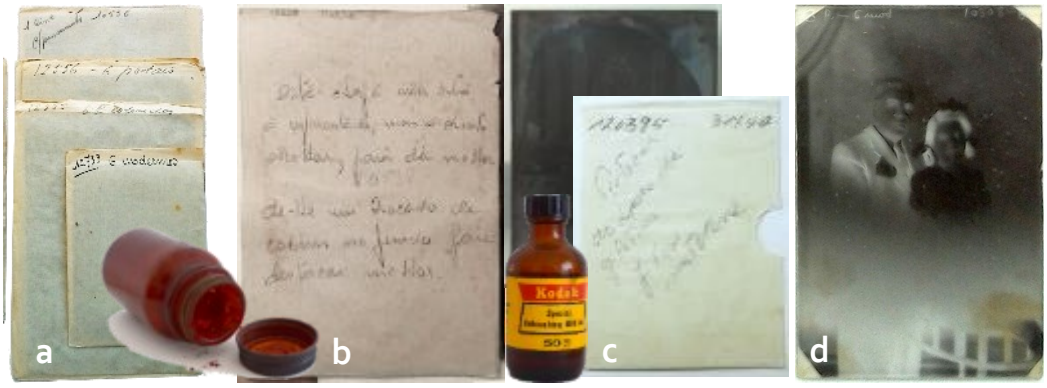


Figure 4.40 – Foto-Carvalho, a. original paper sleeves for individual negatives; b. paper sleeve mentioning "cocim", and bottle with red retouching powder, 1947; c. paper sleeve mentioning "Matolene", a bottle of Kodak Mattoleinm 194?; d. Father and daughter portrait with vignetter, 194? (Estúdios Correia, 16538, 120395, 10308)

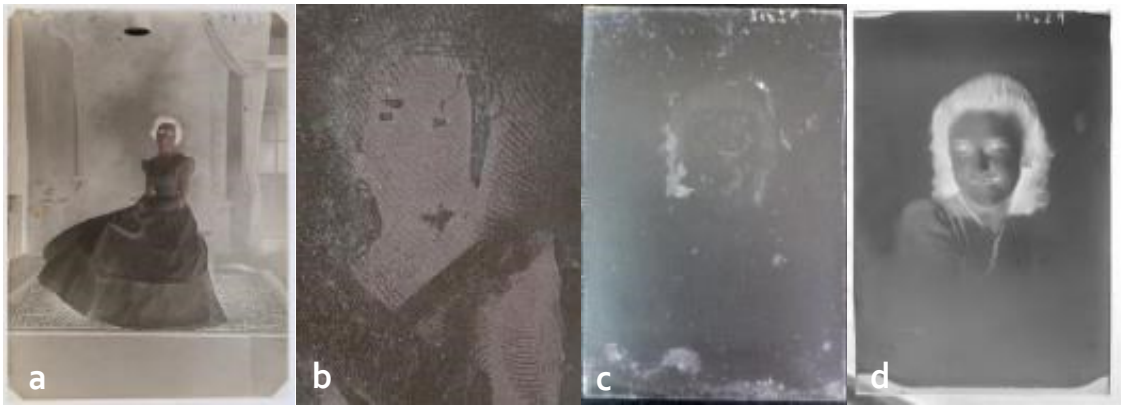


Figure 4.41 – Foto-Carvalho, a. Debutant portrait, 13x18 cm, retouching with red makeup on the glass side; b. detail, macro-photography; c. Girl portrait, 9x12 cm, etched hair, d. viewed in trasmited light (Estúdios Correia, 28796, 11029).



Figure 4.42 – Foto-Carvalho, a. "Queen Saint Isabel sculpture" Image showing paper mask and retouching for total isolation of the sculpture from its background, 194?; c. View of Estremoz with paper mask guide for cropping and size of the final print in meters. (Estúdios Correia)



Figure 4.43 – Foto-Carvalho, a. The construction of the railways (1940's - now deactivated), clouds added by retouching with a cloth or cotton ball; b. Group portrait of Estremoz's Red Cross group; c. detail from b. showing fingerprint, dye applied with the fingers (Estúdios Correia).



Figure 4.44 – Foto-Carvalho, Group portrait, Dr. Crespo with grandsons and granddaughters (1941), a. Original print; b. detail of surface's texture; c. detail of stamp on the back of the print that identifies the negative; d. dry plate negative in transmitted light clearly showing a straight vignetter on the bottom; e. detail of pencil retouching. (Estúdios Correia, 5412)



Figure 4.45 – Foto-Carvalho, Group portrait, Cortes sisters, 1945: a. Digitally converted negative; detail reversed left to right; c. detail from an original retouched print (Estúdios Correia, 10268; Private collection).

This is not a forgotten collection. The clients from the studio still remember it, and it was possible to find and compare the original prints from clients with the negatives in the archive; Figure 4.44 and Figure 4.45 show two examples. What is most striking is the cropping that eliminates part of the image in the negative. The printing papers vary, influencing the overall aspect of the image and helping to conceal the retouchings. Some retouching was done in the prints also. Group portraits were always challenging, particularly with children. Figure 4.45 needed to be retouched in the print to compensate for a distracted girl.

Collection review

This collection was different from the others for several reasons. One, because people can still come and make copies from the original negatives. Two, because it is not yet treated for conservation, and most individual paper sleeves are associated with each negative. The other side of this is that they are quite scratched, and the film part of the collection presents concerning deterioration. Three, because it was possible to compare original prints with negatives, it was possible for comparisons and a complete view of the entire process. And fourth, the opportunity to collect memories from studio workers and clients and the collection's current owners.

The archive does not include larger formats that would probably have more complex retouchings. These would have also been the most expensive, and only a few examples are known, and only the prints. It is the same situation with outdoor portraits of events such as weddings. They seem to have received the same care with retouching, but a more definitive conclusion is not possible because this is also the part of the collection that is missing.

On retouching, the most striking was the random pencil strokes with no perceived common pattern, as observed in other collections. It might be because, in this studio, everyone could retouch or do any step of the photographic process. Still, as prints, the result is homogeneous, and many clients and the interviewed workers guarantee they can identify a "Foto-Carvalho" portrait just by looking at its image. This confirms what was stated in some of the manuals, that each retoucher could find the methodology that would suit them best and achieve similar results.

Fotografia Alvão – a studio from Porto

Much has been written about *Fotografia Alvão* studio and the fond now housed at the CPF. Therefore, the full description of its history will not be made. It can be found in reference works and academic research (Serén, 1998; Figueiredo, 2000; Lacerda & Gravato, 2007)[267] and accessed in CPF's archive database.[268] It will be included, however, relevant information on a few key points, including some not usually described, but essential to better understand the collection conservation condition, as well as the photographic studio's way of working.

Studio's history – shared authorship

Domingos Alvão became an apprentice, at a young age, to the important photographer established in Porto, Emílio Biel.[269] Alvão also spent time in Madrid, learning more about photography. At the turn of the century, he returns to be the manager of the Photo-Velo Club studio and shop at the no. 100 of Rua Santa Catarina in Porto, owned by the capitalist Leopoldo Cyrne. It would be in this location that on January 2nd, 1902, Domingos Alvão would inaugurate a photography studio under his name (officially founded in December 1901). Later the studio moved to the no. 120, in the same street where it exists today.[270]

Fotografia Alvão is a narrow front in one of Porto's most busy streets, but the building extends to the back, and at one point, a courtyard behind reached the opposite street. The actual studio was illuminated by natural light (Figure 4.46b) as described in the periodical *A Voz Pública*:[271]

> A portrait studio with good natural lighting, some simple backdrops reproducing skies and fog likes scenes, small and easily movable furniture, and, above all, with a soft presence; everything is a gift [...] with the most modem equipment for the studio, laboratory, printing, etc. [...] where it is [...] perform [...] the most challenging works in photography, [with] pampering and taste, such as artistic portraits, studies with light, compositions, distinctive poses, etc., etc.[272] (A Voz Publica, Jan. 2nd, 1906 as cited in Figueiredo, 2000, p. 150).

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[267] Lacerda & Gravato, and Serén refer to the collection at the CPF. Figueiredo's research, titled *Nacionalismo e Pictorialismo: the exemplar case of Domingos Alvão*, (2000), focuses on the work by Alvão that escapes the CPF collection. It is more directed to art photography and commission work by Alvão. In his research, Figueiredo also includes a relevant review of the periodicals dedicated to photography circulating from 1899 until 1947.

[268] Archive information about Fotografia Alvão is available online at https://digitarq.cpf.arquivos.pt/details?id=329 [Retrieved February 2021]

[269] Emílio Biel, born Karl Emil Biel (1838-1915), was a German photographer and entrepreneur, established in the city of Porto pioneer to the use and dissemination of the photographic, mechanical prints in Portugal, and published important works, including an edition of *Os Lusíadas*, the epic poem by Luís de Camões, in commemoration of the poet's death third centennial. Other essential publications reunite Portuguese artificial and nature views, namely the well-known *A Arte e a Natureza em Portugal* [Art and Nature in Portugal] with photographs by Biel in a partnership with Cunha Morais e F. Brutt.

[270] The exact date of the move was not ascertained at this time.

[271] According to Arnaldo Soares the studio only started using artificial light when converted to color photography.

[272] Author's translation

This studio employed several photographers and specialized staff to respond to the work volume, working every aspect of the studio, including retouchers and colorists. One of them was Domingos Alvão's brother João Alvão, that was an artist colorist, referred to in the press as:

> João Alvão (Domingos' brother) was one of Porto's best retouchers, an art he also practiced with proficiency in important studios in Madrid and Barcelona. He is his brother's collaborator in the artistic landscape, coloring it with pastel and giving great beauty without prejudice to the photographic characteristics. It is unique in the country and is remarkable.[273] (cited with just the date, 1927, in (Figueiredo, 2000, p. 150))

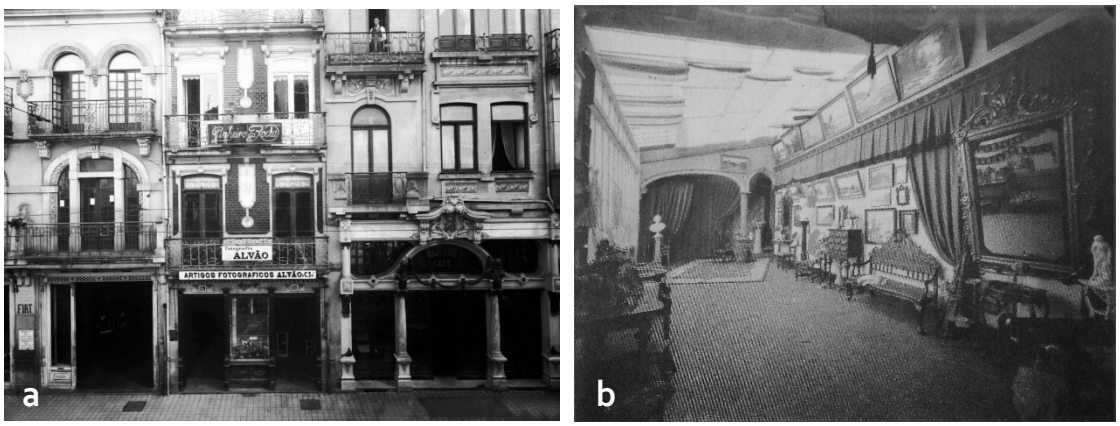


Figure 4.46 – Alvão, a. the studio at the no. 120 of Santa Catarina Street; b. detail inside the studio with glass ceiling and left wall.

Virginia Alvão, daughter of Domingos Alvão, corrects this statement attesting that João Alvão only colored the prints. The retoucher in those first decades, according to her, would be Conceição de Jesus Pereira.[274]

From conversations with the present owner, Arnaldo Soares,[275] and Helena Bandeira, granddaughter of Alvaro Azevedo, it is known that several retouchers worked there and at least in later years, two at the time, and frequently a man and women. As a norm, all studio work was retouched for aesthetic reasons, and outdoor photography retouched to correct minor technical flaws.

From all who worked with Domingos Alvão, the one distinguished most as a photographer was Álvaro Cardoso Azevedo. An orphan at a young age, he started working at 11 years old as an apprentice to Domingos Alvão in 1906. In 1920 Azevedo immigrated to Brazil, at the time already married and with

[273] Author's translation

[274] Maria Virgínia [Alvão] de Jesus Ribeiro, daughter of Domingos Alvão gave interviews for Filipe Figueiredo's research (2000).

[275] Conversations with Arnaldo Soares, a visit at the No. 120 at Santa Catarina Street, May 16, 2017. And visit to CPF by Helena Bandeira, Alvaro Azevedo's granddaughter, in June 2017.

one daughter. At Alvão's request, he would return after only nine months with assurances by Alvão of giving management to the studio, and in 1924 he becomes partner. As Domingos Alvão was taken with illness, Azevedo would take over the studio and attain sole partnership in 1937.

Alvão was known to be "irascible and authoritarian," contrasting with a "bonhomie" character of Azevedo. But in work, their dedication and perfectionist character were similar, and their relationship more than employer/employee was always that of mentor and friend. They had respect for each other's work. Azevedo always signed his photographs with *Alvão*, even when participating in competitive exhibitions. He was even referred to as Álvaro Alvão, by clients and in periodicals, which he, reportedly, did not take offense, but pride. He believed that using *Alvão,* more than recognition for his mentor, was a brand that he always felt his own (CPF, 2002).[276] They both receive recognition in exhibitions for their artistic works. Both photographers were awarded the Ordem de Cristo (Order of Christ) for services rendered to the Country, Alvão in 1934, and Azevedo in 1943.

On the question of a brand Alvão vs. authorship by Domingos Alvão, some testimonials given by the daughters of Domingos Alvão and Alvaro Azevedo contradict each other. Particularly the authorship of some of the more well-known commission works. After reading both testimonies and the interview with Arnoldo Soares, the hypothesis that seems to fit best is that all the work outdoors, commission, and artistic/landscape photography was done by both, and probably in collaboration. For example, both daughters remember their fathers receiving in the studio and at home indigenous Balanta people from Guinea-Bissau, who had traveled to Portugal to be present at the First National Colonial Exhibition in 1934. And both argue that their memories are the testament that reclaims to their father the authorship of that work. Also, both mention a worker named Cosme/Cosmio that would be the personal assistant of either photographer.

Figueiredo mentions an episode when Domingos Alvão goes to visit the town of Lousã. Alvão was so impressed by its beauty that he asks Azevedo to join him there with the photographic equipment, and both ended up staying there for more than a month. Later, Figueiredo states that he concludes that Azevedo did mostly studio work crediting all the important commissioned work to Domingos Alvão.

Weighing all the facts advanced in the various testimonies and believing them all to be accurate, Figueiredo's conclusion regarding Alvaro de Azevedo is not considered to be correct.

On the contrary, it is believed more probable the Arnaldo Soares' opinion that the reason they are so

[276] Interview with Maria Celeste Azevedo, daughter of Alvaro Azevedo. Casa Alvão: Entrevista com Maria Celeste Azevedo, *Ersatz*, 8&9, Feb. 2002, Porto: CPF.

often mentioned as "landscape photographers" in the press of their time is that they both did little studio work and would only do the portraits of the most distinguished clients. José F. M. d'Oliveira and Afonso Ribeiro would be the permanent studio photographers, as identified in Figueiredo's research. The first would have a partnership with Azevedo after Domingos Alvão, but the second died before Alvão (2000, p. 151).[277]

Similar situations are observed in other studios, like Foto-Carvalho, that has a strikingly similar story – and starting with Nadar. Although Félix Nadar is the most recognized artist-photographer, it is well established that the bulk of the studio work would be under the responsibility of his son Paul Nadar. And that the studio had several photographers, and Paul Nadar would be more a supervisor of the entire process and not the one all the time behind the camera.

In this research, it is considered that portrait photography is authored by a team, that by its characteristics, follows the aesthetics defined by the main photographer. Either by imposition or just because, as in this case with Alvaro Azevedo, or Olímpio Ferreira, from Foto-Carvalho, the photographer simply adopted his mentor's style.

The Fotografia Alvão archive at the CPF

The Fotografia Alvão fond was bought in 1982 from the last and current owner, Arnaldo Soares. However, it only comes to the, then recently created, CPF between 1997 and 1998. Before that, it was housed initially at the Museu Soares dos Reis in Porto and then moved to Lisbon to the now extinct National Archive of Photography (ANF). Because of this, the general conservation condition, in 1998, was that of "concerning."[278] The fond includes more than 130.000 photographic objects and an unknown number of other documentation and photographic equipment.

Due to its size, and limited available resources, part of the negative collection still awaits conservation treatment. The ones most neglected are the studio portraits, and of those, the ones of smaller size. It is because the conservation treatments were prioritized according to manifested interest by the public in specific themes or in preparation for exhibitions.

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[277] The studio would also have workers responsible for other tasks in the studio. Although some of the names are known, the specific tasks inside the studio are at this time unidentified.

[278] According with internal administrative documentation, gathered since 1997 to this day. Centro Português de Fotografia – Direcção-Geral do Livro, dos Arquivos e das Bibliotecas (s. d.) *Processo tratamento arquivístico Fotografia Alvão /1997-2009/2010- (Contexto e fontes de informação, processo de aquisição fichas de diagnóstico e higienização…)*, Porto: CPF-DGLAB [unpublished documentation].

The negatives from the studio work are numbered and would have been kept in order, a common practice inside photography studios. After moving several times between institutions, they are decontextualized from original storage containers, and possibly an individual packaging, and set out of order of production.

Most of the negatives relating to studio portraiture are in plastic containers, separated according to size, a preservation procedure received early in the collection's custodial history.

There are records of conservation treatments done to large format negatives. These records include individual treatment sheets that give a detailed description of the deteriorations found and the conservation procedures received. They also have a description of the object, but the retouching work, when present, is described as part of the conservation assessment.

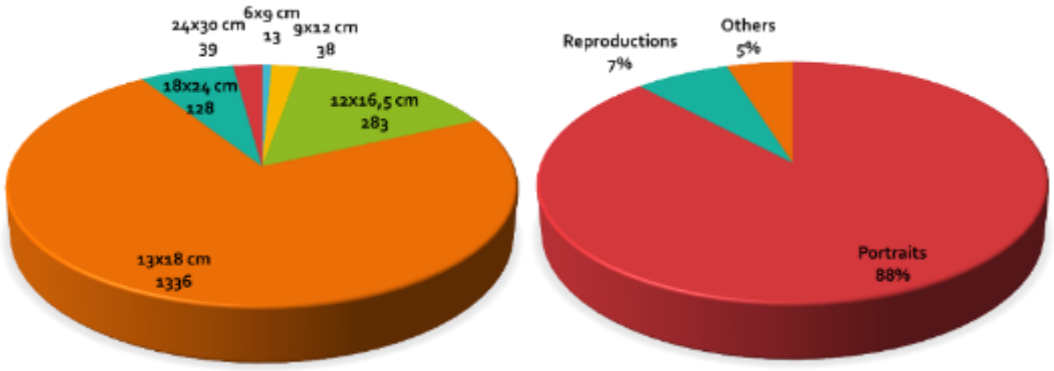


Figure 4.47 – Alvão, distribution of sizes and subjects of the negatives reviewed in 2017, a total of 1837 negatives.

With objects going over one hundred thousand specimens, a selection was needed. The preference was given to large-format portraits. The expectation was that these would present more complex retouchings that could represent the full array of retouching capabilities of the studio. In 2017, more than 1800 were reviewed, most of them with 13x18 cm format (Figure 4.47). The production dates of the selected negatives roughly correspond to the studio's first 15 years and to a time before Álvaro Azevedo's management.

All of these received, during this research, essential preservation treatment and were re-housed in conservation boxes in individual envelopes.[279] In 2018, a selection of 13x18 cm negatives was being treated by CPF staff, and there was an opportunity to observe a few (less than 30) dated from the 1920s.

[279] Basic treatment followed the institution guidelines and included dry cleaning with a photographer's dust blower and soft brushes. The glass support was only cleaned with aqueous solutions. Other treatments included temporary stabilization of fractured and broken negatives, cleaning, and stabilization of biological contamination.

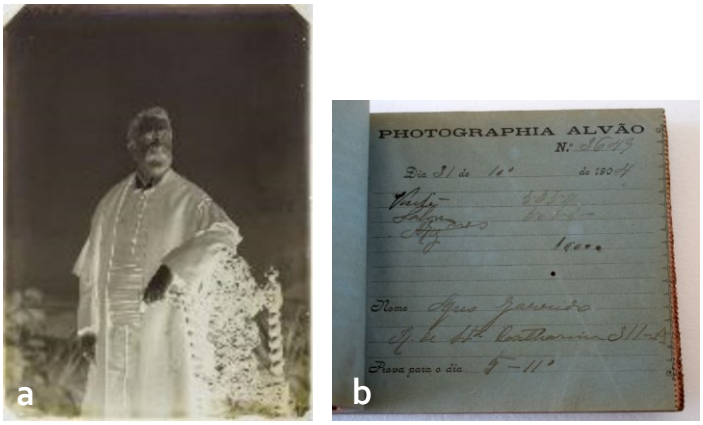


Figure 4.48 – Alvão: Portrait of Judge Aires Guedes Coutinho Garrido, dry plate negative (CPF, ALV, "5055"); b. Receipt book for the negative, Sep. 31st, 1904.

Among other documentation, the Alvão Fond also includes receipt books and proof print albums. It is relatively simple to associate the receipts and proof prints with the corresponding negative by following the number inscribed in the photographic emulsion (Figure 4.48). This task of relating each negative is, however, still to be done and integrated into the archive's records.

Alvão's studio portraits and retouching

Already, in the first decade of the studio, was Domingos Alvão recognized as an artist-photographer and as a pictorialist. His art photography shows outdoor portraits of Portuguese customs and traditions. They are not exactly social portraiture because they are staged, and they are not representative of the Portuguese society because Alvão would choose only "interesting people," mostly women, to use in his compositions. He would pose the women in natural and picturesque scenes such as the ones in Figure 4.49c published in an article in the *Ilustração Portuguesa* magazine. The poses seem relaxed and not taken from established cannons.

However, Alvão's studio portraiture followed the aesthetics of his time, still using the same compositions with painted backdrops, columns, and curtains inherited from the *carte-de-visite* (Figure 4.49b), even if they were *the most perfect* portraits, as announced in its advertisements.

Other reminiscences from the previous century were identified, indicating some technical limitations, such as the use of headrests (Figure 4.50).[280] The innovation is found in the more daring poses. And

[280] These and the following examples were not yet subject of cataloging; consequently, they do not have attributed identification numbers.

not just when it is the portrait of an actor. In Alvão's studio, it is fashionable to have a portrait done in profile or looking backward, and the body rotated in the opposite direction (Figure 4.51). These poses are fond in magazines of that time, suggesting an adopted trend from international photography reaching the studio (Figure 4.32, Figure 4.33).



Figure 4.49 – b. *Elegant Society of Porto*, cover for *IP* with Alvão photography (IP, 463, Jan. 4th, 1915); c. *Mulher da Maia* [The women from Maia] illustrated with Alvão photography (IP, 401, Oct. 27th, 1913).

While studios were photographing everybody, they were still expensive, and the large format would only be available to a selected part of the society. Even for high society doing a larger portrait meant a special occasion.[281] It is no wonder that these portraits were done with care, including retouching. There are repeated poses, but still, each portrait is unique. The same goes for retouching.



Figure 4.50 – Alvão, portraits, examples of different backdrops, props, and the use of headrests, 190?.[282]

[281] In Figueiredo's research, there is a comparison where a portrait by Alvão, in 1920, would cost the equivalent of a schoolteacher's two-month salary. (Figueiredo, 2000, p. 256).
[282] These and folowing exemples were not yet subject of cataloguing, and have no atributed identification numbers.



Figure 4.51 – Alvão, less conventional poses at Alvão studio, 1902-191?.



Figure 4.52 – Alvão, details of retouching in more than just the faces. Pencil and ink are used to highlight clothes and hair.

Lacking more information besides what can be observed on the negatives, retouchings are evaluated by retouchings alone. Figure 4.54 shows a catalog of retouching types for pencil and ink done to the face. Earlier portraits show indistinct pencil marks, almost a smudge. Later the marks are made smaller, more separated, and shaped as comma with a larger starting dot. This suggests different hands.

With ink, the evolution goes similarly. Earlier portraits have makeup completely covering the skin areas, sometimes scratched off in the darker areas of the mouth and eyes, and intensified with extra lines of ink. Later the ink is applied in fine dots or lines, and intensity is given by increasing the density of the spots.



Figure 4.53 – Alvão, etching in the neckline.



Figure 4.54 – Alvão, catalog of pencil and ink retouching types.

Vanity in Fotografia Alvão

While each portrait was perceptibly retouched with particular attention, some aspects are repeated, indicating an established aesthetics and taste. Figure 4.53 shows different examples where the etching was done to the neck, redefining a narrower shape.

A protruding lower lip is apparently not deemed pleasing, and, in several negatives, a slight adjustment is made by etching. An adjustment can also be made to a nose if it is too broad or an ear that sticks out (Figure 4.55).



Figure 4.55 – Alvão, shaping the face by etching, noses, and ears.

Several negatives are retouched to reduce the ladies' waist to an hourglass figure. For the illusion of a slimmer waistline to be perfect, the excess area needs to be removed entirely by blocking it with an

opaque layer. For this, the ink is applied to both sides of the negative. Then, the effect was completed, as already explained, by retouching the print, matching the area to the tones in the background. The hourglass figure did not mean an oversize breast and the example in Figure 4.56c shows a breast reduction for modesty's sake. Sometimes, to compose the *most perfect portrait,* it is enough to adjust a pocket-handkerchief (Figure 4.56).



Figure 4.56 – Alvão, retouching with ink in the waistline; etching used to reduce breast size, and the combination of pencil and etching to adjust an oversized handkerchief.

Collection review

From all the collections study here, this one presented the most detailed retouching. Understandably larger negatives are easier to work on, and as expected, they showcase the retouchers' full capabilities. The negatives from the 1920s show different patterns of retouching, suggesting either a different retoucher or a change in taste, probably a little bit of both.

All details matter in the Fotografia Alvão, and portraits are retouched with care. While the retouchings found do not seem excessive, some adjustments clearly fall outside the search for photographic truth. The perfect portrait does not mean reality. They give, however, insight into taste and beauty in Fotografia Alvão.

Foto-Estefânia – a studio from Lisbon

The archive from studio Foto-Estefânia is owned by the company Lupa – Luís Pavão Lda. and made available by courtesy of Luís Pavão.

The studio and archive

The archive at Lupa was donated in 2012 by Filipe Loriente, the last owner of the studio, Foto-Estefânia. The collection was studied before as part of a practical course on conservation of photographic collections, but not much is known from its background (Trindade, 2014).

Foto-Estefânia studio apparently did not exist before 1914, as it is not included in Luís Pavão's survey (1990).



Figure 4.57 – Objects from the Foto-Estefânia's archive selected for this research, including a retouching desk.

The stationary found in the negative boxes gives some information, albeit limited. At some point, there were two shops at two near addresses, at the plaza and street D. Estefânia in Lisbon (Largo D. Estefânia no. 11, and Rua D. Estefânia no. 151-A). At the latter, it exists another photography studio working today with digital photography.

Through the stationary, it was found the name of Arménio Pereira, also identified as an owner of Foto-Estefânia and, at some point, Filipe Lorient Pereira as manager. Receipts from 1930/32/43 identify Arménio Pereira as a manager, and only the shop by the plaza D. Estefânia, no. 11, and have no mention the name of Filipe Loriente.

Luís Pavão estimates that the negatives on glass were produced in the 1930s and 1940s; this is confirmed from the receipts.

The objects selected for this study include a retouching desk, some retouching materials, ten original

negative boxes with 48 negatives, and two conservation boxes with 23 negatives.[283] Figure 4.57 shows the general aspect of these objects. One of the boxes also contained other material on film that finally was not considered. They all have 18x24cm (7.09x9.45 in.) and are mostly portraits.

The negatives in the original negative boxes have not yet received conservation treatment. The ones in conservation boxes were cleaned, the emulsion with an air blower or soft brush, and the glass support with a solution of water and ethanol (50:50). Those with fractures or cracks were repaired using the sandwich method, which stabilizes the negative by encapsulating it with additional glass support (Figure 4.58a). Even when encapsulated, it is still possible to observe the retouchings by avoiding the reflections of the extra glass surfaces (Figure 4.58b). Milene Trindade, the conservator responsible for the treatment of some of these negatives, in her report, noted that one of them presented, what she called masks, on the glass surface – what is called makeup – and did not cleaned the areas with aqueous solutions. However, the solution was used on the rest of the surface.

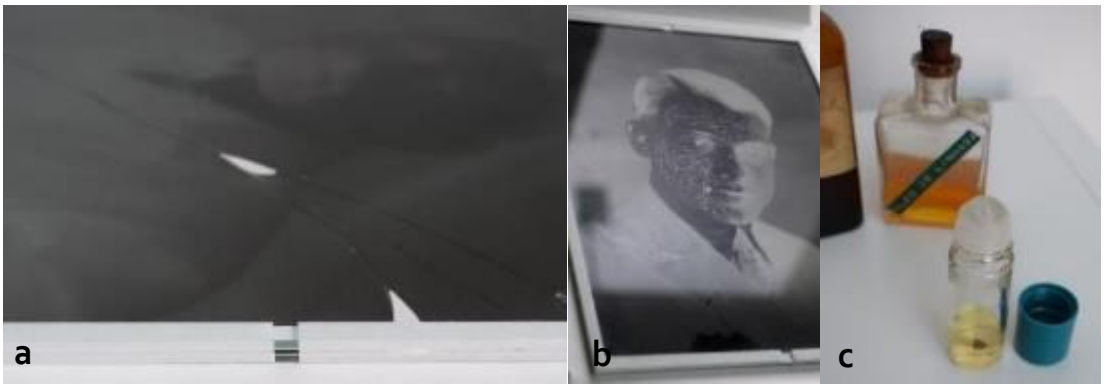


Figure 4.58 – a. Negative preserved in a glass sandwich, detail showing layers, and missing areas filled with a paper board cut to shape, treatment by Milene Trindade (2014); b. Another example; c. Roll-on flask with oil-base retouching varnish (Lupa).

According to Luís Pavão, from information given by Filipe Loriente, he was a photographer and the retoucher of his negatives. Loriente used, as a retouching varnish, a mixture he prepared with linseed oil and spirit of turpentine, and he applied it, ingeniously, with a roll-on flask (Figure 4.58b).

Retouching practice in Foto-Estefânia collection.

From the probable production dates (the 1930s, 1940s), the receipts suggest a similar story, as seen in the other two studios. Arménio Pereira probably started as a photographer and only later the owner. At one point, two studios existed, suggesting a staff of workers, more the one photographer, and at least

[283] Two of the boxes were empty, with only paper fragments and a few receipts, correspond with the negatives already treated.

that many people doing retouching. Filipe Loriente began to work at Foto-Estefânia later, hired as an apprentice or photographer, possibly when the studios were already using film.

The retouching desk is covered with a cardboard mask with a small aperture for film negatives, attesting that these were also retouched. The cardboard would not have been original, but other similar artifices were used to the size of each negative. This was done to enhance details on the negative by blocking all light in its surroundings. On the one hand, it suggests that even when small negatives became common, some kind of retouching was still practiced. On the other hand, this desk is constructed like the ones described in the old manuals, from even before the twentieth century, suggesting it would have been used since the beginning, with glass plate negatives.



Figure 4.59 – Foto-Estefânia, varnish stains: a. Portrait of a cello player; b. Group portrait (Lupa).

Only 71 negatives were observed, but their production spans 20 years or possibly more. Adding to this, little information is known about the studio, which limits possible generalized conclusions.

The information by Loriente was that he used an oil-based varnish. However, from manuals, the assumption is that the typical retouching varnish is resin-based. These have protective properties, as explained, and can be identified in the aged negatives for lack of deterioration in the varnished areas (Figure 4.59a). One example from this collection shows yellowing of the varnish (Figure 4.59b).[284]

The deterioration of oils is well known by conservators, as reticulation occurs, changing the structure of the oil film with consequent yellowing (Mallegol, Lemaire, & Gardette, 2001). But the other negatives do appear as expected, suggesting the use of a different type of varnish. Another possibility for this, however, is an external cause for the yellowing, for example, contact with other materials, such as acid papers. Figure 4.60 shows an unvarnished negative with distinctive yellowing in the center in a

[284] Another example was presented in Figure 2.33, see above.

rectangular shape suggesting prolonged contact with a sheet of paper of that size. In the original boxes, negatives are indeed separated by small pieces of paper.

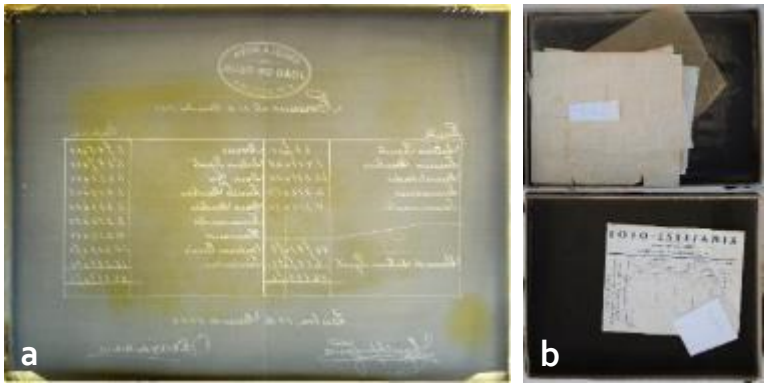


Figure 4.60 – Foto-Estefânia, yellow stains: a. Reproduction of document, unvarnished negative; b. original storing boxes (Lupa).



Figure 4.61 – Foto-Estefânia, portraits, detail of the face, different patterns of pencil retouching (Lupa).



Figure 4.62 – Foto-Estefânia, pencil retouching, a. Composition made from prints, retouching in faces and eliminating contour lines; b. Retouching of arms and hands; c. Retouched wrinkles in stockings (Lupa).

Different patterns of pencil strokes are found (Figure 4.61). Particularly on the retouching of faces. Either almost like an ink mask covering the skin with intensification in certain areas around the eyes, mouth, and nose. Opposite, some portraits are retouched, only following the direction of wrinkles and

expression lines. Some present long strokes, while other smaller ones.

Pencil is also found in other skin areas, such as arms and hands, and occasionally used in the background and other details (Figure 4.62).

Only experienced hands would do the etching work, and very detailed etching was found in this collection. Figure 4.63 shows examples where the etching was used to define and sharpen contours around a monocle, hair, and neck. Another example was shown in Figure 2.31, where the etching was used to erase the background.

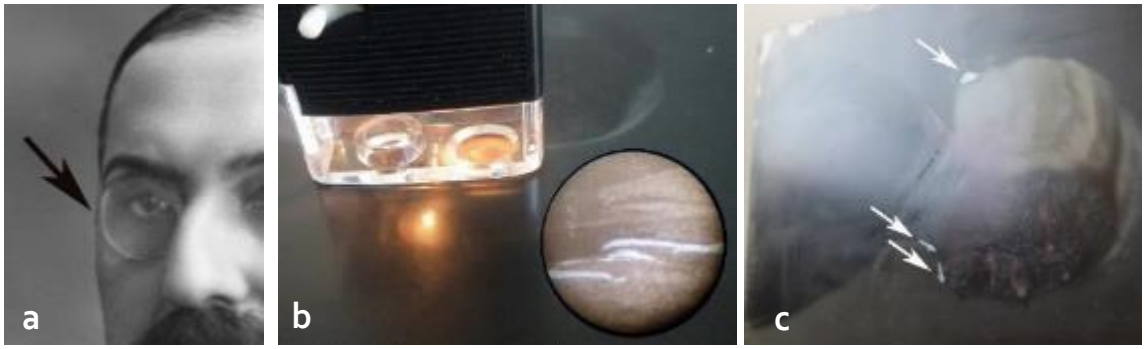


Figure 4.63 – Foto-Estefânia, Etching, a. portrait of a man, detail of the retouched dark lines; b. detail viewed with a handheld microscope with 50x magnification; c. portrait of a woman with etching (Lupa)



Figure 4.64 – Foto-Estefânia, Makeup retouching, portraits (Lupa).

The most interesting about this collection is the makeup retouching that was done differently from other collections. The typical application of the red dye to correct exposure on the face, done with the fingertips, still exists. On top of that, detailed work is done with a brush in spots or very fine lines. The red dye is used similarly to pencil retouching in some cases; in others, it is used to introduce highlights, for example, a line on the nose is repeated in several portraits. Some have a crosshatching pattern that was not found in any other collections.

The use of paper masks was also found. They are sometimes complemented with retouching with red or black ink (Figure 4.65).



Figure 4.65 – Foto-Estefânia, Masks, a. group portrait with ink mask to prepare for an individual portrait; b. group portrait with a doll with masking done with black paper and ink; c. Detail (Lupa).

Collection review

Even with a small number of examples, some repetition was found. The examples presented indicate a specific way of retouching, which is characteristic of this studio, mostly in the aesthetic retouchings. The highlighted line on the nose was also seen in Fotografia Alvão in later negatives, which might indicate a change in aesthetics, not just a characteristic of one photographer but a shift in general taste. Even today, the nose is highlighted in professional cosmetic makeup, so it would be interesting to trace its uses. From this time, most possibly, the inspiration came from the cinema, glamour photography, and new studio lighting. The pointillism crosshatching patterns with the red dye suggests that the retoucher had training in the arts, at least, drawing. Crosshatching was also unique, reasserting a need to survey more collections.

NEG collection at Lisbon's Municipal Photography Archive (AMLSB)[285]

This collection was the subject of a research project and published elsewhere.[286] This research is included as a complement to the other collections. Since first studied, new information was added.

[285] The information included in this chapter was previously published as: Pereira, C. O retoque do negativo fotográfico - estudo de uma colecção do Arquivo Fotográfico da Câmara Municipal de Lisboa [Retouching of photographic negatives - Study of a collection at AMLSB]. *Estudos de Conservação e Restauro - ECR, 2*, 38–57. https://doi.org/https://doi.org/10.34618/ecr.2.3153.

[286] *Idem.* Author's research project integrated with the master's degree in Conservation Science (2009-2012).

The archive

The Lisbon's Municipal Photography Archive was created in 1942 and moved permanently, in 1994, to its current facilities at the 246th of Rua da Palma in Lisbon. It reunites photography collections from Lisbon, and its mission is the preservation of documents and memory of Lisbon, integrating collections from all the city's public services (Boas, 1997, pp. 1-4).

The collections are identified with three letters, usually corresponding to the name of the photographer or donor, similar to what is done at CPF. However, the NEG collection is different as it reunites negatives and other photographic objects that do not integrate any other collections. NEG stands for *Negative and Positive Collection*. It consists of 5126 objects on a glass support.[287]



Figure 4.66 – AMLSB, stamp glued on the negative (LSM-0923, previously NEG-1036).

It is known that one collection was bought from the auctioneers Soares e Mendonça in 1965. At the time, the reason presented for the purchase was the "interesting variety of the subjects depicted" (Silva A. J., 1990, p. 13). Some negatives integrated other collections, namely the LSM collection (a direct reference to the purchase from auction [Leilão] *Soares e Mendonça*). Others became part of the NEG collection, but after the move and all the years left forgotten, more data about provenance was lost (Dias, 1997, p. 3).

One negative, at least, still has the auctioneers' stamp (Figure 4.66). In 2009, at the time of the first research, this negative was still integrated with the NEG collection but has since then migrated to the LSM collection. The same may have happened to other negatives as the archive staff identifies them.

The negatives have different sizes and themes, of which 1/3 are portraits, and 3/4 of these are retouched. The collection itself is not organized thematically or chronologically. While it is not possible to say how many different photographers created the negatives, they were produced with different cameras,

[287] The online database only lists 4891 documents. The reason for the 241 difference is not known, but most of them are either unidentified subjects or authors and possibly these were identified and integrated with other collections. Not all are negatives, and it also includes some positive transparencies that will not be considered for this study.

identified by the size and the markings left on the negatives. Also, the negatives were produced for two commercial activities, portrait studio, and photojournalism.

Since the first research project, the collection was made available online on several platforms that changed through the years. The latest version from 2020 is similar to that used by the CPF but does not present additional information to the previous ones.[288]

Summary of the previous study

Unlike the previous collections, there was the opportunity to do a more systematic survey, summarized in Figure 4.67.

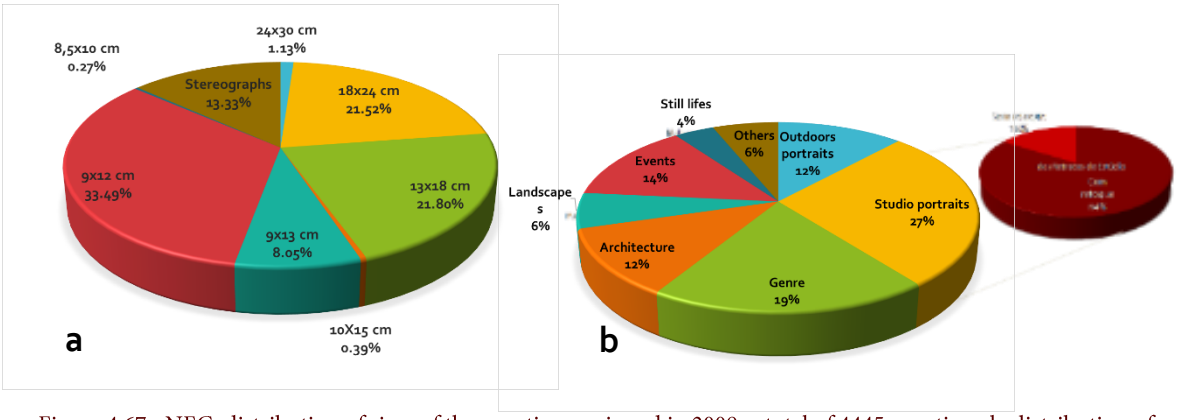


Figure 4.67 - NEG, distribution of sizes of the negatives reviewed in 2009, a total of 4445 negatives; b. distribution of subjects, portraits are 27% of the collections and of these 84% have retouchings.

Four thousand four hundred forty-five records were created on a datasheet, each negative was identified, and it was registered the type and placement of retouching when present.[289]

There was also the opportunity to experiment retouching on negatives separated from the Archive's collection destined for "purge." With kind courtesy from the Archive's team, some prints were done from selected negatives. The results from these tests were addressed in chapter 5.

Because the author, production interval, and purpose of the collection are not identified, the types of retouches found will be presented only as a catalog and not as an accurate characterization of the collection.

[288] It is possible to know more about the archive at the official website: http://arquivomunicipal.cm-lisboa.pt/pt/; or browse images at the online database https://arquivomunicipal3.cm-lisboa.pt/X-arqWEB/. [Retrieved February 2021]

[289] Stereographs and positive images from the collection were not included in these records.

Catalog of typical portrait retouching[290]



Figure 4.68 – AMLSB, make-up, catalog of types.

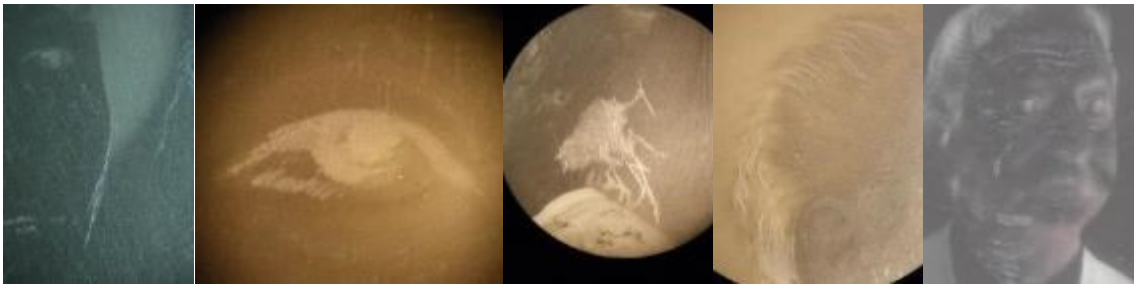


Figure 4.69 – AMLSB, etching: defining contours, intensifying the gaze, fixing stray hairs, grooming the mustache.

[290] No images are presented of varnishing. The varnish was applied only in the areas where the pencil is used, as expected, and as seen in examples from all other collections with no distinctive feature.

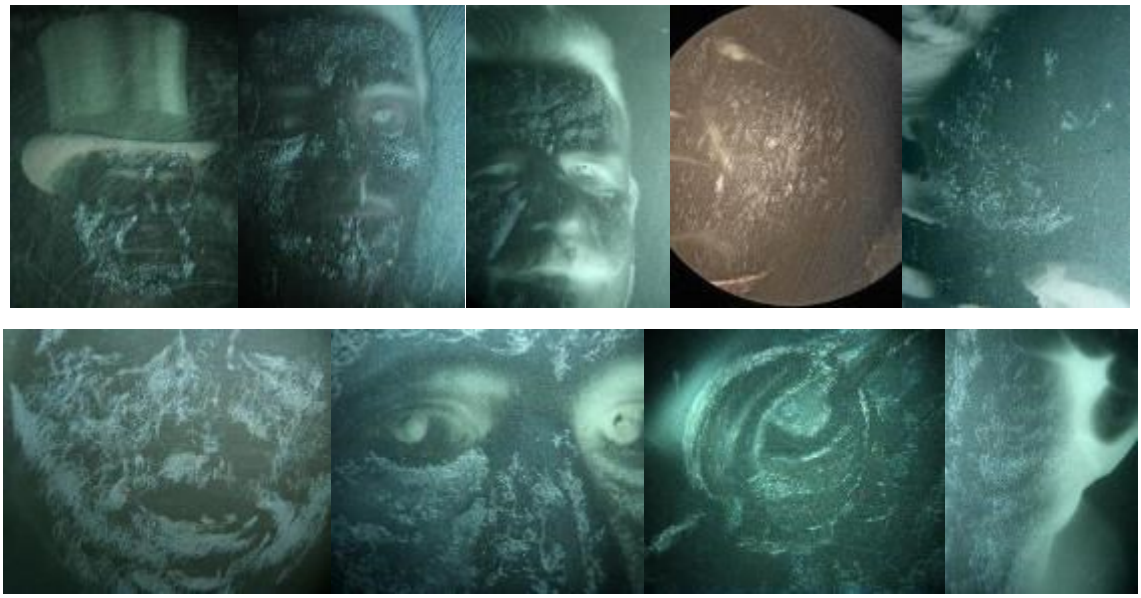


Figure 4.70 – AMLSB, Pencil retouching, smoothing and sharpening face features.

Other retouchings



Figure 4.71 – AMLSB, retouching in colors, fixing exposure and contrast, adding volume, separating the sitter from the background; a nun's wimple should be bright white; correcting half-tones in a shadow.

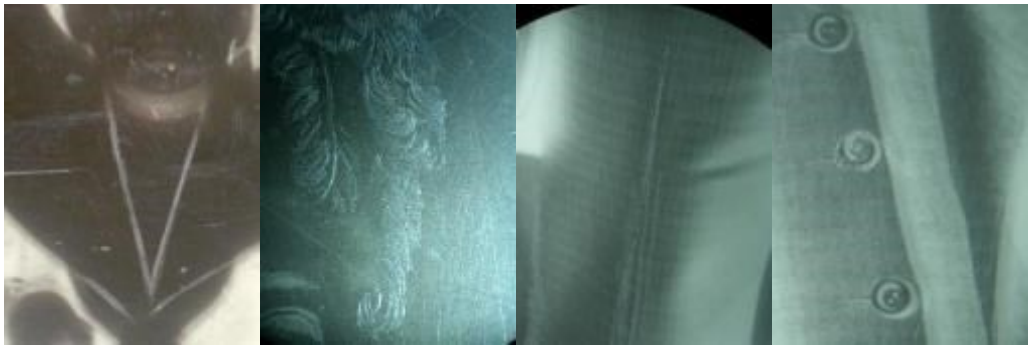


Figure 4.72 – AMLSB, Pencil retouching: sharpening a tiny sailor's costume; Defining the fine white feathers on a military helmet; tailoring for a sharp look, fixing the front crease in the pants, and replacing the missing button.



Figure 4.73 – AMLSB, sharpening an unfocused pair of little dancers, etching + pencil (AMLSB, NEG-0842).

Masks



Figure 4.74 – AMLSB, catalog of ink masks.

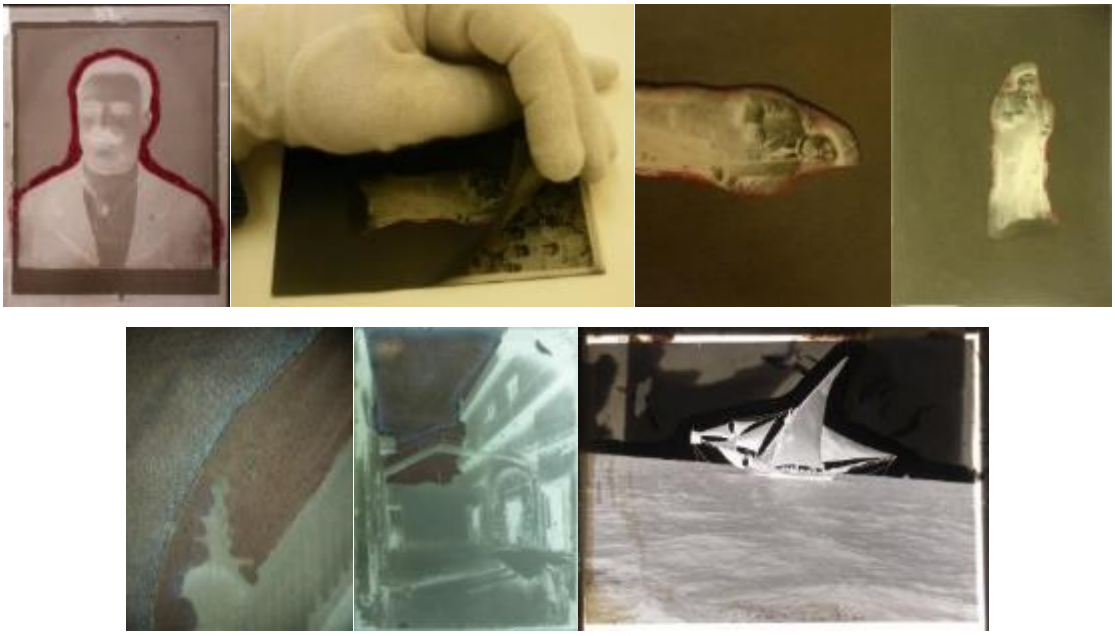


Figure 4.75 – AMLSB, the combination of ink and paper masks

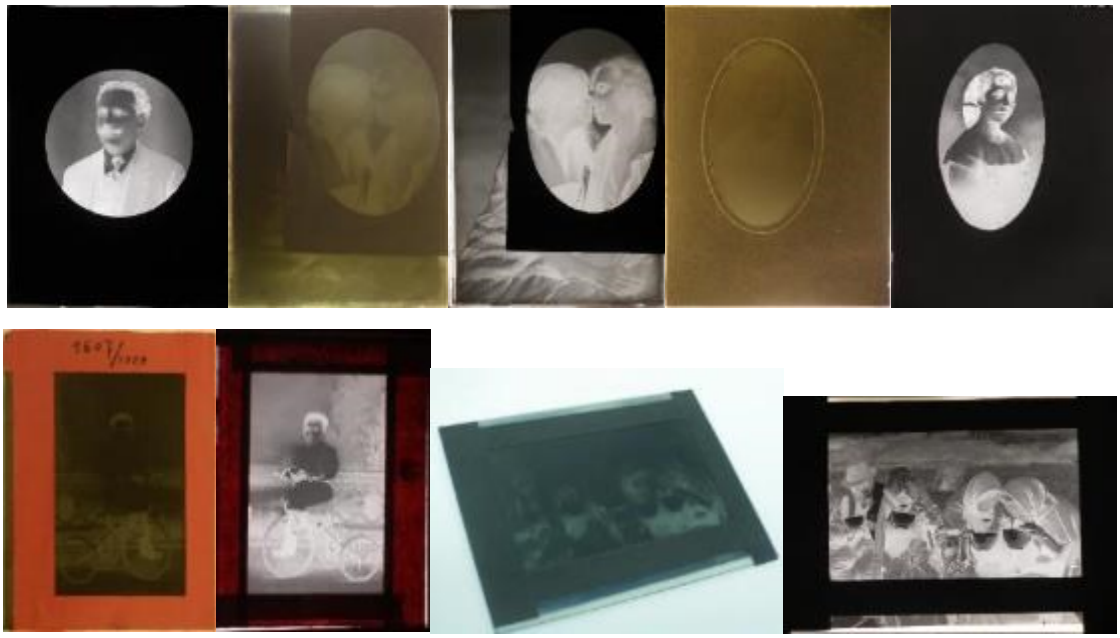


Figure 4.76 – AMLSB, framing the subject with a paper mask.

New interpretations – Rediscovering Arnaldo Fonseca

Seeing the collection with fresh eyes

The original purposes identified in this collection were studio portraits and photojournalism. Many images depict events such as visits to Lisbon by dignitaries, national and foreign, sports, scientific meetings, crime scenes, building fires, activities attended by the Royal family, or later with the Republic, personalities from the Portuguese government, and other social events. The portraits seem to have been produced for individual purposes. Many present written, on the margins, the number of copies, size, and type of print, similar to what was found in other studio collections. However, the collection itself does not appear to have been originated from a sale by an old studio disposing of its old archive. But also, they do not seem to have been brought together randomly.[291] Nowadays, this collection remains disorganized. What might have been an organization system is not identified. Items that are obviously part of the same photographic session now exist separated in the collection, making it challenging to find the common thread.

[291] As seen, items were moved from one collection to another, particularly as authorship identification is ascertained. What was in a seemingly random collection finds its way into a more organized one, that still does not account for much of its original uses. This does not exclude possible later additions.

Old and new sources

With the opportunity to again consider this collection, new interpretations were possible. The known information was cross-referenced with the other collections and other sources.

It was already established that publications, like *Ilustração Portuguesa*, would publish work from different photographers, despite having contracted collaborators. And that these magazines and journals provide a good pool of information on the photographers themselves. Adding to this, nowadays, the internet is filled with aficionados of all subjects, and bloggers and personal web pages exist on every topic conceivable. In photography, particularly, it was found that some are surprisingly reliable, even if most do not include references to their sources. Still, they give clues on where to search next. Coincidence also played its small role, and new data was gathered when researching something else.

The identification of an influential photographer

It will be argued that this collection was a secondary archive, put together from photographs, negative or prints, from different sources gathered over time. Although different photographers probably produced them, at one point, the main contributor is believed to be Arnaldo Fonseca.[292]

Initially, it was thought to be the archive of one studio, as many images possess similarities. The identification followed different clues, and the authorship of several images was confirmed as Arnaldo Fonseca. Once one image was positively identified, others could be too because of similarities. By chance, the carte-cabinet in Figure 5.23 was found on a blog,[293] mislabeled but identifiable as one of the negatives observed for retouching in the first study. The same image was then identified in *Ilustração Portuguesa,* also signed as Arnaldo Fonseca (*IP*, Jun. 15th, 1908, *121*, p. 148).

The positives did not show much, but the negatives show more, and the same backdrop was looked for in others, and it was found. There are many backdrops in the images, but a connection between them can also be made because different settings used the same tables and chairs. Like breadcrumbs, it led to the conclusion that most of them are from the same studio.

However, several images are visibly produced after 1910, when it is known that Arnaldo Fonseca

[292] Arnaldo Fonseca is mentioned several times throughout this text. He was a photographer and author and is mentioned in regards to the magazine *Boletim Photographico* and manuals on photography. See chapters 1 – Portugal – Boletim Photográphico; 2.2 – Arnaldo Fonseca.

[293] Blog by Manuel Marques: http://manuel-bernardinomachado.blogspot.com/2014/11/republicanos-esquecidos-fonseca-com-um.html. After contacting the blog's author, the label was corrected. [Retrieved February 2021]

already abandoned his work as a photographer. Another photographer could have picked up the same studio after Fonseca.

Upon closer attention, the collection presented some anomalies suggesting that it was not a typical archive from a studio. Various images from the archive were found in publications, notably a relevant number of studio portraits. This is not uncommon and has already been shown in other collections, for example, the Fotografia Alvão. The anomaly was in the perceived amount compared to the archive's size, which is relatively high. Moreover, no exhaustive research was done on other periodicals, which might have identified even more published images.

Retouchings also provided clues. The usual practice was to print only the best negative, and the one selected was the one retouched. This archive presents several negatives with technical problems, such as lack of focus or movement, which are retouched. Stranger so, if considered to be the archive of a photographer with Arnaldo Fonseca's known quality. In any studio, flawed negatives would typically be discarded.[294] No client would want to pay for flawed portraits. However, in this collection, some are even retouched, suggesting that they were printed, for example, the one in Figure 4.73.

The hypothesis is that these were extra negatives supplied to news media; one suggestion the daily journal *O Século*, which also edited the *Ilustração Portuguesa* magazine. Further research is needed to identify who owned or gather this archive. However, the authorship of many was established.

Arnaldo Fonseca

Arnaldo Fonseca (1868-1936?) was a studio photographer but also a photojournalist. Photographer of the King, he was a Republican at heart. After the revolution in October of 1910 that deposed the monarchy and established the first Portuguese Republic, Fonseca retires as a photographer. He joins political life as a diplomat from 1911 and until 1935. He was stationed in various places, in order: Manaus – Brasil, Vigo – Spain, Verín – Spain; and as Consul to Canton [Guangzhou] – China, Bahia – Brasil, Porto Alegre – Brasil, Marseille – France, and finally Lyon – France. During this time, he was honored as Commander of the Order of Christ and Knight of Santiago's Order. He also had a brief stay in the Ministry of Foreign Affairs in 1911-1912.

[294] It is acknowledged that, as a safeguard, the photographer would produce more than one negative in each session and then chose the best one. However, experience suggests that the not selected ones were only rarely kept. The one selected would be retouched and preserved, and the rest was discarded.

He was a writer on photography[295] and politics. He wrote technical texts, opinion articles, and even proposed legislation for photography.[296] In politics, he is known for *Do Regicídio à República* [From the Regicide to the Republic], with a presentation article in *Ilustração Portuguesa* (Mar. 27th, 1911, *266*, p. 389), among other texts.[297]



Figure 4.77 – *Ilustração Portuguesa*, by Arnaldo Fonseca: a. "Na Cidade dos Esplendôres" [In the City of Splendor], with a large view in the centerfold; b. "O Sétimo Céu Carioca" [The Carioca Seven Sky]; c. "O Rio Pobre" [The Poor Rio]; "O Rio Monumental" [Monumental Rio], (no. 146, 154, 160, 178)

The photographer

Arnaldo Fonseca was director and co-founder, with Julio Worm and Arnaldo de Bettencourt, of the Portuguese Photography Society in 1907. But before that, he was the director in 1889 of the Lisbon's Photographic Institute. Also, director from 1890 to 1892 of the *Boletim do Grémio dos Amadores Photographicos* [Amateur's Photography Guild bulletin]; and, already mentioned, editor of the photography magazine *Boletim Photographico*, from 1900 until 1908 (Sena A. , 1991; Sena A. , 1998).

As a photojournalist, he was not only the photographer but also the writer of the essays that accompanied his photos. For example, In 1908, he traveled to Brazil and participated in the National Exhibition that commemorated the Centennial Opening of the Brazilian Ports to International Commerce, represented in the Portuguese Pavilion. *Ilustração Portuguesa* published an extensive

[295] A note about Arnaldo Fonseca's contribution as a writer on photography, see also chapter 2.2 – Arnaldo Fonseca.

[296] A legislative void was felt on the question of the author's rights, and it was the topic of debate, namely in the *Boletim Photographico*. Fonseca's text, *Propriedade Photographica* [Photographic Property], was published in no. 66, in 1905, and again in French, *La Propriété photographique*, published by Worm & Rosa, the same year. Only later would Portugal sign the Berne Convention for the Protection of Literary and Artistic Works in 1911, and only in 1927 would Portugal have its legislation by decree on the *Propriedade literária, scientítica e artística* [Literary, scientific and artistic property], which included specifically photography. Diário do Govêrno n.º 114/1927, Série I de 1927-06-03.

[297] Information collected from the work by Luís Pavão (1990), the Hemeroteca Portuguesa (http://hemerotecadigital.cm-lisboa.pt/Periodicos/BoletimFotografico/BoletimFotografico.htm) and by Manuel Marques, the grandson of Bernardino Machado (1851-1944), twice Portuguese President (1915-1917 / 1925-1926), and personal friend to Arnaldo Fonseca.

photo-narrative essay of his travels divided into nine issues, documenting the exhibition and his touristic exploration of Brazil.[298] A year before, he had written another photo narrative essay, divided into two issues, on the forest and Palace of Bussaco.[299]

As a studio photographer, he was attached to various studios and collaborated with other photographers.[300] A survey on the photographers of Lisbon from 1886 to 1914, by Luís Pavão, identifies Arnaldo Fonseca as photography director of the *Officinas Photographicas* of the *Instituto Photographico* (Pavão, The photographers of Lisbon, Portugal from 1886 to 1914, 1990).[301] This is confirmed, for example, in Figure 4.79, where the cover for issue 122 of magazine Brasil-Portugal, from 1904, labeled "Plate by Officinas Photographicas under the direction of Arnaldo Fonseca." Moreover, in *Ilustração Portuguesa*, issue 171 of May 31st, 1909, an image of the Camacho Studio entrance mentions in the label that Arnaldo Fonseca as its Director.[302] As a close collaborator of Julio Worm, it is possible that Fonseca also used his studio, if not an operator there, at some point.[303]

Most studios are named after the lead photographer. The fact that Arnaldo Fonseca's studio is named Officinas Photographicas [Photographic workshops] suggests modesty on his part and that other photographers also worked there.

Uses and retouching practice in Arnaldo Fonseca's photography

Several published images show actors in different poses; they were used to illustrate the dramatization of poems or theatrical plays the actors were on. For example, a series by Actor Augusto Rosa exists complete in negative as found in two pages of *Ilustração Portuguesa* (issue 41, Dec. 3rd, 1906) in a foto-dramatization of a poem titled "O Melro" [The blackbird]. The collection also holds similar series with actress Palmira Bastos, actors João Rosa, Eduardo Brazão, and Taborda. At least some were also printed as single portraits in articles and postcards (Figure 4.78).

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[298] Published in *Ilustração Portuguesa*, issues 146, 148, 149, 150, 153, 154, 160, 178, 180, from Dec. 7th, 1908 to Ago. 2nd, 1909.
[299] Published in *Ilustração Portuguesa* issues 92 (Nov. 25th, 1907) and 101 (Jan. 27th, 1908).
[300] At least one of the issues, about the Visit to Brazil, includes photographs by another photographer, signed as A. Malta.
[301] António Sena refers that Arnaldo Fonseca co-owned Vidal & Fonseca Studio, but it was probably a typing error for the coincidence of names. Vidal & Fonseca was owned by the widow of Antonio da Fonseca that died before 1900 (Sena A. , 1991).
[302] According with Pavão the Camacho studio had been "taken over by the Officinas Photographicas in 1906" (1990, p. 89).
[303] Pavão does not mention Julio Worm's studio in his survey (1990). This might be because he reviewed the Anuário Comercial, an annual directory of all commercial establishments. As mentioned before, Worm's establishment was not just a photography studio but also a photography supplier publishing company. It might have been listed in another section of the directory. Images depicting the Worm Studio and exhibitions with Julio Worm's work exist in the LSM and NEG Collection, attesting to its existence.



Figure 4.78 – AMLSB, Arnaldo Fonseca: a. Composition made from different negatives from the NEG collection reproducing a page in *Ilustração Portuguesa* (NEG-1870, 1866, 1868, 1710, 1712, 1871); b. "O Merlo" [The Blackbird], poetry by Guerra Junqueiro, recited by Actor Augusto Rosa (IP, 41, Dec. 3rd, 1906); c. Actress Palmira Bastos Postcard 31 from series Theatro unidentified publisher, (AMLSB, BPI-0809); d. Actor Taborda, the first page of a eulogy article (IP, 160, Mar. 15th, 1909).

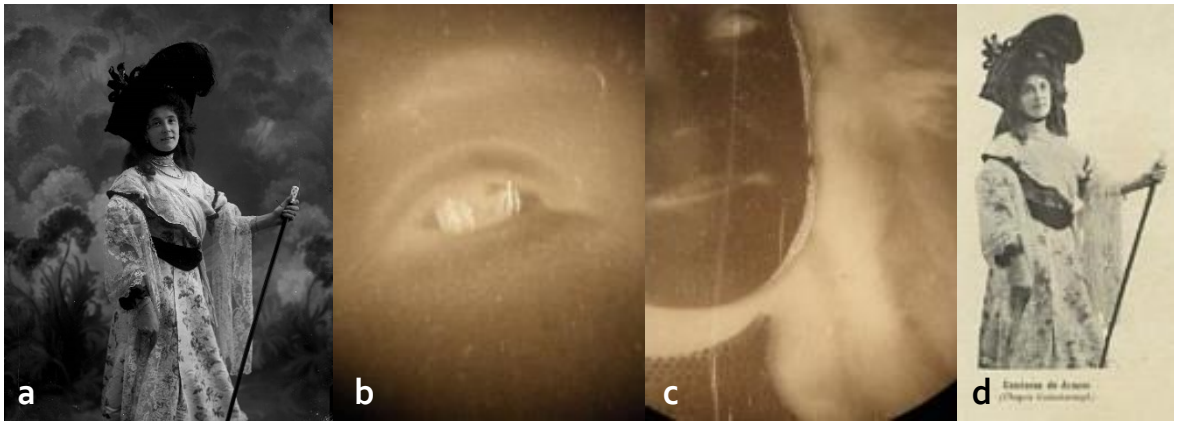


Figure 4.79 – AMLSB, a. Countess of Arnoso with a Gainsborough hat, for the "Têtes" [heads] party, from Officinas Photographicas; b. & c. etched, sharpening features, (AMLSB NEG-773); d. *Brasil-Portugal* magazine cover, no. 122, Feb. 16, 1904).

Who the retoucher was, it is not possible to know at this point. The 18x24 cm (7.09x9.45 in) negatives present the most elaborate retouching, including detailed use of etching, which reveals a skilled retoucher. Fine detailed work is found in the eyes, and Figure 4.79b shows an example. Above, Figure 4.37 was already included as an example by Arnaldo Fonseca with elaborate retouchings. The purpose was to achieve a perfect portrait of Councilor Joaquim José Machado, a military man that would not accept less.

"Collection" review

Overall, the collection presents a great variety of retouchings, including retouching with green and yellow ink, only found mentioned in manuals but not seen in the other collections studied here. And it gives a good illustration of retouching materials and techniques as already presented (Pereira C. ,

ECR, 2010). So only a few comments are added on the ones identified to be by Arnaldo Fonseca.

On retouching, the images show good attention to detail; no hair is left out of place. It does not mean, however, over-retouching. On the contrary, retouching seems to be adapted to each sitter. The ladies were photographed with a flattering soft focus, and retouching brings out the eyes and fixes the contour lines and stray hairs elegantly. Most older people still look old. Except for military men, that have all the details touched up a little, even the age.

The eyes seem to be an important part of retouching. Retouching the eyes is not recommended in many manuals, and others do not attempt the feat. Still, these have the pupils intensified, and a speck of light was added to the iris when needed, demonstrating a high level of the retoucher's ability.

They are not average studio portraits, and many have the look of an official portrait, not just the King's. Actors, as always, show a good relationship with portraiture, adopting more relaxed poses, in some cases, while in others they are dramatized.

Smaller portraits of, possibly, less famous people seem to be more standardized, perhaps indicating that one retoucher was responsible for these portraits, while another more experienced retoucher, or Fonseca himself, would do the most important ones.

The photojournalistic images have fewer indicators of authorship and were not positively identified.

This collection presented an excellent opportunity to know a little more about Arnaldo Fonseca and his work. He is such an important Portuguese photographer with much still to be rediscovered.

Women and retouching

Many more collections are yet unknown. Remembering old photography studios is much more than an archive of negatives or an image database. These archives tell the stories of work and life inside the studios. One element less studied in Portuguese collection is the role of women. Above, it was explored the photographer and the retoucher and their relationship with the client. None of the photographers in these collections were women. However, she was found as a retoucher, a constructor of images in the Fotografia Alvão and Foto-Carvalho studios.

Women's work is frequently left out from art history books, not because their work lacks quality, but because of cultural bias. The social structure was that books were written by white men about selected groups of people, mostly white men, and women appear only as subjects in art. That is slightly less the case with photography. Even if less represented in earlier photography history books, women were active participants. Nonetheless, some got forgotten and are only now being rediscovered. In Portugal,

only recently are women gaining notoriety and being the subject of research. For example, the works on several professional and amateur women photographers by Teresa Flores (2017) and Paula Viegas (2019). Flores remarks:

> The absence of [the artistic side of Queen Maria Pia] reveals Portuguese historiography's difficulties in confronting its own past construction models and questions itself about the invisibilization processes. It is frequently the case when speaking about women's activities, and as verified, even about queens.[304] (Flores, 2017, p. 119)

In the myriad of strange findings during this research, there were several texts on women and photography. One was an encyclopedia of available professions for women in America by Virginia Penny from 1863 that already lists photography-related professions. The profession number 44 is *Daguerreans*; she describes from a received letter:

> A lady Daguerrean and photographer writes me: "Ladies are employed in the business as operators, and to superintend; also to repaint and retouch photographs. With care in the use of chemicals, I do not consider it particularly unhealthy; less so, I think, than sewing by hand or machine." (Penny, 1863, p. 53)

In the number 84, *Photographists and Colorists*, she comments on the viability of the profession:

> There are several ladies in Philadelphia who make their living by painting photographs. Some ladies have quitted the profession of teaching to become photographers. (Penny, 1863, p. 90)

And further in the description of the profession:

> One photographer writes: "Women are employed in every country where there are first-class galleries. It is unhealthy in the operating rooms, on account of the acids and poisons. We pay $4 a week to ladies to attend the show case and wait upon customers. We pay men $6 and $7, because they can do more by one third of the same kind of work than a woman. Any part of the business can be performed by a woman. We pay girls $4 from the commencement. They spend eight or ten hours at the gallery, but are not employed all the time. They are as comfortable as in their own parlors receiving visitors. Ladies prefer one of their own sex in the reception room. There is always demand for superior work in our line; consequently, a prospect of employment so long as the world stands." (Penny, 1863, p. 92)

A curious French article, *[The woman photographer]*, was translated and published in the Portuguese magazine *Boletim Photographico* in 1902, encouraging more women to take on professional

[304] Author's translation.

photography.[305] The author, signed as Gastine,[306] compares how in America and England, there were already "established women photographers" doing a completely different photography style to French photographers. For him, this is essential for women to become professional photographers. They would photograph from home or at the client's home, that Gastine views as suited to women. Also, women bring a different aesthetics that the author encourages as the "modern style" (Gastine, 1902).

He acknowledges that even if he does not know women photographers in France, there are those already doing related work inside the studio or as a service to amateurs. And remarks:

> In these easy and honorable occupations, there are a new precious resource to the weaker sex, as they are well paid, even leading to a comfortable life, if not fortune, when the woman photographer is a skilled practitioner and knows how to create a wealthy clientele. (…)
> At long last, the photographic industry and commerce, and for a long time, occupies thousands of women in France. (…) The photography-related work that a woman can do is well paid to assure a living, if not independence and dignity.[307] (Gastine, 1902, p. 115)

He also recognizes that photography is of great advantage to the professional woman, as other *decent* occupations such as teaching music or crafts were not valued and not paid enough to assure a living.

As final remarks, he adds:

> And everything contributes to predicting that it preserves such advantage. Which is good to be known in a time when the most enchanting half of the human gender cannot find a way to sustain itself if not at the expense of freedom, beauty, and virtue… accelerating our decadence singularly.[308] (Gastine, 1902, p. 115)

The Portuguese magazine *Echo Photographico*, which has a cover showing a woman holding a camera, published an opinion article, in 1909 signed only as Dr. C. N., titled *A Mulher e a Photographia [Women and Photography]*. It also encourages women to take professional photography. The author notices that women photographers are banality in other countries and advocates that women would make "more natural" portraits of children and other women.

Many were the known and mostly unknown women photographers over time. Most referenced in photography history books are Anna Atkins and Julia Margaret Cameron. In their contemporaneous publications, mostly magazines, women are also recognized side-by-side with men by their opinion

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[305] Gastine. (1902). A mulher photographa [Woman photographer]. *BP*, *32*, 113–115. http://hemerotecadigital.cm-lisboa.pt/Periodicos/BoletimFotografico/1902/Agosto/N032/N032_item1/index.html [Retrieved February 2021]

[306] Gastine is possibly Louis Gastine (1868-195) director of the monthly French magazine *La Photographie française* [The French photgraphy] published between 1899-1904.

[307] Author's translation.

[308] Author's translation.

articles and reproductions of their work. For example, during the height of pictorialism, *Camera Work* published works by artists such as Gertrude Käsebier (the central subject of the very first number of *Camera work*), Mary Devens, Eva Watson Schütze, Anne Brigman, Alice Boughton, and Ema Spencer, and many more mentioned.

Portuguese magazines also show examples of Portuguese women photographers, artists, and professionals, albeit at a comparatively smaller scale to men (Viegas, 2019).

Among amateurs, Queen Maria Pia was a known avid photographer. Like the rest of the Royal Family, she had a few images published, for example, in the *Boletim Photographico* as part of her participation in the first National amateur photography exhibition (Figure 1.44).[309]

Professional photographers working and owning studios are less recognized, but they existed. Dorothy Wilding, recognized in chapter 1, is one such example, although almost forgotten at the time of her death.

In Portugal, several women photographers may have worked side by side with their husbands and some may have become independent photographers as widowers. Pavão, in his text about photographers active in Lisbon between 1886-1914 (Pavão, 1990), identifies several studios ran by women, namely:

- Maria Eugénia Rea Campos, active 1891, 1895-1901; and the same as Loureiro studio, active 1902-1914
- Viúva Correia [Widow Correia], active 1895-1898
- Viúva de António da Fonseca [Widow of António da Fonseca], active 1895, 1896
- Antónia Gonçalves, active 1911
- Elvira Loureiro Pardal (Photographia Pardal), active 1895, 1897-1902
- Maria Carvalho (Photographia Phénix), active 1896-1902

The dates presented were retrieved, by Pavão, from the annual Portuguese commercial directory of the years 1888 to 1914, except 1893 and 1894, which Pavão could not get access. Some studio names may refer to women's studios, but they are not specified if they were photographers or just owners. Other studios might have had women operators. More in-depth research is needed to ascertain this. Viegas makes an effort in her master's thesis (2019) to compile women photographers from 1844-1918, and lists in Lisbon:

[309] See chapter 1 - *Portugal – Boletim Photográphico.*

Alda Coutinho, Angelica Serra Ribeiro, Antonia Gonçalves, Elvira Loureiro Pardal, Ida Augusta, Izabel Jacintha Reeckell, Juliette de Humnichi, Madame Fritz, Maria Carvalho, and Virginia Silva

Two names in Azores archipelago:

Luiza Avellar Ribeiro and Philomena Adelina da Silva

It includes seven widows, without confirming their role in the studio as photographers or just owners: Adéle Fillon, Candida Monteiro Corrêa (1848-1911), Carlota Ferreira Guimarães, Maria Jose da Costa Vianna (1868-1937), Widow Pereira, Widow Ribeiro, and Widow Santos.

Frequently, studios would be known by the name of the main photographer. But successful studios, with a large clientele, would have more photographers unnamed in history. Some of them could have been women that cannot be identified unless researching records for each studio. For example, at the Foto-Carvalho studio, Beatriz Alda de Carvalho was the director but without ever being a photographer. Nevertheless, it employed other women to work in the laboratory, the reception desk, and as retouchers. Similar indications exist about the studio Alvão.

Even if Gastine, in his article, declares that American women photographers did not retouch their work (Gastine, 1902, p. 114), this was found to be untrue. Not only have the American woman retouched their images they also wrote and taught photography and retouching. One example is Clara Weisman, mentioned above (Weisman, 1903).

More evidence was found in another fortuitous discovery, a booklet of the Illinois College of photography from 1905-1906. From the listed staff members, the only woman is Ruby W. Bissell, responsible for the Department of Retouching and Etching. It has a section justifying the college and courses with comments by several people, including some that praise the retouching department, for example:

> A NEAT AVOCATION FOR WOMEN. "A woman's natural delicacy of touch is scarcely anywhere more valuable than in the retouching of photographic negatives, an occupation which women find pleasant and profitable. (…) I think that any bright woman can become a fair retoucher in three months' practice. (…) "the work is of a sort specially adapted to women." (Illinois College of Photography, 1905, p. 14)

About women artists that also retouched their work, Anne Brigman is a known example.[310] The

[310] See above, chapter 1 - *Pictorialism in the twentieth century.*

suspicion is that investigation on other artists' work processes would surface more about retouching by women in art.

The women were also a particular subject in front of the camera, and retouching was carefully done to women portraits. Nadar is quoted by the Gernsheims to have avoided photographing women saying that "images are too true to nature to please the sitter" (Gernsheim & Gernsheim, 1969, p. 307). Nonetheless, there are several known women portraits by Nadar.

The peculiarities of women's portraiture were something that many agreed. As seen from the selected collections, the women (and military men) were the most carefully retouched portraits. And women were a special subject in retouching manuals.

An equilibrium was needed between the photographer's intention and the client's expectations. The idea of self, taste, fashion, and visual culture were factors, and particularly, women were expected to have light velvet-like skin attained only by retouching (Figure 4.35).

Undoubtedly, many other dimensions can be added relating to the woman and retouching in photography history. This short chapter is only intended to introduce the topic, add another reason for preserving retouched negative collections, and inspire new investigation avenues.

Chapter overview

The multi-disciplinarity typical of Visual Culture Studies
means that many scholars adopt an eclectic and pragmatic attitude
towards theories - they borrow concepts and methods from a spectrum of disciplines.
What matters to them is a theory's utility:
will it enhance our understanding of examples of visual culture?
(Walker & Chaplin, 1997, p. 60)

The small chapters of interlude between the collection descriptions serve as context and suggest new avenues of investigation. They do not intend to provide a global view on each theme, which by themselves could be the topic of other independent studies. But they give a connection to the social uses of photography and retouching.

The first conclusion is that retouching is only a theoretical debate in the arts. Professional photographers needed the perfect photograph, bound by client approval and their own pride in producing the best result. Retouching allows them to overcome technical aspects and to correct less flattering features. These corrections, however, were bound by personal or socially accepted concepts of beauty.

The example with Aurélio da Paz dos Reis also shows that portraiture is special among other types of photography. Even the self-designated amateur photographer would have his portraits retouched. That there is an accepted aesthetics of what a portrait should be, all collections resemble in some way. Included in the characteristics that made a photograph a portrait are the pose, the studio (or studio-like), and retouching.

The official portrait would be retouched with extra attention, while the regular client would have a portrait with a more standardized retouching. The best photographer had to be or employ the best retoucher as the quality of the product, and by extension, the photographer was entirely dependent on that of the retoucher.

The practice taught in manuals is reflected in actual examples from collections, in the most technical aspects. The MHNC-UP museum collection is one example where retouching was needed and justified, even in scientific photography.

Some manuals also gave recommendations about aesthetics and beauty, but these were changing rapidly, and the published image was the new source of standards. Early portraits from the Alvão collection inherited the nineteenth-century look. However, later portraits, including Foto-Estefânia and Foto-Carvalho, already show the inspiration taken from the actors and other celebrities' glamour portraits.

The conclusion on the best retouchers is that Arnaldo Fonseca was definitively one of them (or the retoucher he worked with). By comparison, the Foto-Carvalho was average, maybe not the technique itself, but because most portraits are repetitions of the same poses and retouchings. Maybe this judgment is unfair because, in the Foto-Carvalho collection, the larger negatives did not survive, which would have been the best showcase for the studio's capabilities.

Fotografia Alvão and Foto-Estefânia compare in retouching techniques, but only the Alvão's later negatives. Once again, this confirms that there is an evolution in aesthetics, taste, and retouching practice. Besides new poses and modernized studio settings, retouchings show the evolution of beauty standards, even in the smallest detail, such as thinning the neck or adding a highlight on the nose.

In the end, a good portrait was the one that corresponded with social expectations, a pleased client, the photographer's intention, and the image he wanted to convey, giving insight into his time and social conventions as a visual cultural testimony and heritage.

5. Conservation of retouched collections

The third group of objectives of this research was to survey and evaluate the conservation of retouched negative collections in order to identify where improvements can be made.

Each of the selected collections has a different conservation history, and some have been in institutions for a long time, while others are still in private hands. This allowed comparing how previous conservation treatments affected retouchings and what are the preservation conditions.

Conservation conditions and what is entailed in the preservation of archive collections were verified. Some aspects were already commented on in the descriptions above.

To recognize what was done and have been done to preserve negatives collections and how they are valued in institutions and by the public is essential to understand their conditions today, improve the practice, and move forward. As conservators are not the only ones responsible for preserving collections, it is also necessary to recognize the entire archive or museum staff's role contributing more directly or indirectly. During visits to collections, interviews were done with staff members with different responsibilities to identify how collections are preserved from the moment they enter institutions and how they are made available to the public.

This chapter is divided into two parts. First, it presents a short review of the theoretical framework for the conservation of photographs and photography collections. As a corollary to the contemporary theory of conservation, it will be discussed conservation and its specificity regarding photography, its evolution, and tendencies today, as they relate to the preservation of retouched negative collections.

In the second part, some of the steps in collection conservation and uses are revised in more detail, such as cleaning, handling, digitization, or exhibition. They directly concern with the knowledge, understanding, and preservation of retouchings.

How retouched collections are being described is also a concern as a quick search of online databases returns very few results. It will also be revised some aspects of photographic collections descriptions. Each issue is explored, and recommendations are given when relevant.

5.1. Thoughts on a theoretical framework for conservation

Our ancestors restored statues;
we remove from them their false noses and prosthetic devices;
our descendants will, in turn, no doubt do something else.
(Yourcenar, 1983, p. 60)

What explains conservation today and the conservator's role also helps understand the significance of retouching practices, how negative collections are valued, and how to ensure its preservation for the future.

Conservation is not, and for a long time now, a subject that follows an accepted text or author. In contemporary times, what dictates conservation are different variables and amalgamations of past and present, collective, and individual perspectives, as part of a participatory model.

It evolves parallel to the concepts of culture and heritage. Each year, conservation as a profession and the practice, commitments, and ethics of conservator-restorers are debated in multiple conferences worldwide. Technological and scientific advances and practical case studies are also shared in meetings to help understand one of the most multidisciplinary research areas.

The contemporary conservation theory is fluid, and it will, for sure, be criticized in the future. For now, it helps to understand conservation today and to fill the gaps of previous theories. Salvador Muñoz Viñas, the author of the *Contemporary theory of conservation* (2011),[311] identifies several approaches to the conservation's theoretical framework. They follow similar reasonings and arrive at similar conclusions. The main difference, he identifies, is one of the central concepts around which the theory is developed: meaning, value, or function (Muñoz Viñas, 2011, pp. 171-181). Similar assumptions can be described using any of the terms, but this text approaches the problem through the concept of value. Considering function might be less versatile and less obvious when it is, for example, to be enjoyed, as many of the visual mediums are. Considering meaning might also be less applicable from an economic standpoint. The concept of value is more interesting because it usually does not stand alone. Its use with a qualifier makes it more versatile, such as cultural value, economic value or artistic value. Following the theoretical texts' model, the following section will start with the characterization of scope and key concepts.

[311] The text *Contemporary theory of conservation* as cited throughout this text is a later edition of a different version published in Spanish in 2003, *Teoría contemporánea de la Restauración*. Before that, a small article was published in English in 2002, in the no.3 of *Reviews in Conservation*.

The history of photography viewed through the lens of retouching, presented in chapter 1, showed how professional photographers, artists, and amateurs, and even historians valued photography differently and how the concepts of photography and art changed through time. This is also reflected in conservation, where many concepts varied in time and have mutable definitions according to context. The following descriptions of key concepts are presented to fit this text, even if others argue different or broader meanings.

Conservation – Object and time

In the beginning, it was stated that this is an object-centered research. It was explained how this was the purview and privilege of the conservator. It is worth clarifying that this understanding of conservation does not mean accepting a narrow focus on European - Western culture or a cultural bias that is recognized, characterized, and even criticized as an object-centered culture.

In its broad sense, conservation goes beyond the conservator as a trained professional and a physical object with specific deterioration and conservation needs. Conservation can relate to the preservation of intangible heritage or intangible values. When the intangible is brought to the discussion of conservation, it may affect the tangible in unprecedented ways. Because decisions are no longer done based on history and science alone but include other professionals from various branches, such as economy, tourism, and activism; and not just a selected group of people but also communities.

Laurajane Smith, in her text *Uses of heritage* (2006), presents the concept of "authorized heritage discourse:"

> Western discourse about heritage, which I term the 'authorized heritage discourse,' that works to naturalize a range of assumptions about the nature and meaning of heritage. […] The authorized discourse is also a professional discourse that privileges expert values and knowledge about the past and its material manifestations, and dominates and regulates professional heritage practices. (Smith, 2006, p. 4)

Her text presents a tendency nowadays that addresses the inclusion of communities and the people using and enjoying culture into the, opposing, "non-authorized" discourse about the preservation of cultural heritage.

Nonetheless, conservation of cultural heritage is argued in the following text from the perspective of the conservator. As understood in this text, the conservator is the professional specially trained for the conservation of cultural property, the tangible part of cultural heritage, meaning that he works with objects. The conservator may recognize that an object has intangible values of memory, significance,

which relate to practice, tradition, or a moment in time. Nonetheless, having to preserve the object, and consequently preserve the intangible through the preservation of the object. There is no need to preserve an object if its tangible qualities, the physical object, are no longer valued. Therefore there is no need for a conservator, as it is currently understood as a specialized professional.

Another ruling concept is time. Repeated often, conservators work on objects from the past, which have reached the present with a value deemed important to preserve, and preservation subsequently redirects to the future. Conservation exists if time is considered relevant. Similarly, the day people only value the present, the conservator profession ceases to have meaning, as it exists today.

Historically the understanding of preservation and time has been the point of criticism. John Ruskin (1819-1900), in his *The Seven Lamps of Architecture*, when writing about memory, stated:

> I must not leave the truth unstated, that it is again no question of expediency or feeling whether we shall preserve the buildings of past times or not. *We have no right whatever to touch them.*[312] They are not ours. They belong partly to those who built them, and partly to all the generations of mankind who are to follow us. The dead have still their right in them: that which they laboured for, the praise of achievement or the expression of religious feeling, or whatsoever else it might be which in those buildings they intended to be permanent, we have no right to obliterate. (Ruskin, 1849, p. 181)

This line of thought significantly influenced conservation in his time and western cultures. The contention point is that this eliminates use in the present and through time by stakeholders and communities in general. Contemporary authors noted that saving for future generations means a loss of value. On the one hand, the future is never reached. On the other hand, people and communities, the non-authorized, the users of cultural heritage, become disconnected from it in the present. This opens questions on the needs for the preservation of cultural heritage.

Smith describes:

> Heritage, according to the [authorized heritage discourse], is inevitably saved 'for future generations' a rhetoric that undermines the ability of the present, unless under the professional guidance of heritage professionals, to alter or change the meaning and value of heritage sites or places. (Smith, 2006, p. 29)

Nowadays, in some situations, the problem might be reversed with an excess of presentism, as attitudes today are valued over historical considerations. Even when recognizing history, and the past, decisions may be carried with the predominance of present values and interpreting the past solely from a present-day view and use. Without recognizing the importance of the past that allowed for the existence of

[312] In italic in the original text.

cultural heritage in the present, and a future and how it will recognize the present day's assumptions as past, there is no need for preservation or restoration of deterioration and damage caused in the present. Conservation may be a timely utopic as actions are taken today, by today's knowledge and today's interpretations of the past and preserve for an unknown set of values in the future.

The tendency opposing the "save for future generations" idea is not just about the people who will enjoy cultural heritage, but also to include them in the discourse contributing with knowledge, value and leading to a more sustainable preservation.

Nowadays, the pass for conservation may lie in between uses in the present and understanding the past and future; between the object itself, its physical characteristics, and the associated intangible values; and between value attributed not only by heritage professionals but also by the "non-authorized" discourses.

Unlike Ruskin's statement, and ultimately, conservation means *to touch them*, the objects. It means evaluation, decisions, and action that indeed alter the object, even if the goal is not the recovery of a damaged object but to preserve what exists today. The evaluations and decisions ultimately are made in the present time, and principles will keep changing as the understanding of culture and world changes.

Key concepts

Conservation

Conservation can mean an area of study, a part of cultural heritage management, a profession, and a specific set of actions on cultural property.

Conservation as an area of study is multidisciplinary. A conservator, or conservator scientist, to have expertise in the many aspects of conservation needs training in areas of study from both human and exact sciences.

As an action, one definition of conservation can be, as adopted by the ICOM-CC (International Council of Museums, Committee for Conservation)[313]:

> All measures and actions aimed at safeguarding tangible cultural heritage while ensuring its accessibility to present and future generations. Conservation embraces preventive conservation, remedial conservation and restoration. All measures and actions should respect the significance and the physical properties of the cultural heritage item. (ICOM-CC, 2008)

[313] Resolution adopted by the ICOM-CC membership at the 15th Triennial Conference, New Delhi, 22-26 September 2008. http://www.icom-cc.org/242/about/terminology-for-conservation/#.X9M0vOZxeUk. [Retrieved February 2021]

Or, according to Portuguese law nº 107/2001, of September 8th, which establishes the bases for policy and regime for valuing and protection of cultural heritage,[314] conservation is:

> [to] properly care for and protect property in order to ensure its integrity and prevent its loss, destruction, or deterioration. (Lei n.º 107/2001)

There are two important notes to these definitions. One, it clearly states that it relates only to property, physical objects, what is referred to as tangible heritage. Second, it does not define who is to do such actions. As a profession, conservation is a well-established independent expertise, but as an action is not done only by conservators. This meaning that "proper" care and "all" measures and actions include all professionals that directly or indirectly contribute to conservation.

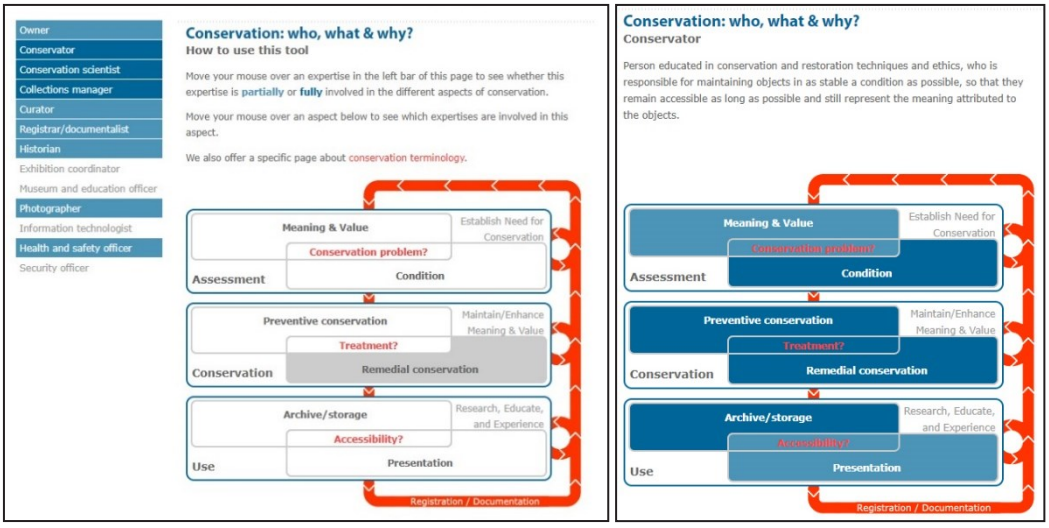


Figure 5.1 – Conservation management and areas of expertise, adapted from *Conservation: who, what & why?* graph, highlighted: a. the professionals involved in *Remedial conservation*; b. aspects that relate to the expertise of *Conservator*, A. J. van Dam (Idea and design) (ICOM-CC, s.d.).

The ICOM-CC web page shows an interactive graph *Conservation: who, what & why?*[315] It identifies different professionals and different actions involved in the various aspects of conservation, in the whole that is conservation management in a museum. Including the following professionals: Owner, Conservator, Conservation scientist, Collections manager, Curator, Registrar/documentalist, Historian, Exhibition coordinator, Museum and education officer, Photographer, Information

[314] According to line b, number, 1 article 21st of Portuguese law for *Policy and regimen for the protection and valorization of Cultural Heritage – Lei n.º 107-2001 - Diário da República n.º 209/2001,* Série I-A de 2001-09-08. https://data.dre.pt/eli/lei/107/2001/09/08/p/dre/pt/html [Retrieved February 2021]

[315] ICOM-CC; A.J. van Dam (Idea and design). (n.d.). *Conservation: who, what & why?* International Council of Museums - ICOM-CC. http://www.icom-cc.org/330/about-icom-cc/what-is-conservation/conservation:-who,-what-amp;-why/. [Retrieved February 2021]

technologist, Health and safety officer, and Security officer.

Choosing different elements on the page, the graph changes identifying who is involved in what aspects of conservation (Figure 5.1). Selecting the *Conservator*, which shows a similar graph to that of the *Conservation scientist*, all aspects of the graph are highlighted, even if the "Meaning & Value" and "Presentation" are in light blue, which corresponds to "partially involved" (Figure 5.1b).

The *Archivist* can be included in this list, as similar reasoning can be applied to archives. In the same way, the security officer has its role, the cleaning staff could also be included.[316]

Conservation practice is divided according to different specialties, and Photography sets its own group, referred to in this text as *Photography Conservation*.

Grant Romer wonders, in *What a photograph is?* (2010) what should be the correct designation as some refer to it as *Photograph* or *Photography* conservation, or other versions. In the Latin languages, such as Portuguese, Spanish, or Italian, this is not an issue as the word is the same for both – *Fotografia* / Photographie (Fr). Because conservators deal with objects, he also suggests *photographic materials* as a "careful" option.[317]

The photograph definition is an open debate. Etymologically was meant as "writing with light." From the Ancient Greek *photos* – φοτοσ – to shine / light (modern "fos" -φως), and *graphos* – γραφοσ – writing (modern "graphí" -γραφή). But this does not account for the prints, generally called *digital prints*, which are not produced using light, but still included in photography conservation. The definition of the profession's focus is essential. The use of *Photography* is not chosen because of the type of objects that receive conservation treatment. It refers to the body of knowledge, skills, and training needed by the conservator, which differentiates it from other branches of conservation and fits the term photography in its broad sense.

Conservation objects

By UNESCO's definition and categories, photography is included in the tangible cultural heritage, and, consequently, photographic objects are in the scope of conservation. However, not all are considered

[316] An anecdote from the conservation training program illustrates the importance and risk of having a cleaning staff unaware of conservation needs. The story is about a person responsible for cleaning in a museum that would open the glass showcases, clean inside with common glass cleaner, and then close the showcase. Aerosolized particles of the detergent would be trapped inside the showcase, which began to cause deterioration in the objects inside.

[317] The American authors seem to prefer the use of *photograph conservation*, and associations like the AIC (American Institute for Conservation), ICON (the UK's Institute of Conservation), or ICOM-CC have *photographic materials groups* maybe in a way referencing to objects and leaving out numeric/digital images.

conservation objects, so it is important to revisit what is. Conservation objects are all that, at some point, or by someone, were deemed worthy of conservation treatment, as opposed to maintenance, repair, or care. As defined in Muñoz Viñas, in *Contemporary theory of conservation* (2011):

> They are conservation objects because a number of people agree that they have desirable social, private or scientific meanings, not because of their material features: for them to become social symbols, they must be socially accepted; for them to possess scientific meaning, they must be recognized by scientists for them to be private objects of conservation, they must have some special meanings for a family, for a group of friends or even for an individual. (Muñoz Viñas, 2011, pp. 152-153)

Value

The worthiness of a conservation object refers to the recognition, in the present day, of assigned values, by a number of people, which ensures their preservation. Although values, meaning, and function are the focus of contemporary conservation theorists, values are not a contemporary concept. They were described before with similar understanding, referring to how people value monuments, by Aloïs Riegl in 1903, in his *Der moderne Denkmalkultus, sein Wesen, seine Entstehung* [The modern cult of monuments: its character and origin]. Values are, however, recognized to be impermanent. As considered today may differ from others in the past, the same way the understanding about culture and heritage changes. Riegl refers to this:[318]

> According to today's terms there is no such thing as an absolute, but only a relative, modern art value. (…) The artistic value of a monument depends on the extent to which it meets the requirements of modern artistic will [Kunstwollens], requirements that, of course, are even further from finding clear formulation and, strictly speaking, will never find it, since they change continuously from subject to subject and moment to moment.[319] (Riegl A. , 1999, pp. 27-28)

And Muñoz Viñas follows the quote above:

> And if the subjects no longer agree that the object has that meaning for them, the object would simply lose its meaning. Inter-subjectivism in conservation can be viewed as a consequence of agreements among the subjects for whom objects have meanings. Furthermore, the responsibilities for the conservation of an object fall on the affected people – or their representatives; it is their duty to preserve or restore those objects, and it is for them that conservation is performed. (Muñoz Viñas, 2011, p. 153)

[318] Aloïs Riegl's *Der moderne Denkmalkultus, sein Wesen, seine Entstehung* (1903) was then translated to many languages. It was reviewed the Spanish translation from 1999. At this point, an English version is not available, and the translation for the quote presented combined the Spanish and original German version of the text, which is already in the public domain and accessed at https://archive.org/details/bub_gb_tbQDAAAAYAAJ_2/ [Retrieved February 2021]

[319] Author's translation.

Noting that:

> It must be emphasized that societies protect these objects not because of the objects themselves, but because of the intangible, symbolic effects an unwarranted alteration might have upon the subjects that make up that society. (Muñoz Viñas, 2011, p. 160)

For a long time, however, this idea of value was not considered as relevant in conservation and only recognized again in contemporary times. In between these two authors, other theorists shift their focus to different aspects or specific values to the detriment of the rest, such as truth and authenticity.

For example, Philip Ward, in a book that is now a reference in the history of conservation, *The nature of conservation: a race against time* (1986), demonstrates a different understanding of value. When referring to "the nature of conservation" and the "principles of conservation," he says:

> Although the relative value of objects is a legitimate curatorial consideration, it should not influence the conservator. Every object must be accorded the best care that is possible at the time. This does not mean that the most elaborate or extensive treatments must always be applied. Different degrees of treatment may be justified by circumstances, but whatever the extent of treatment, its quality must be the best. (Ward, 1986, p. 9)

By today's views, this is partially correct. The quality of the conservator's work should always be the best possible. However, values do not dictate quality but the reasons for conservation. They help decide, for example, between a complete reconstruction or the preservation of fragments. Values are the main focus in the decision process for allocating resources not just for specific conservation action but including financing of human resources, installations, and long-term plans. Many conservation and restoration projects need to be justified to the administration or when applying to public and private funding. Even general popular opinion demands justification, as crowdfunding has been successfully used in many initiatives.

Truth

Instead of values, general classical conservation theories have had other objectives, like the pursuit of authenticity, objectivity, or truth. Because the latter is also an essential concept to photography and this research, some notes are developed here, as presented by authors such as Ana Macarrón Miguel in her *Historia de la conservación y la restauración* [History of conservation and restoration] (1997), first published in 1995, or Salvador Muñoz Viñas in his review of the *Contemporary Theory of Conservation* (2011).

The search for truth has been an objective in conservation and revisited each period. Theorists like

Eugène Viollet-le-Duc (1814-1879)[320] or John Ruskin[321] already defended the search for truth as an aim in the preservation of monuments. Although with opposing arguments and results, one supported stylistic reconstruction, and the other advocated the preservation of the marks of time and even the ruin.

Scientific conservation, popular in the mid-twentieth century, was also a search for truth. The standpoint is that truth is an objective pursuit. And something objective can only be truly determined by scientific proof. However, it became apparent that scientific truth was also limited and biased and cannot give definitive responses to the conservator, even if the scientific findings are indisputable. Modern scientific conservation had forgotten Riegl's conclusions of the limits, risks, or the impossibility of achieving a definitive formula.

The lesson can be taken from the history of photography itself. That there is no truth, or at least not a globalizing absolute objective truth that many scholars defended or searched.

An objective truth also must consider its counterpart, the possibility of an un-true nature or condition. This pertains particularly to retouching, as many before had identified it as un-true, as adulterations of the photographic object. By that reasoning, classical theories and science can also justify the removal of all retouchings. Hopefully, by now, in this research, it has become clear that this reasoning does not consider the problems of the photographic truth, such as the eye of the photographer, the artistic license, and the intention behind the production of each photographic object.

Stakeholders

In many texts, the term stakeholder is used to identify users of cultural heritage. Historically, scholars and professionals, which work with cultural property, considered only their own views and how they valued cultural heritage. Today, values are given by the community that relates to the object, including

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[320] Viollet-le-Duc (1814-1879) was a French architect with considerable work as a restorer of several landmark historic buildings. Like Ruskin, he was well aware of the invention of photography and its potential. He kept photography collections gathered as part of his professional practice as an architect and restorer. As a restorer, he advocated for aesthetical restoration and stylistic reconstructions, the search for an ideal architecture, and the use of modern materials, which at the time was the iron. Much of this is explored in his text *Entretiens sur l'architecture* [Discourses on Architecture], 1863-1872. (Macarrón Miguel, 1997; Hannavy, 2008).

[321] John Ruskin was also an architect and, in many aspects, shared views with Viollet-le-Duc. However, he condemned reconstructions and restoration, particularly those that changed the historical value of the passage of time and used materials that did not agree with the original form, as advocated by Viollet-le-Duc. Ruin. As Ruskin saw it, the *original* had value in itself and should not be restored, advocating for preservation and conservation instead. He also wrote on his views for architecture and conservation in his *Seven Lamps of Architecture* (1848). (Macarrón Miguel, 1997; Hannavy, 2008, pp. 1223-1225)

the scholars, but mostly by a wider group of people – all of them are the stakeholders. They connect with cultural heritage in different ways, either contributing to an object's significance or being affected by it. As identified by Muñoz Viñas, de la Torre, Mason, or Avrami (Avrami, Mason, & Torre, 2000; De la Torre, 2002; Muñoz Viñas, 2011):

> Because of the complexity of contemporary society, it is important to recognize the diversity of potential stakeholders — they include, but are not limited to, the individual, the family, the local community, an academic discipline or professional community, an ethnic or religious group, a region, a nation-state, macrostates (such as the European Community or the North American Free Trade Area), the world. Relations among stakeholders at various levels are both intimate and tense; they sometimes build affiliation and community and other times sow discontent. Motivations for valuing (or devaluing) of material heritage vary among these stakeholders. Broader cultural conditions and dynamics (for instance, marketization, technological evolution, cultural fusion) influence these interactions. Continuity and change, participation, power, and ownership are all bound up in the ways in which cultures are created and progress. (Avrami, Mason, & Torre, 2000, p. 9)

A framework to the conservation of photography – corollary from the Contemporary Theory of Conservation

Early in this research, there was a need for a theoretical framework that could explain photography conservation today, as the conservation of retouched collections cannot be understood without recognizing the established practices in general.

None of the theorists mentioned above focused their attention on photography. Still, photography conservation practice did not evolve separated from them. To better understand the specificities concerning photography conservation, this section addresses its different aspects until the present day. It will start with a historical review of photography conservation practice, followed by a bibliographic review to identify influential texts.

Conservation of photography suffers from apparent paradoxes. The first one relates to the young age of the discipline, research areas, profession, and practice compared to other areas of conservation with centuries of source material and practice. The contradiction in this is that conservation of photography is a concern since its invention.

Since the beginning, scientists and inventors were aware of the deterioration of the photographic image, beginning with the light itself and the importance of the developing, fixing, and washing processes. Photography was born only when the image was successfully fixed on a support. Photography itself is an act of preservation. In Daguerre's published announcement, cited above, Gay-Lussac, who was the spokesperson for the commission reunited to evaluate the acquisition project for

Daguerre's process, remarks on photography:

> Mr. Daguerre's discovery is known to you by the results that have been put before your eyes, and by the report, in the Chamber of Deputies, of the illustrious *savant* to whom the secret had been entrusted. It is the art of fixing the very image of the darkroom on a metal surface, and preserving it.[322] (Gay-Lussac in (Daguerre, 1839, p. 32))

As seen in chapter 1, many developments since the invention already had conservation concerns in mind for both image and object.

In 1855 a commission was formed by the *Photographic Society of London*, joining chemists and photographers lead by Thomas Frederick Hardwich (1829-1890),[323] and chaired by Roger Fenton, to study the "fading of positive photographic pictures upon paper." What is historically known as the "Fading Committee." Their results were published in a report, and the conclusions determined as the causes for fading the excessive use of the fixative – hyposulfite of soda (sodium thiosulfate) – and the action of sulfur, "and imperfect washing after fixing."[324] This initiative is not only interesting for its early date and testimony of preservation concerns by those that were still developing the first steps of photography, but also for its influence after. As remarked by Hannavy:

> The methodology used by Hardwich to determine the causes and effects—in what was the first scientific study of its kind—established the principles upon which the effects of aging on photographs would be determined for many years. His experimental methodology is still held up as an exemplar. (Hannavy, 2008, p. 1060)

Photography, particularly professional photography, has always been demanding and expensive, and personal archives were preserved for insurance and financial gain. Manuals recommended best practices, like Frerk's manual:

> When the required improvements have been made. What else? Are we now going to spoil everything we have done, and are we not going to be careful enough to save this negative? We must ensure that our negative can be safely preserved for several years if necessary. If it is a plate or rigid film, each negative must be kept in a transparent paper envelope with an order number or a brief description. […] The envelopes will be placed in boxes duly labeled and classified to always have the appropriate references, and stored in a dry place, not too hot and as dust-free as possible. (Frerk, 1948, pp. 52-53)

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[322] Author's translation.

[323] Thomas Frederick Hardwich was a British chemist and author of what is considered the first manual of photography chemistry first published in that same year, *A Manual of Photographic Chemistry: Including the Practice of the Collodion Process* (Hardwich, 1855).

[324] Delamotte, P. H., Diamond, H. W., Hardwich, T. F., Malone, T. A., Percy, J., Pollock, H., & Shadbolt, G. (1855). The first report of the Committee Appointed to Take into Consideration the Question of the Fading of Positive Photographic Pictures upon Paper. *Journal of the Photographic Society of London, II* (36), 251–252. This report was reprinted as *Readings 15*, in the compilation *Issues in the conservation of photographs: Readings in conservation* (Norris & Gutiérrez, 2010, pp. 112-115).

The first photography conservator was, undoubtedly, Louis Daguerre himself. Daguerreotypes were protected with glass and enclosed in cases as a conservation measure, even before entering museums' collections and being considered for their cultural and historical significance. Daguerre, describing the final steps of the process, recommends what to do for preservation:

> After this wash the proof is finished, all that remains is to preserve it from dust and fumes that could tarnish the silver. The mercury that draws the images is partly decomposed, it adheres to silver, it resists the water that is poured on it, but it cannot withstand any friction.
> To keep the prints, you must put them under glass and adhere them; they are then unalterable, even in the sun.[325] (Daguerre, 1839, pp. 69-70)

For similar reasons, the photography industry was second to be concerned about conservation issues. After the photographers and photography industries, conservation of photographs was subsidiary work of paper and documents conservators. Finally, scientists and paper conservators would develop in full specialization in photography in the last third of the twentieth century.

Looking back – Summary to the history of photography conservation

Modern conservation[326] would have significant development in the 1970s. It evolved from Italian thinkers and the most recognized Cesare Brandi (1906-1988) and his text *Theory of restoration*, first published in 1963. He was influential to the conservation practice, especially in European countries around the Mediterranean, and was the foundation for the *Restoration Charter* of 1972. Still, it was an artistic-historical approach that did not give all the answers to conservation. Like the ones, before him, of authors like Viollet-le-Duc and John Ruskin, already mentioned.

After Brandi and the landmark event of the Florence flood of 1966, it became clear that time and use were not the only factors contributing to the deterioration of cultural heritage. It was felt that a more pro-active and preventive approach was necessary. To this end, different approaches emerged.

On the one hand, Giovanni Urbini (1925-1994) defended a "scheduled action" for prevention as a primary conservation action. Urbini also defended the need to understand the environment and not

[325] Author's translation.

[326] It is not the objective to make a comprehensive history of conservation but introduce critical moments and issues that contributed to the concept and practice of photography conservation today, affecting Portuguese collections. However, it needs to go beyond photography and include conservation in general. It needs to go beyond Portugal, and influences come from Europa and the Americas. Still, it is presented from the point of view of Western culture.

just the object, defending a scientific approach. On the other hand, were Umberto Baldini (1921-2006) and then Ornella Casazza (?-2020). They developed a critical approach to conservation, considering it a necessary act for the preservation of the objects but preserving what remained without mimetic reconstructions.

During this time, scientific conservation was established. In countries in the north of Europe, less influenced by Cesari Brandi and the Italian lead, started earlier. However, historically started years before with Camillo Boito (1836-1914), also Italian. He was the author of the first Charter of Restoration, known as the *Prima Carta del Restauro*, in 1883, defending truth and authenticity. It opposed Viollet-le-Duc and Ruskin's ideas that he viewed as based on personal taste and opinion and advocated scientific research's impartiality. By the mid-twentieth century, the called "hard sciences"[327] turn their interest to conservation. Even if never under a unifying text, scientific conservation helped push further the knowledge in conservation and cultural heritage (Macarrón Miguel, 1997; Macarrón Miguel & Gónzalez Mozo, 1998; Muñoz Viñas, 2011).

In the mid-century, attention turned to the photographic heritage's specificities, initially as individuals' interest. And the first scientists were faced with a second paradox. Photography was born of science, and science dominated conservation. But while some objects presented deterioration, many photographic materials were not aged enough, and there were no tested or verified treatments. The only tools conservators had was to know the much possible about the photographic processes and to learn as situations presented themselves. And scientists could only predict the course of deterioration and call attention to potential problems. This approach is still dominant today in photography conservation.

One of the first to pay attention to photography's conservation needs was Eugene Ostroff (1928-1999). He studied photography and was a curator for the Smithsonian Institution, active from 1960 until 1994. More than being a photographer and curator, his interest in understanding and interpreting photography prompted him to study the causes of deterioration and stability of photographs. In 1967, he would publish one of the earliest texts on the modern conservation of photographs. It was published under the generic title, *Preservation of photographs*, enumerating the different photographic processes'

[327] "Hard sciences," such as chemistry, biology, or physics, as opposed to "soft" social sciences.

characteristics, advising on possible deterioration causes, how to avoid them, and even treatments (Ostroff, 2010).[328]

Similar to what happened earlier for other areas, the conservation of photography was propelled by the creation of research laboratories within museums.[329]

Accepted as the first was the International Museum of Photography at the George Eastman House, founded in 1949,[330] and there, in 1972, José Orraca (1938-2009) was the first photography conservator, that much contributed to the establishment of the profession and research area, and developing the field of photography conservation. The institution's influence far extends beyond the museum as they have a partnership with research and education institutions, namely the Rochester Institute of Technology (Kennedy N. W., 2016; Mustardo, 2016). They have contributed to conservators' specialization worldwide, including the prominent Portuguese conservator Luís Pavão and others.

In the 1970s, photography conservation training starts as an independent specialization, as part of the Art Conservation program at the University of Delaware and the Winterthur Museum (Kennedy N. , 2010; Kennedy N. W., 2016).

In the 1990s and into the new century, most modern and contemporary art museums have a photography department. Nevertheless, many photographic collections were and are reunited in archives. And institutions like the International Council on Archives (ICA), founded in 1948 in Paris, also have an essential role in the preservation of these collections, and archivists frequently carry out preventive conservation.

Another paradox of photography becomes apparent. Photography is not just art or history; it is, most of all, a document. Photography is not only produced by a few artists; but virtually by anyone, as a hobby, as an art, as a profession, as part of bureaucracy in one's work. More institutions hold photography collections than museums, and most museums, even not having a photography collection as a purpose, keep photography archives. Yet, it is possibly the area with less trained conservation

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[328] It was initially published as Ostroff, Eugene (1967) "Preservation of Photographs," *Photographic Journal*, 107: 309-314. It was reprinted as one of the texts, reading 2, in the compilation by D. H. Norris & J. J. Gutiérrez (Eds.), *Issues in the conservation of photographs: Readings in conservation* (pp. 8–20). Los Angeles: The Getty Conservation Institute. In 1974 he also wrote four articles, "Conserving and Restoring Photographic Collections," in Museum News magazine.

[329] The most important museums of Europe were establishing research laboratories since the late-nineteenth century, namely the first at the State Museum of Berlin in 1888, then in the British Museum in 1919 and, in the 1930s, at the Museum of Fine arts of Boston, the Louvre, in Paris, the National Gallery, in London. Also, in the 1930s, institutions were being created specifically for the research in art and conservation of cultural heritage, such as, respectively, the Doerner Institute in Munich and the Istituto Centrale di Restauro (Central Institute of Restoration) in Rome (Macarrón Miguel, 1997; Boadas, et al., 2016).

[330] Today it is known as the George Eastman Museum.

professionals working and with a variable training level, frequently low.

In Portugal, in 1977, the Arquivo Nacional de Fotografia (Photography National Archive) was created. It was the first National institution dedicated to the preservation and organization of Portuguese photographic collections and the training of specialized professionals. Later it was extinct, and several other archives were created to house and preserve Portuguese photographic collections, both in Porto and Lisbon, but not with the initial intentions and capabilities. Nowadays, in Portugal, and despite several initiatives through the years, research in photography conservation is limited and dispersed, promoted almost exclusively by individuals' interests, and training is virtually non-existing.

What was written about the conservation of photography

The bibliography on the conservation of photography collections is dispersed, and in some respects limited, but has had exponential growth.

Since the early years, there were written sources, other than technical announcements or practical instructions, concerning photography preservation. The book *Issues in the conservation of photographs* has no parallel, and it is an essential reference for the history of conservation of photographs, to be revisited frequently. It was compiled by Debra Hess Norris and Jennifer Jae Gutierrez (2010) and, as stated in its abstract, "chronicles the emergence and systematic development of photography conservation as a profession." It reunites 72 texts and a significant "further reading section." The earliest text in this compilation is by Eugène Vaillat, first published in 1850, *Process for restoring stained and oxidized old prints to their original condition*. It includes, for example, the report by the Fading Committee and the text by Eugene Ostroff, already mentioned. Part VII *Developing Criteria in the Conservation of Photographs: Collection Management and Treatment* gives an overview of Conservation's theoretical framework as a profession. Most significantly the chapters 60, 61, and 62, by James M. Reilly, Debra Hess Norris, and José Orraca, respectively, all originally published in 1991.[331] The publication's only fault was not to seize the opportunity to include an updated review of all the texts and a characterization of the profession at the time. Aside from a few more technical texts, the only theoretical reflection included, from 2010, is a rather pessimistic view by Grant Romer. For him

[331] Reilly, J. M., *Preserving Photograph Collections in Research Libraries: A Perspective*, (pp. 567–576) and Norris, D. H., *Preservation Planning for Diverse Photographic Holdings*, (pp. 577–585) – originally published in Photograph Preservation and the Research Library, 1991). Orraca, J., *Developing Treatment Criteria in the Conservation of Photographs* (pp. 586–590) – originally published in Topics in Photographic Preservation, 1991.

having no definition for *photograph* is a problem. He also identifies two groups of professionals. One made of those that agree with him, that the lack of an absolute definition for photographs, which everyone agrees with, is the downfall of the profession and the destruction of photographs. A second group, in which this author is included, to whom it is not a problem, and as mention above, prefers to designate *Photography* in its broad sense and as used in contemporary times.

Aside from articles on specific subjects, some outstanding efforts exist that tried to compile a "complete book" of the most relevant topics and steps in conservation. The biggest challenge is the number of different photographic processes and materials.

Maybe the first of such works is *Collection, use, and care of historical photographs*, by Robert A. Weinstein (?-?) and Larry Booth (1920-2003), published in 1977. Weinstein, a photography historian, and Booth, a curator at the San Diego Historical Society, wrote a complete book, not specifically directed to the conservator but a broad public. In its pages, it is found what is missing in later books, a comprehensive understanding of the profession's needs in its theoretical and practical aspects. They also justify the need to preserve photographs as cultural objects, as historical evidence, educational objects, and even for their commercial value.

The book is understandably outdated but, surprisingly, still valid in most aspects. And of note, it includes a small entry recognizing the uses of retouching and a change of opinion about its legitimacy in its time (the 1970s), that goes as follows:

> Retouching was developed in the nineteenth century to help portrait photographers feed the vanity of those of their customers who felt offended by Nature. […] The photographic profession developed a variety of methods to satisfy this need. A popular one, retouching, was done on both negatives and prints and although the results were not always esthetically pleasing by present day standards, it was enthusiastically accepted in its day. […] There is a growing satisfaction these days in presenting and seeing things as we think they are or were. For such vision, retouching is useless. (Weinstein & Booth, 1977, pp. 52-53)

More specifically written to conservators and other professionals dealing with photography collections is *Fundamentals of photograph conservation: a study guide* (1991), by Klaus B. Hendriks (1937-1996). Hendriks was a chemist and began working with photography in 1971 at the National Archives of Canada. He was also the author, in 1984, of a report for UNESCO's division of the General Information

Programme included in a series of studies for the RAMP programme (long-term Records and Archives Management Programme).[332] In it, Hendriks focus on:

> Besides the preservation of photographs that is implementing measures to prevent damage or deterioration there are three areas of activities designed to conserve photographs:
> 1. duplicating and copying;
> 2. the application of conventional prints and drawings conservation techniques to photographs;
> 3. the restoration of discoloured or faded photographs in chemical solutions.
> (Hendriks K. B., 1984, p. 79)

The study guide, from 1991, is also coordinated in these three aspects, and both do a review of the characteristics of the historical photographic processes. The former is written as a practical manual, including the description in detail of the black and white photographic process and the organization of a darkroom and laboratory. This was particularly important before the digital age and crucial for reproduction. Many of the recommended conservation and restoration treatments are derived from paper conservation. It also includes the state of the art in chemical restoration treatments, of the time. Hendriks gives lengthy explanations of each conservation and restoration treatment describing all necessary materials and techniques, including photographs and drawings. Still, it is written for knowledgeable professionals, both in conservation and chemistry (Hendriks & National Archives of Canada, 1991).

Both texts are now partially obsolete, firstly because they were written before the digital age. And for the enthusiastic description of chemical treatments that were not completely understood, or their short to long-term effects known. Conservators, nowadays, do not recommend these treatments. Hendriks recognizes the limitations and advises that:

> Considerably more research is required in the area of chemical restoration before the procedures introduced here can be recommended for use in a large scale. (Hendriks & National Archives of Canada, 1991, p. 358)

However, these texts are congruent historically, considering that they were written at a period that valued mostly scientific conservation. Moreover, modern photographic processes – with gelatin emulsion and digital – were not yet considered for their historical value. Specific restoration processes were still in their infancy, as Hendriks recognizes in the 1984 report "just begin to emerge." (Hendriks K. B., 1984, p. 79).

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[332] Hendriks, K. B. (1984). *The Preservation and restoration of photographic materials in archives and libraries: a RAMP study with guidelines.* https://unesdoc.unesco.org/ark:/48223/pf0000058641.locale=en [Retrieved February 2021].

Kodak also released the book *Conservation of photographs* (1985), authored by George T. Eaton, a chemist. The text is understandably highly focused on the Kodak processes and materials and does not venture into restoration techniques from paper conservation, as Hendriks did. It does, however, recognize that only then was photography gaining interest as cultural objects, and leaves a very contemporary remark on values:

> It is only very recently that original photographs have been perceived to be artifacts of value similar to rare historical documents and fine art works. The tendency in the past has been to regard photographs very lightly. This attitude has been responsible for the destruction of vast amounts of material. (…) Many a photograph which had very little value at the time of its production has become of great cultural and monetary worth with the passage of time. (Eaton & Eastman Kodak Company, 1985, p. 22)

Nowadays, books such as these are limited. Still, some authors stand out. Internationally, Bertrand Lavédrine (1958-), a chemist by training, specialized in French history of photography, has been the director of the *Centre de recherche sur la conservation* [French Conservation Research Center]. He dominates as an international reference author, and his texts have been translated into other languages like English or Spanish. The four relevant references are *La conservation des photographies* [The conservation of photographs] (1990); *A guide to the preventive conservation of photograph collections* (2003), edited from a French edition from 2000, also *(Re)Connaître et conserver les photographies anciennes* [a play on words, know and recognize the preservation of old photographs] (2007) also published in Spanish, and last *Photographs of the past: process and preservation* (2009).

The major difference from these books to the previous ones is the "restoration" part of the conservator-restorer work that is non-existent or reduce to the presentation of formulas and a few notes. Lavédrine gives his opinion in his first book:

> While the conservator is dependent on the nature of the fonds he owns and their character more or less ephemeral, he is, on the contrary, fully responsible for their conservation. The goal is to balance the object and its environment. The restoration is only a remedy to the inadequacies of conservation. (Lavédrine, 1990, p. 109)

Lavédrine focuses all the books on the identification of the photographic processes, collection storage, and environment monitoring.

In Portugal, the most important reference is the book by Luís Pavão, *Conservação de colecções de fotografia* [Conservation of photography collections] (1997), edited for a Spanish translation in 2001. It follows a similar organization to Lavédrine's books but has more extensive descriptions in each section and a historical introduction.

In Italy, Luciano Residori, a chemist, does his take on the subject with *Fotografie materiali fotografici processi e techniche, degradazione analisi e diagnosi* [Photography, photographic materials processes techniques, degradation, analysis, and diagnostics] (2009). Of all the books, it is the one with the strongest chemistry approach describing the different photographic processes or the deteriorations. It gives deep insight into the materiality, but little on preservation and conservation and nothing on restoration.

More recently, two interesting books from Italy give a more contemporary approach. They are written in collaboration with different authors for each chapter, but not as manuals and do not provide specific directions. One book is coordinated by Barbara Cattaneo, restorer of library materials and photography, *Il restauro della fotografia: Materiali fotografici e cinematografici, analogici e digitali* [Photography restoration: photographic and cinematographic materials, analogic and digital] (2012), and the second is coordinated by Donatella Matè, a librarian with training in biological sciences, *Fotografie: Orientamenti per la conservazione* [Photographs: Conservation guidelines] (2016). They are particularly interesting for several reasons. Most collaborating authors are already from a new generation of trained conservators instead of chemists or others. Also, the two books complement each other. The latter focuses only on preventive conservation, indoor climates, storage, and biodeterioration; it is written by a group of scientists and two restorers. The book by Cattaneo starts with considerations about ethics and a methodological framework on some of the issues of photography conservation. It is a true reflection on the profession's deontology, which is lacking in the other works already mentioned, and completes the contemporary theories of conservation for photography's specificities.

A contemporary tendency is for books to reunite different specialists, also a testament to the diversity of processes, materials, and conservation problems in photography conservation.

For example, in Brazil, Funarte-CCPF [The Brazilian National Foundation for the Arts – Photography conservation and Preservation Center], addresses the issues of photography conservation in a series of books, eight to date, *Cadernos técnicos de conservação fotográfica* [Technical notebooks for photography conservation], published between 2004 and 2016. Each one is adapted from different works and renowned authors, namely the Brazilian authors Sandra Baruki, Nazareth Coury, João Carlos Horta, Francisco da Costa, Clara Mosciaro, Pedro Karp Vasquez, and the international authors Nora Kennedy, Peter Mustardo, Anne Cartier-Bresson, Luís Pavão, Klaus B. Hendriks, Martin Jürgens, Sylvie Pénichon, and Alison Murray.

Photography conservation is also addressed in generalist books on conservation of paper, documents, and books with a practical approach detailing case studies in various languages. An example is a book edited by José Vergara Peris, with case-studies at the Valencian community of Spain, *Conservación y restauración de material cultural en archivos y bibliotecas* [Conservation and restoration of cultural material in archives and libraries] (2002).[333] The book is divided into chapters for different objects, such as manuscripts, parchment scrolls, binding, books, engravings, paper objects, or photographic images. It is a small book for such broad topics, and the included images illustrate the possibilities of treatments that are only mentioned. At the same time, other practical and technical aspects of generic work are described in detail, for example, the construction of conservation boxes.

There are two other groups of texts that deal with the preservation of photographs and photography collections. One group differs less in content from the previous books. These books are not targeted at conservators but other professionals dealing with collections or even the general public. They include the same topics even if reviewed with less depth, in some cases. There are many references to such books, and a usual indicator is the word "care" in the title that, as seen, is not the same as conservation. One example is *The care of photographs* (1987), by Siegfried Rempel, chemist and conservator scientist at the Canadian Conservation Institute, now retired. This book is surprisingly interesting despite its publication date. It includes more practical information than others written with the same intention. It also recognizes, in a very contemporary way, that similar objects might receive different treatment depending if they are in a museum collection or archive collection.

Another, more recent, example that has become a model, and adopted as a guide book in many archives, is *Care of photographs* (2003), by Susie Clarke and Franziska Frey. It is one of the results of the SEPIA project (Safeguarding European Photographic Images for Access) for the European Commission on Preservation and Access.[334]

Archivists and information scientists write the third group of books. They usually include chapters on collection management and digital records. Preservation is also a concern, and there are good examples. Only as an example among many, a comprehensive book by Joan Boadas, Lluís-Esteve

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[333] A recent edition is available online that differs from the printed version in a few aspects but reproduces the same text regarding photography conservation https://bvpb.mcu.es/es/consulta/registro.do?id=406060 [Retrieved February 2021].

[334] The original online page is now unavailable; many of the texts on the SEPIA project and other information are available at the ICA site. https://www.ica.org/en/publications-archivists-managing-photograph-and-film-collections-0. The original website is preserved at archive.org/ Internet Archive Waybackmachine. http://web.archive.org/web/20080607140452/http://www.knaw.nl/ecpa/ [Retrieved February 2021

Casellas, and M. Angels Suquet *Manual para la gestión de fondos y colecciones fotográficas* [Management manual of photographic fonds and collections], from 2001, written from experience at the archives of Girona, Spain. Or many books of the Spanish publisher Trea, including *Património fotográfico: de la visibilidade a la gestion* [Photographic heritage, from visibility to managment], coordinated by Antonia Salvador Benitéz (2015), that includes a chapter on *Conservation and Restoration* by the photography restorer Rosina Herrera Garrido.

The difference from other books and reason for some concern is that sometimes the preservation and even conservation sections are written by archivists. And archivists have a different approach to work than conservators. While a conservator organizes his work case-by-case, considering each object for its own specificities of conservation conditions and treatments, archivists strive for uniformity. The archivists' work is ruled by sets of uniformed guidelines, norms, and standards.

A book that stands out as a bad example, contradicting conservation principles, is coordinated by Ross Harvey and Martha R. Mahard, both information scientists, The Preservation Management Handbook, and *21st-century Guide for Libraries, Archives, and Museums* (2014). Ross Harvey brings to this book a unifying theory of preservation, based on his experience with the preservation of digital documents that cannot adapt, and:

> Proposes a new set of preservation principles that apply to all materials, whether analog or digital, regardless of whether they are located in museums archives or libraries. (Harvey & Mahard, 2014, pp. 11-12)

The first signs of concern rise at the very beginning of chapter one, when it is described who are the professionals involved in the preservation of collections:

> Collaboration is as hallmark of the new, converging preservation environment and an essential characteristic of any successful preservation management program. Cultural heritage professionals – defined in this book as museum professionals, archivists and librarians – apply their specialized knowledge to prioritizing the needs of their collections, and they collaborate with preservation managers, who in turn, draw on experts in climate control, fire safety, pest management, digital preservation, and more in developing the broader overview of a collection and its preservation needs. (Harvey & Mahard, 2014, p. 3)

In his list of cultural heritage professionals, there are no conservators. Even the word, conservator, is carefully omitted in most of the book except when it is impossible to avoid, but explicitly stating that a conservator is not a part of the archive and the service of one is only necessary at the beginning or as a consultant (Harvey & Mahard, 2014, p. 76).

However, the need to have unifying policies that are not the same as guidelines or standards is the

book's downfall. The authors give justifications for the unifying policies and explain how they can serve equally digital and analog. However, the reasoning given is concerning. In the book, some principles are said to come from the American Conservation Institute's code of ethics, which mislead in thinking that all follow similar conformity.

It states specifically concerning globalized policies such as:

> A policy could be to put all thin pamphlets in acid-free envelopes, and another to repair all paper tears in manuscripts with Japanese tissue paper.[335] (Harvey & Mahard, 2014, p. 76)

As José Orraca put it, "[mass conservation] conjures up images of survival rates, or casualties from friendly fire." (2010, p. 589). Another example is a generalized policy of keeping multiple copies. While this is best practice for digital documents and might be possible for archive documents or even libraries, it is not for museum objects. As an exception, a museum may request a contemporary living author for another print of a specific photograph so that the museum can have one on display and another for research or just for safekeeping. But that is not the same thing as suggested in this book.

Or the suggestion of keeping originals in "low-cost" storage after being reformatted. This is an example of a policy that cannot be accepted. On the one hand, "low-cost" suggests that the minimum required preservation conditions are not met. On the other hand, it values the copy more than the original. The justification given for keeping the original is only a "just in case basis," disregarding the original objects' value. (Harvey & Mahard, 2014, p. 23). On this issue, it gives further justifications for not preserving the original. For one, it is not done for digital objects, which are copied and reformatted undisputedly. And second, reformatting has always been done, historically, and gives the example of a palimpsest, where the Archimedes codex was used to copy a medieval prayer book (Harvey & Mahard, 2014, p. 26). Failing to identify that even if, at some point, someone did not value the Archimedes text, it is preserved nowadays for recognized value. Following his reasoning, it would be as simple as to make digital copies of the prayer book and throw away the object. It would be the conservation solution, no need for conservators, and forever lost the Archimedes codex and the prayer book.

The same formula is followed throughout the book: one sentence with a universalizing statement that most can agree with. Indeed, some principles defended in this research are mentioned in this book, such as "advocacy is necessary to ensure preservation," or "preservation is the responsibility of all." But in another part of the text, another statement contradicts what was said and with complete disregard

[335] The underlined words are not underlined in the original text; it was done to emphasize the generalization of principles.

for collections' specific needs and the importance of cultural heritage property.

There are certain issues where conservators and archivists meet. For example, a group of objects might have the same value and be acceptably preserved following the same procedures or setting standards for temperature and relative humidity values in storage rooms.

Yet, these standards cannot be policies as they do not have generalized applicability. The values differ with each type of object, and in photography, they with types of photographic processes.

Another example, alkali reserve in papers may help contain acid deterioration process in gall inks and be recommended and appreciated for the preservation of manuscripts. But alkali is also known to contribute to the deterioration of some colorants and pigments. For example, cochineal dye loses color, and red lead turns dark (Coccato, Moens, & Vandenabeele, 2017; Berrie & Strumfels, 2017), and therefore the use of alkaline paper is not recommended for preserving illuminated manuscripts. The examples could go on.

Harvey and Mahard also fail to identify that significance changes in time and that preservation is done not just for today but also for future generations of stakeholders. It promotes an outdated view where "all" do not do decision-making as stated, but a small group of experts, the cultural heritage professionals (not including the conservators), and does not consider stakeholders and changes of interest, value, and function in time.

Many good examples and references exist in all languages, as information leaflets, recommendations, and guidelines from international institutions or as internal documents of many archives and libraries. The ICA (International Council on Archives) has extensive information online, including Susie Clark and Franziska Frey's text,[336] already mentioned. The IFLA (The International Federation of Library Associations and Institutions) also presents *Care, handling, and storage of photographs*, prepared by Mark Roosa (2002),[337] or UNESCO's *Guidelines on preservation and conservation policies in the archives and libraries heritage*, prepared by Patricia Chapman (1990), and the text by Klaus Hendriks already mentioned.[338] All recognize the conservator's role, even if some admit that many institutions still do not have one or cannot afford one on the permanent staff. For example, the one by UNESCO identifies:

[336] See footnote above.

[337] Online versions are available at https://www.ifla.org/publications/node/8067 [Retrieved February 2021].

[338] See footnote above.

> Those who are responsible for libraries and archives, librarians, curators, archivists and conservators, all have a professional duty to ensure that items within their collections are maintained in a condition appropriate to their use and their intrinsic value.[339] (Chapman, 1990, p. 1)

All the authors mentioned, and many others, also publish extensively in smaller research articles reuniting the body of knowledge on photography conservation today. Two examples of compilations of research articles are recalled, from those already mentioned: *Issues in the conservation of photographs* is edited (2010), by Debra Hess Norris and Jennifer Jae Gutierrez, *Coatings on photographs* by Constance McCabe (2005). And a third compilation is the proceedings from a conference held in Logroño, Spain,[340] edited by Jesús Cía *Conservation of photographs, Thirty years of science* (Boadas, et al., 2016). This conference intended to do a summary of the last thirty years of photography conservation. Comprised of separate articles, each gives insight into particular institutions or countries, but they do not provide an overall critical view; still, it is a relevant book with historical importance.

It reunited several of the most prominent photography conservators, namely: Joan Boadas, Cécile Bosquier-Britten, Anne Cartier-Bresson, Ángel M. Fuentes, David Iglésias, Debra Hess Norris, Nora Kennedy, Bertrand Lavédrine, Paul Messier, Peter Mustardo, Fernando Osorio, Luís Pavão, Clara M. Prieto, James Reilly, Jesús Robledano, Henry Wilhelm.

Review of the review

Dissemination of knowledge is now done through short articles that, as seen in the introduction, concerning retouchings or the preservation of collections with retouchings is still limited.

Views on photography conservation promoted by authors such as Lavédrine, since the 1990s, perdure to this day. And general formed opinion is that photography conservation is limited to what is outlined in his books. That is reduced to *understanding* – identification of process and deterioration – *protection* – storage, environment, and monitoring – e*xhibition*, *access, and dissemination* – reformatting and digitization. This represents the past. It serves well for most archives' needs and accommodates archives' manner of standardized working strategies and purposes.

Representing a new tendency and maybe the future, a book like the one by Cattaneo (2012). Even if

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[339] The word conservator is not underlined in the original text.

[340] Meeting organized by Casa de la Imagen, directed by Angel M. Fuentes, held in Logroño, Spain 20-23rd June 2011, *Conferencia internacional, Logroño 2011 = Conservation of photographs, Thirty years of science: International conference, Logroño 2011.*

not a practical how-to manual, it is a useful guide for the contemporary conservator. For other professionals caring for cultural heritage, it can be one of the few texts that shows the importance of the conservator work and the demands of knowledge and specialization, that sometimes are not recognized.

The most important books will become those that reunite several texts with views from different authors, either on a topic, like Coatings on photographs (McCabe, 2005), or conference proceedings that usually represent the state of the art. Aside from Cattaneo's in Italian, and possibly other unknowns in other countries, with a circumscribed impact, a void exists in Portugal of an updated book that outlines the profession.

It was clear that photography conservation, contrary to other areas, does not deal with just one object at a time and that most archives do not have the resources to do more, nor are all collections preserved with the same purpose. But the minimum conservation strategy is already established. Now conservators need to do more, need to want to do more, and advocate for newly updated practices and the training of qualified professionals.

Contemporary theory of conservation evolving

Many photographic collections seem not to have had the privilege of being valued for the passing of time. They have been kept, hidden, and recognized only for their documental value, which to be intact means keeping the image perfect. This also promotes some disregard for the object itself, seen only as the carrier for the image.

This view was predominant in the early years, which was not that much time ago. As seen above, conservation books include chapters on duplication, and the purpose of most chemical and other treatments were to recover the image.

First attempts to manage the conservation of photograph collections seem daunting, indeed. Photographs were collected with little criteria, and by the time someone first thought of organizing and preserving them, they were already in the number of thousands. The first person in charge of doing it was doing it alone and needed to develop some criteria for what to preserve. In time, and in the face of irreversible loss, criteria started to change.

Photography conservation may be at a defining point as the needs of preserving photographic collections are gaining interest, and established attitudes are changing, at a time when digital photography has replaced analog photography in everyday lives, and digital access is paramount.

The following section discusses some issues in conservation today. Some are examined compared to what is being done in other areas and conservation general; others arose during this research. Conclusions are drawn from observation of current practices and contemporary tendencies, and as they relate specifically to retouched negative collections.

Revisiting values in conservation

Values in conservation can be identified as documental, artistic, historical, remembrance, identity, or others, as defined by authors such as Riegl (1999), Muñoz Viñas (2011), Miriam Clavir in *Preserving what is valued* (2002), or in the Getty Conservation Institute's reports *Values and heritage conservation* by Avrami, Randall, and De la Torre (2000), and *Assessing the values of cultural heritage*, edited by De la Torre (2002), already mentioned. Although not directly referring to the field of photography, the values identified in these texts are recognizable in photography, and a photographic object may hold one or several of them.

On photography, a reference about values is made, by Boadas and Iglesias, as defined by the archival community, and includes probative, informational, association, economic, and use values and the object's value. Although they have similar reasoning and definitions, they do not relate directly to the conservation values, as defined by the other authors. And for example, the probative value can include all conservation values as it relates to the "capacity of the document to provide meaningful information about activities, functions, and origins of their creators." Or the value of the object as it "reflects the technological capabilities of each period," but also "the photographer's creativity and technical skills in the development process." (Boadas & Iglésias, 2016, pp. 33-34).

These values are used not to justify the need for the preservation of a specific object or collection, but on the contrary, for the selection of what to keep and what to discard. And the usefulness of these values is to classify and sort collections rather than identify and recognize their influence. And finally, it is done by comparison with the rest of the collections in one institution. That means that collections and values are set on a scale, and the most important are the collections that in any, or all, of these values are identified as having notoriety or rarity. These values are only known to be used in archives for decision making, in acquisitions, for example. A consequence of this is that a collection that might be recognized as having similar historical or artistic significance, compared with others already in existence, will be discarded or not accepted or not acquired. As reasoned by Boadas and Iglesias:

> Based on the fact that it is irrational and impossible to keep all graphic memory. (Boadas & Iglésias, 2016, p. 33)

The other side of this is it also promotes the decentralization of collections. One collection with no relevant value to a central institution might be of the most importance to the community that best relates to it.

According to its mission, each museum also has some criteria for the acquisition of collections. But it is essential to make a distinction and recognize that this classification of values is not, in the same way, related to conservation.

For conservation purposes, an object *per se* is not more valuable than another, and there are no fixed classifications. Recalling what was already said, values are impermanent and given by the stakeholders, but not as an active decision by the conservator. Philip Ward noted[341] how conservator-restores act in practice and the quality of conservators' work is not bound by value. But values can justify why some cultural objects are preserved, and others neglected.

For example, the fond Alvão was bought by the Portuguese government because it was recognized to have value as part of the National cultural heritage. It followed a civil process, values were identified and justified, and the result was classification and acquisition.[342] This was done according to Portuguese law no. 107/2001, that "Establishes the basis of politics for cultural heritage protection and valuing regime" (Lei nº 107/2001).[343] In turn, this law follows what is done internationally, namely by UNESCO's *Convention concerning the Protection of the World Cultural and Natural Heritage*, also called the *Convention of Paris of 1972*.

Despite the recognized value of the fond, as a whole, conservation was done differently to different objects within the whole.[344] Some negatives have received a complete restoration in its more than thirty-year institutionalization; others only basic cleaning and storage. Others remain in the original transportation boxes, awaiting conservation treatment. Conservation was prioritized according to manifest interest in specific objects within the fond for their individual values.

Like in this example, and in most situations, it is the stakeholder, not the conservator, or other

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[341] See above 5.1. Thoughts on a theoretical framework – Value. (Ward, 1986, p. 9)

[342] Alvão Photographic Archive inventory – announcement at the Diário da República n.º 282/1981, Série III de 1981-12-09. https://dre.pt/application/file/4403599. [Retrieved February 2021]

[343] Law 107/2001 – *Policy and regimen for the protection and valorization of Cultural Heritage – Lei n.º 107-2001 - Diário da República n.º 209/2001,* Série I-A de 2001-09-08. https://data.dre.pt/eli/lei/107/2001/09/08/p/dre/pt/html [Retrieved February 2021]

[344] See chapter 4 - Fotografia Alvão – a studio from Porto

professionals, specialists, who attribute values. A concept that is defended in contemporary theory, namely by the author, repeatedly mentioned, Muñoz Viñas, as he presents an "attempt to weave many [existing] ideas into a coherent theory" (2011, p. xi). He identifies who owns the heritage:

> It belongs to us – not to me, not to some of us. We can use it as we see fit, but that 'we' is not just comprised of a minor group of empowered decision makers and me; it refers to a much larger group of people (Muñoz Viñas, Contemporary theory of conservation, 2011, p. 151)

And values vary from person to person, and, as already said by Aloïs Riegl, they vary from "subject to subject and moment to moment."

Stefan Michalski suggests a graphical representation of values where "each object plots differently for each individual," and he gives examples of different value given by a person of his "mum's picture," another person's "mum's picture," and the "Mona Lisa" (Michalski, 1994, p. 248). In his explanation, values relate, for example, to the number of people that ascribe a particular value to an object. Each person's mother's picture may be considered similar in intrinsic value. They both have remembrance value, but only to each person, while the Mona Lisa may have an equal value to several people. In what Muñoz Viñas, interpreting Michalski, refers to as symbolic power (Muñoz Viñas, 2011, p. 62).

Similarly, this can be recognized in the difference between the collections Alvão and Foto-Carvalho. They are similar in many aspects, mainly about their production, but not in their symbolic power. The latter presents great significance to the people of the town of Estremoz but nothing to other regions. While the Alvão name is recognized in Estremoz, having such a collection would mean little to the community. Because the Alvão name is recognized in many parts of the country and the images themselves represent many and relevant aspects of Portugal as a nation, the collection is valued as a National heritage and is rightfully preserved at a National institution.

Values in conservation influence, affect, and condition the conservator's actions and decision process more specifically and directly. For example, conservators were always the group of specialists that reported the significance of retouchings. But they failed to identify value, which led to removing some retouching during conservation treatments of negatives, as observed in the collections included in the research and reported by some conservators. This was a consequence of lack of understanding and lack of recognition of value to the retouching practice in photography, as noted elsewhere,[345] or by other conservators, namely, Rosina Herrera (2011) and Tereza Cermanová (2010).

[345] Presented by the author in several oral presentations, posters and articles (Pereira C. , 2010; Pereira C. , 2016; Pereira, Barata, & Castro, 2017; Pereira & Castro, 2016; Pereira, Castro, Barata, & San Andrés, 2019).

Cultural heritage also gains and loses value with conservation treatments. And adding to the value of cultural heritage is also a part of the conservator's purview.

The loss of values is not always negative, even if, unfortunately, sometimes it is, and many are the known examples. On a painting, for example, a yellowed but original varnish layer is often removed during conservation treatments. The varnish material is lost irreversibly, against one of the old central ethical principles of conservation. The lost varnish had historical and technical value, which cannot be recuperated. But there is also gained value. A painting that was forgotten, maybe on a passing hallway, or the museum storage, is again enjoyed. It has recovered its function. The people who enjoyed it more frequently may not agree with the treatment and may find it "too bright." This hypothetical painting in this hypothetical museum was moved to a privileged room, and many more visitors enjoy the painting.

Similarly, putting an object on display can have its risks and lead to its deterioration and value loss. Any object would be better off stored away in dark chambers with controlled temperature and humidity. But this would also mean a loss in value as, with time, fewer and fewer people would know that they even existed, for example, with many archive collections that, for its nature, and the institution's, have little access and visibility.

Doing conservation is making choices, and ten conservators may find twelve different ways to do it. Conservation and conservation of value are subjective. Riegl identified it as *Kunstwollen* [art's will] and recognized its impermanence. Salvador Muñoz Viñas calls this "The transactional nature of heritage conservation"[346] that he describes:

> A conservation treatment is akin to a transaction: there are costs and there are benefits. These cannot be objectively or precisely assessed (…) Furthermore, it cannot happen otherwise, since it is the relationship between those costs (risks taken; symbolic, aesthetic and information losses; economic costs, etc.) and the gains (the aesthetic improvement, the intentional messages transmitted, the increased lifespan, the increased monetary value, etc.) that needs to be taken into account in order to judge any conservation treatment fairly and sensibly. (Muñoz Viñas, 2017, pp. 62-63)

Finally, cultural heritage values can also be promoted and preserved through advocacy. Conservators have privileged access to objects. Besides conservation procedures, they can contribute by presenting

[346] It was a presentation at the Reinwardt Academy in March 2017. Video of the presentation is available online, and the Reinwardt Academy also publishes a text [Retrieved February 2021]. Video at: https://www.reinwardt.ahk.nl/en/research-group-cultural-heritage/publications/videos-memorial-lecture/ Proceedings: Muñoz Viñas, S. (2017). The transactional nature of heritage conservation. *Reinwardt Memorial Lecture, 9 March, 2017* https://www.reinwardt.ahk.nl/media/rwa/docs/Publicaties/Rwa_memorial_lecture_2017_munoz_web.pdf.

their work in conferences or with the publication of texts, actively doing research, such as this, or by working in outreach projects with museums and archives.

Photography – Image and object

Photography sets a group apart from other conservation objects, as different values can be assigned to the physical object and its image. And an image can be just an image dissociated from its support.

Mission and type of institution have an influence on which type of values are given more importance in a collection. In a simplified analysis, an archive may hold a collection, gather in time, for their documental value, and museums acquire single photographs or small sets for their artistic or historical values. One is valuing content, the image, and the other recognizing the authenticity of each object.

This research gives more focus and, in a way, more value to the physical object – the negative – Its production and motivations as it relates to retouching, to advocate for their historical, technical, social, and even artistic importance. But it is also focused on its uses as they relate to the image and justifying its legitimacy by pointing out/calling attention to its visual significance.

The image may be considered to have documental, historical, artistic, identity, visual culture values, among others. However, this raises questions: what values can be associated with the physical object? Are they the same? Can some values relate exclusively to the object?

In this digital age, and even if the artists still choose the physical support for their work, the photographic object loses importance. Anyone can consider having a digital copy that can be accessed anywhere, even on personal mobile devices, in virtual ownership.

When each photograph exists in its digital copy, is there enough value to justify the preservation of negative collections or photography collections in general?

Walter Benjamin notices this, in a different scope, when he wrote *The work of art in the age of mechanical reproduction* ((2007), original edition 1935). He reflects on what defines a work of art in opposition to a copy. And he finds what defines and relates the concepts of authenticity, uniqueness, and authority as prerogatives of the original, in its existence in a time and place, that he calls the "aura":

> Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be. (…)
> The presence of the original is the prerequisite to the concept of authenticity. (…)
> The whole sphere of authenticity is outside technical – and, of course, not only technical – reproducibility. Confronted with its manual reproduction, which was usually branded as a forgery, the original preserved all its authority. (…)
> The authenticity of a thing is the essence of all that is transmissible from its beginning, ranging from

> its substantive duration to its testimony to the history which it has experienced. Since the historical testimony rests on the authenticity, the former, too, is jeopardized by reproduction when substantive duration ceases to matter. And what is really jeopardized when the historical testimony is affected is the authority of the object.
> One might subsume the eliminated element in the term "aura" and go on to say: that which withers in the age of mechanical reproduction is the aura of the work of art. (Benjamin, 2007, pp. 220-221)

For Benjamin, authenticity is not a fixed property, it one that develops in time, and he identifies how it changes, namely with the art trade. When he refers to these concepts and the aura, he refers to a specific set of values, that are also already established as impermanent.

The world adapted to the mechanical reproduction, and values such as authenticity changed, even if the "aura" of an original object is still associated with its presence in a time and place that defines authority. After Benjamin, authenticity was determined by science, and as such, not as mutable as before. In some way, this definition still perdures. But now, it allows for copies – multiple originals – to be authentic.

Considering a photographic negative and a print, the former is "more authentic." It is the holder of the original capture. It is the object produced and present at the time of the scene it captures at the same time the photographer chose to create it. The print authenticity is not bound by its presence at the time of the capture. Yet, it is considered authentic if found to be produced by the same photographer of the negative, even if at a much later date or a re-print.

In this digital age, one would call it, paraphrasing Benjamin, the age of digital dissemination. More than the value of art, the concern is how these photographic objects are valued when exhibition and dissemination focus on the image alone. Benjamin identified that the cult value given to pictorial art was replaced, by photography, for the exhibition value. Now, with the internet, dissemination value displaces exhibition value.

Even before the digital, Benjamin recognizes that:

> Technical reproduction can put the copy of the original into situations which would be out of reach for the original itself. (Benjamin, 2007, p. 220)

Now, photographic cultural heritage, shared via the internet, can reach even more people than before. But, at what cost?

When every image is available online, is there still a need to preserve the photographic object?

Interregnum – Aura, an example set in space

Recently a group of more than 2400 photographs taken during NASA's "golden age of space exploration" went for auction.[347] Many depicted images took during the space voyages and moon landing, between 1968-1972, for scientific research. At the time, they automatically gained the "firsts" status even if they were not processed in space or following an innovative printing process. They still had innovation and technological value, which was transformed in historical value in time.

The objects in the auction's collection are described as "vintage print." This description guarantees that these are not copies from other prints or the original negatives printed later outside NASA. These were printed during the period of activity of the Apollo Program and accepted as authentic. Despite many images being available online for years, the well-known and many times reproduced *Portrait of Buzz Aldrin with the photographer and the Lunar Module reflected in his gold-plated visor, July 16-24, 1969*, taken by Neil Armstrong,[348] a large format "vintage" print, achieved the highest price of all the lots and was sold for 56,250£ (Figure 5.2).

The image, identified by NASA as AS11-40-5903, was first published in *Life Magazine* (August 8th, 1969) and in other of NASA's publications of that period.

The curious thing about this image is that the most well-known version is retouched (Figure 5.2a). The original capture (Figure 5.2b) was altered for aesthetic reasons. In the retouched version, a black area was added right above the helmet. This was done to balance the areas above and below the astronaut. The image is also cropped and slightly rotated[349] to correct the standing to a more perpendicular position.[350] The top part of the suit is not visible in the original, including an antenna cropped by the limit of the photo but – visible in other images like AS-40-5902 presented in Figure 5.2c. In the retouched version, the antenna was not added. An original "unretouched" print was for sale at the same

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[347] Christie's auction in November 2020 of "The Victor Martin-Malburet Collection that comprised more than 2,400 photographs — most of them unpublished — telling the story of the American space programme from the late 1940s to the 1970s." feature story at https://www.christies.com/features/The-story-of-the-American-space-programme-11262-7.aspx?sc_lang=en#FID-11262 [Retrieved February 2021].

[348] Photograph described as: *Portrait of Buzz Aldrin with the photographer and the Lunar Module reflected in his gold-plated visor, July 16-24, 1969*, in large format, by Neil Armstrong. A large-format presentation vintage chromogenic print on fiber-based Kodak paper, 27.7 x 35.5cm (11 x 14in), with NASA / US Army caption numbered "AS11-40-5903" and "A Kodak Paper" watermarks on the verso 27.7 x 35.5cm (11 x 14in).

[349] The rotation angle varies according to print. The one presented is rotated ~1,5º counterclockwise. This is clearly visible because the images have an overlay grid of crosses used for geometrical measurements (grid of reseau).

[350] Jones, E. M. (2005). *A Brief History of AS11-40-5903.* Apollo Lunar Surface Journal. https://www.hq.nasa.gov/alsj/a11/a11-5903history.html. Images presented available in the same website. [Retrieved February 2021]

auction. Of the three versions available at the auction, this one reached the lower price, sold for 6,250£.[351]

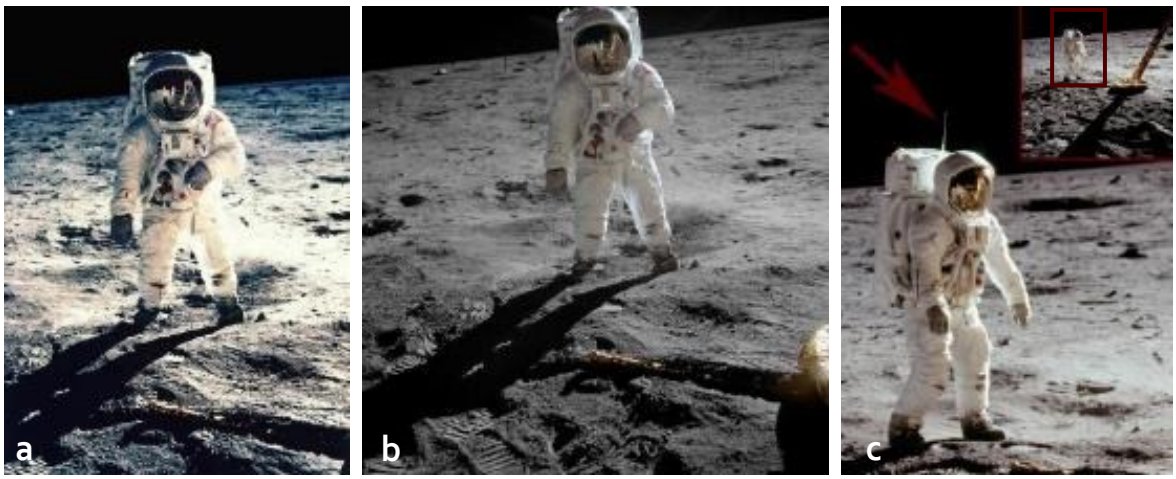


Figure 5.2 – "Aldrin poses for portrait / Armstrong's reflection in visor," AS11-40-5903, a. official retouched release; b. original "unretouched" version; c. detail from "Aldrin stands beside LM strut and probe," AS11-40-5902, 1969 (NASA, JSC scan).

Although they are images made on a scientific mission, retouchings are not criticized even though they were not done because of technical necessity.

The associated aura explains the difference in value that these specific images achieved through exhibition and dissemination. Yet, the aura remains attached to a physical object and despite existing copies.

Valuing of the photographic object

Photography as an object shares some values with its image, for example, artistic or historical values. But they do not necessarily are the same in both. An image might have historical value, but not necessarily the support it was printed; this is true, for example, for news photography. On the contrary, all those photographs that mark the "firsts" in any photographic process are valued for their technical accomplishments regardless of what they depict. And the "aura" of the original object still survives despite Benjamin's predictions of the influence of mechanical reproduction. And some photographic objects that were printed in multiple copies succeed in attaining aura status, like Aldrin's portrait.

The most recognized value in photography is the documental value. A photograph is a document as it holds the record of a time and place in its image. This value also exists in the object, more relevantly,

[351] The smaller copy of the retouched version was sold for 21.250 £.

although not always recognized, in negatives, as they are the original object. In that sense, they are unique, and they are the original document.

A particular and specific case in photography that values object over the image can be called the Daguerre value and relates to daguerreotypes. These are appreciated, bought, and preserved for the simple fact that they are daguerreotypes, regardless of the date of production, author, subject of the image, and, to some extent, even its conservation condition.

Art collections and art photography express artistic value. As seen, this value is closely related to its aura, the value of an original object produced in a specific time that differentiates it from later copies or reproductions.

Besides historical or documental value, some photographic objects hold archeological value.[352] Other authors do not differentiate this value, but it is used, in this text, to complement the historical value.

History is better defined for the passage of time, regarding the age of the object or the time of its production and its significance to a specific moment or event. Historical photography collections refer to the recognized historical values. "Historical collection" is also a term related to collections of photography produced by historical processes, recognizing a timeline of successive events, photographic processes in use before the photographic film, and the gelatin emulsion.[353]

But archaeological value refers to analysis from the material object and can become, arguably, one of the most important values to the conservator.

Consider the example of a Roman amphora. The amphora has archeological value, as it is an object in itself and a fragment of its context; it represents its time, the development of a technology, an industry, commerce, the people who used it, a way of living, even with none or little artistic qualities, even if only a part of it has survived.

Considering now, Niepce's view from the window at Las Gras (Figure 5.3). It is not a work of art, and the image is almost gone, but it is definitely a mark in history. If not the first, it is considered to be the oldest surviving example of a camera photograph. It is valued not for what it depicts but as an object, and it is its materiality and production that has significance. A value that transcends the object itself,

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[352] The term "archeological value" is used to differentiate from James M. Reilly's "artifact value." As he defines it: "original photographs have higher image quality than any subsequent copy and are often beautiful or instructive objects in themselves. A vigorous collectors' market exists for photographs, and the dollar value of some images is surprising high" (Reilly, 2010, p. 570), which relates to the ***aura*** of the physical object and not as a ***cultural artifact*** as generally understood, namely in archeology.

[353] Nowadays, film and all photographic objects with gelatin emulsion that were not considered historical photography are being included in that category as the digital completely replaces them.

also becoming the representation of its time, as a product of the Industrial Age, a testimony of a technical achievement, the culmination of a need or will that could only be possible in its time. Thus, it has archeological value.

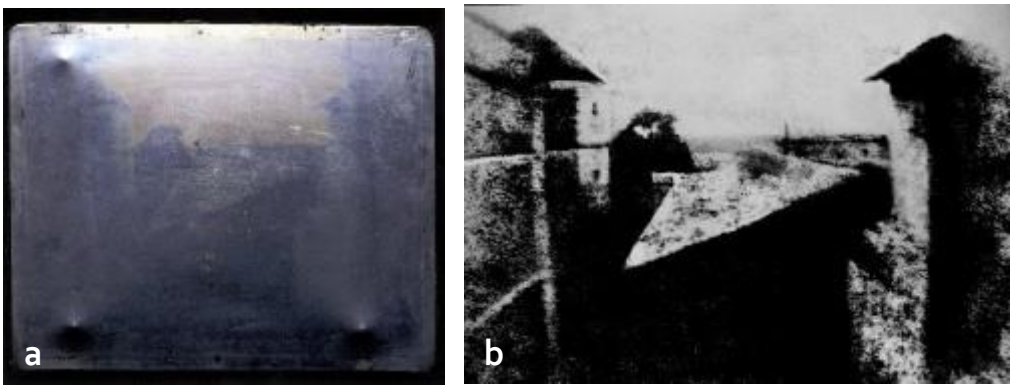


Figure 5.3 – View from the Window at Le Gras by Nicéphore Niépce, 1826/27: a. heliographic plate as it is today; b. enhanced image[354] (Harry Ransom Center's Gernsheim collection, The University of Texas at Austin, US. Images source: Wikimedia Commons).

Archaeological value in dry plate collections

Photographers make different choices to obtain their images. They chose the type of print, size, print cropping, the use of secondary support, among other options. None of these are present or reflected in the negative. When a collection holds different stages of the photographic process, the difference from the negative to the final print becomes evident. In the following examples from the APR collection (Figure 5.4 & Figure 5.5), more of these choices can be identified.

But negatives represent better the photographic process than the photographer's final product. And the archeological value further applies to negatives, as they are not the final object, even though they show a version of the original image.

Compared to the print, the negative is just a step in the photographer's process, so it should lack values such as remembrance or visual culture, as they are associated with the image. And the photographer's intended image exists only in the final original print. However, that is not the case. The uncropped

[354] Enhanced version by the Swiss Helmut Gersheim (1913–1995), made ca. 1952, of Niépce's View from the Window at Le Gras, (Harry Ransom Humanities Research Center, University of Texas, Austin). The View from the Window at Le Gras was the first successful surviving permanent photograph created by Nicéphore Niépce in 1827, in Saint-Loup-de-Varennes (Saône-et-Loire, Bourgogne, France). Captured on 20×25 cm oil-treated bitumen. Due to the 8-hour exposure, the buildings are illuminated by the sun from both right and left. (description and image Joseph Nicéphore Niépce, via Wikimedia Commons): https://commons.wikimedia.org/wiki/File:Point_de_vue_du_Gras_by_Ni%C3%A9pce,_1826.jpg; https://commons.wikimedia.org/wiki/File:View_from_the_Window_at_Le_Gras,_Joseph_Nic%C3%A9phore_Ni%C3%A9pce,_uncompressed_UMN_source.png. [Retrieved February 2021]

image of the negative often shows more than the print, and it has extra information that adds value to the object (and its image).

Photographers frequently leave personal notes on the negative, such as dates, locations, or identification of the events depicted. It is also common to find notes indicating the intended size and type of print, information written for the person that would process the negative that, in many photographic studios, would not be the photographer. All this information will not appear in the final image but adds insight into the photographer's intention and technique.



Figure 5.4 – Half of stereoscopic photographs: a. dry plate negative; b. digitally converted positive; c. original test print; d. original print with vignette effect on secondary support. Actor Augusto de Mello by Aurélio da Paz dos Reis, ca. 1910, Centro Português de Fotografia, Portugal (CPF, APR, 7113).



Figure 5.5 – Half of stereoscopic photographs: a. digitally converted positive of a portrait from a dry plate negative; b. original test print with vignette effect; c. digitally converted positive of garland from a dry plate negative; d. original test photomontage obtained by double exposure of the portrait and the garland negatives. Actress Lucília Simões, by Aurélio da Paz dos Reis, ca. 1908, Centro Português de Fotografia, Portugal (CPF, APR, 4157 & 2240).

Another choice was to retouch the negatives and how to retouch. A "good retouching" was not to be discernible on the final print, but the varnish, pencil retouching, colorants, and etchings are visible on the negative. And these have significance, more than the practice of a photograph. They are not just a testimony of an obsolete intervention, and retouchings had other purposes beyond overcoming technical difficulties. Today they are a testimony of the retouching practice as a whole and the aesthetics of their time.

Summing up, the negatives tell more than what they depict. They are not the final product of the photographer. And yet, as objects, they hold information that has value and that justifies their

preservation. They represent a period's visual culture, a practice, an industry, commerce, the people who validated and criticized it, a profession, the photographic process, even if adding none or little artistic quality to photography. All this classifies negatives for archeological value.

Information and preservation

Recognizing values, either by a classification during acquisition and archival processing or assessment during conservation treatments, does not guarantee the preservation of a collection. This was already demonstrated for the Alvão fond, which was officially inventoried in 1981, bought in 1982, and a large number of negatives still await conservation treatment at risk of loss.

Beyond the recognition of value, it is information that ensures preservation, the most information possible about an object; also, the largest number of people aware of that information and value, whether experts or non-experts. Enough information to engage communities, raise awareness and move public, political, and social opinions for sustainable preservation.

The preservation of the photographic object in museums and archives is dependent on the acknowledgment of its values. And it is essential to verify if these attached values are truthfully and clearly being transmitted to the next generation; this is, preserving as much as possible, not just the object but also its cultural significance, in the present and future generations.

Information about the nature of the photographic objects, photographic techniques, and even their conservation conditions, especially for negatives, already has archeological value. This represents the knowledge that enriches the object, its image, and its relevance in the historical context. Particularly for future generations and even today's non-experts.

The established procedures for all stages of conservation management, such as presented in Figure 5.1, rely on information is needed at all levels, and lack of information and knowledge – possessing information – risks loss of value, deterioration, alienation, and loss of cultural property. Examples of this are presented in the following chapter.

Each professional in an institution, be it in a museum or archive, responsible for preserving photographic collections has the task of collecting information in some part of his job.

They gather the most information and documentation as possible about an object; this information is included in internal documentation, catalogs, inventories, and acquisition proceedings. Conservators develop further research on conservation conditions and specific characteristics of each object (material, history, production and artistic technique, or others) to understand the object better and

justify the decision-making process, even before starting conservation procedures. This is also recognized in conservation by professional guidelines, ethical codes, and laws, in the form of preliminary, condition, and intervention reports. Acquisition, cataloging, or conservation treatments are just some of the moments where information has a crucial role.

The public can access information through published catalogs and online databases. Exhibitions are an alternative way, but negatives are rarely presented in exhibitions.

Universities and research centers, including humanities and exact sciences, or conservation that includes both, do in-depth research on general or individual objects, their history, uses, materials, deterioration processes, and more. The information recovered or uncovered by these institutions and professionals also contributes to cultural heritage knowledge and value.

Potentially these reach a wider audience through publications, interpretation centers, and educational services, and other means of dissemination.

And nowadays, a great resource for publication and dissemination is definitely the internet.

Even an archive that was never the focus of an exhibition or a collection that was never recognized to have relevant cultural value can reach outside its community with the internet and be found and valued. The Internet can promote dissemination in a way that no other type of publication can. And undoubtedly, the digitization of collections contributes to the preservation of cultural heritage in two ways, allowing access and re-valuation.

It allows for fragile collections to be accessed with fewer restrictions and without risking material integrity. In an archive, the more fragile objects are kept in the strictest preservation conditions, and the downside is that they are less accessible. The rest of the collections, considered stable, are stored according to the request for access. Less requested items are also kept in similar conditions to those that are at risk of deterioration. Reducing the need for access allows that more collections be held longer in the ideal conditions.

And at the same time, keeping a searchable record with images allows for incomplete records to be found and their value recognized or rediscovered. Particularly important for photography collections as they easily reach the hundreds and thousands, leaving an overwhelming task to the archivist, and many records are still incomplete.

Everywhere digitizing campaigns are making collections available to the world and frequently are defined as “copy to preserve” or “digital preservation.”

The digital image databases are exceedingly focused on the image alone.[355] Searching online, it is evident a lack of relationship between the original object and the image in its digital version. After the digitization, the object is destroyed in some of these campaigns, reinforcing the idea that the object has lost value and has become obsolete.

How can the photographic object be preserved if it lacks or is devoid of assigned values?

Nonetheless, the fact is that all around the world, most collections are being kept, aside from being already digitized. But will future users, that only know the digital image value the physical objects?

The digitization process results in loss of information and knowledge about materiality and a break with the past, at the cost of knowledge and information about production and uses.

Although experts today still recognize the value of negative collections, these suffer the most significant loss due to incomplete representation in online databases, at risk of their preservation.

Professionals dealing with conservation also deal with information and produce information. From books and history, particularly in western cultures, this information, called by Laurajane Smith as the authorized heritage discourse,[356] is now being complemented with "external," "non-authorized," non-expert sources.

The increasing inclusion of stakeholders and communities, in general, in all processes of conservation is a product of contemporary changes. This is seen, for example, in the *Burra Charter for Places of Cultural Significance*, written for the Australian reality by the Australian ICOMOS in 1979.[357] Although with less influence in the Portuguese context, it has been adopted internationally, after the 1999 revision, and made for:

> The Charter sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians. (Australia ICOMOS Burra Charter, 2013)

Its universal applicability may be contested and is even cautioned by the Australian ICOMOS. And may not apply to individual objects. As already argued, discussing archives, setting standard procedures

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[355] The issues of preserving and maintaining these databases go outside the purpose of this research and the responsibilities of the conservator of photographs and will not be addressed. Nevertheless, one must not mistake preserving objects and the preservation of information by reformatting. As it stands today, no digital support (hardware and software) is expected to have more longevity than the physical object. Reformatting is possible, but it assumes recurrent investments in new equipment and converting data from obsolete supports to new ones.

[356] See note above.

[357] The Burra Charter was first written for the Australian reality by the Australian ICOMOS in 1979. This charter is interesting because it has been updated to accommodate changes in time about heritage and culture concepts, and the current version is from 2013.

is a problem in conservation, as each object has specific needs and values. But the charter addresses some issues that are a sign of a break with the past as it recommends that "community and stakeholder engagement should occur throughout the process" (Australia ICOMOS Burra Charter, 2013).

As seen, archives have more strict standardized procedures that limit the possibility of direct input from stakeholders and communities. However, this also might be changing. Several institutions now share their images and ask for the public to complete the existing records, such as the identification of events and places. The CPF, since 2012, shares images on social media in a crowdsourcing effort. Aida Ferreira, an archivist at the CPF, promoter of such campaigns, shares her experience in a dissertation (2019) and how she noted engagement and further dissemination of collections through the interaction with the interested public. The CPF's online platform is also being prepared to receive direct contributions from registered users.

Conservation today – theories and the role of the conservator

However practical and alluring a conservation theory may seem, or even be justified, it is problematic to define a unifying contemporary theory. Scientific conservation failed to produce a unifying text because it was clear that science could account for, or analyze, the subjective and mutable, intangible issues. More recent texts, such as those by Muñoz Viñas, de la Torre, Mason, or Avrami, are products of research rather than personal experience alone and can give a more flexible stand for a contemporary theory.

Nowadays, it is increasingly recognized the role of those not directly involved in the preservation of cultural heritage, the non-experts, the users (stakeholders and communities). The "non-authorized," however unbecoming such a term is,[358] are in effect, the ones for whom preservation is done, not just in the future but also today. And are now called for more active participation in the conservation of cultural heritage. The questions then become: who defines cultural heritage? What should be the conservation guidelines? How to raise stakeholders for hidden collections? And what is the role of the conservator?

[358] It is used in opposition to Smith's "authorized heritage discourse" (Smith, 2006), see above.

Towards an amphibious conservator - Advocating for advocacy

"That is why we all get into [conservation] because it's fun."
(Karen Pavelka, 2020)[359]

Nowadays, values, meaning, function, and significance, are in the central stage, explaining conservation as they allow multiple possibilities in the conservator's decision process. Martha de la Torre and Randall Mason, in the introduction of the report *Assessing the values of cultural heritage* (2002), identify why today a globalizing theory means integrating different points of view, including from non-specialists:

> Until recent times, the heritage field was relatively isolated, composed of small groups of specialists and experts. These groups determined what constituted "heritage" and how it should be conserved. The "right to decide" of these specialists was validated by the authorities who funded their work. There was a tacit agreement between the groups with the power to act.
> In recent decades, the concept of what is heritage has evolved and expanded, and new groups have joined the specialists in its identification. These groups of citizens, of professionals from other fields, and of representatives of special interests arrive in the heritage field with their own criteria and opinions – their own "values" – which often differ from our own as heritage specialists. (De la Torre, 2002, p. 3)

Contrary to what is said by De la Torre, and as seen, the concept of heritage did not change only recently. It was not fixed in the past; what changed more recently is the recognition of external sources to institutions and people in charge of protection, conservation, and management of cultural heritage. Still, as used in this text, concepts were defined to adjust to the text's purpose, and other definitions were retrieved from the "authorized heritage discourse" from institutions such as UNESCO, ICA, or ICOMOS.

So, who defines an object's value?

During an oral communication published elsewhere,[360] someone asked, who defines? Is it the conservator? The short answer was "no!" As time was short, no further explanation could be added.

Photographic collections are kept hidden, and because of that, they have few users and, therefore, value. One possibility to invert this is to make them accessible via the internet. The presented communication

[359] Karen Pavelka, 2020 AIC Award Winner of the Rutherford John Gettens Award for outstanding service to AIC, interview February 2021, talks with AIC's Collection Care Network by Kelly Krish, Univ. Texas Austin.

[360] Author's oral presentation at the 2019 AIC PMG & ICOM-CC PMWG joint meeting: *How and Why: Photograph Conservation Today*, held on 19-23 February 2019. Published as Pereira, C. C., Castro, L., Barata, C., & San Andrés, M. (2019). Digitizing collections - A reflection on negative archive collections, prioritizing procedures and what is lost. *Topics in Photographic Preservation*, *18*, 192–201.

tried to show what different values exist in a negative collection and how they are miss represented, or not at all, in the available online image databases.

When the database is designed, it is also chosen what information is included, and this has a direct influence on what values are being preserved, promoted, or even created.

It is when the object is handled that many forgotten values are rediscovered. The conservator's choices affect how objects are valued, and he has the chance, if not to define value, to bring them to light. For that, the conservator needs to participate more actively in other aspects of conservation such as "Presentation" or "Meaning and value," even if the ICOM chart says that the conservator's expertise is only partially involved in these aspects (Figure 5.1). The information the conservator learned gives him expertise.

A lot has evolved since the beginning of this research. More written sources are available, online databases have more information, and "advocacy" is increasingly found in many descriptions from conservator associations and departments.

Soraya Fleischer reflects on *amphibian anthropologists*, as she characterizes those that work both in research and with communities (Fleischer, 2007, p. 40). Similarly, this can be applied to conservators that produce research and, simultaneously or not, participate or promote outreach programs and conservation advocacy among stakeholders and communities.

Some conservators can spend their entire careers inside a workshop. Some share their work with the conservation community presenting in conferences and publishing their results and research. But others have already embraced an amphibious attitude. Several are the examples of a successful addition to conservation by the inclusion of stakeholders.

A project, began in 2009 by the Getty Conservation Institute (GCI), reunited its scientists with members of the alternative photographic processes community. The collaboration went both ways and further, as Dusan C. Stulik and Art Kaplan stated:

> To make this collaboration mutually beneficial, GCI researchers have been sharing scientific findings with project participants and with the conservation community at large, using project updates and dissemination of the work through publications and presentations. (Stulik & Kaplan, 2012, p. 15)

In 2016, a funding campaign was launched by the Nederlands Fotomuseum for the preservation of 42.000 color slides from the Dutch artist Ed van der Elsken. They started with a pilot treatment for 1000 slides. In the face of a conservation project beyond the museums' financial means, they opted to involve the public using the media and promote related events. These, and the results from the pilot

treatment, raised public awareness. The individual public donations encouraged public and private institutions to contribute. The project raised the funds needed, and the collection was treated in the projected calendar of two years (Pietsch & Fernandes, 2019).

At the 2019 AIC PMG & ICOM-CC PMWG joint meeting, Millard Schisler suggested a new generation of conservators, which he called *Conservators of the 2020s* (Schisler & Dilippi, 2019). And the Image Permanence Institute organized a symposium *2020 Vision*, which was unfortunately canceled in the face of the world's shutdown. The year 2020 came and went with many halted initiatives. However, the idea remains an updated version of conservators, not born instantaneously but developed, and for a future beyond 2020.

Much of it will include requesting more participation from stakeholders and, at the same time, more involvement from conservators in awareness and advocacy initiatives.

During an interview with Karen Pavelka, winner of the AIC's 2020 Rutherford John Gettens Award, when asked about particular qualities that make for an effective advocate and relating with materials in libraries and archives that are not generally seen by the public, she replied:

> I think to be an advocate, first of all, you have to have a natural curiosity to want to understand a situation and all its complexities. Then you need to understand your own bias and what you're looking for and why. Then you need to be able to listen to other people and understand their viewpoint and when it differs from your own, be able to communicate and balance things out. And then, you need to be able to speak up and speak up loudly and effectively, and not scream and yell, but present your case and be willing to negotiate. That's not something that comes easily to people who may have gone into conservation thinking they were going to spend 100% of their time at the bench, [laughs] which is never going to happen and never was going to happen. But, you know, we all have that; that's why we all get into the field, because it's fun. (Pavelka, 2020)

In her answer, Karen Pavelka summarizes the situation. Advocacy is not just to engage with others and is not an unbiased action. Engaging stakeholders and communities is vital to foment or even guarantee cultural heritage preservation in general. This is most important for collections that are hidden and for practices, like retouchings, that are forgotten or have little recognition outside those handling the collections.

So, when asked who defines the values. In cases such as this, the conservator's action significantly influences identifying and giving value and is definitely not unbiased. Therefore, it is necessary for the conservator to be amphibian and actively act on all aspects of conservation. And if the research pursues as many aspects as possible, then the conservator will have a complete view and be able to passe it on, raising more stakeholders.

The following section addresses the present conditions, established conservation procedures, and what affects the retouched objects, from Portuguese negative collections.

5.2. Condition of retouched materials

The three most recurrent retouching materials are varnish, graphite, and colorants. And a focus is given to these. As no known studies were found about such materials when used for retouchings, the assessments of conservation conditions were judged by observation alone, considering at the same time intentions and effects, as described in technical literature, and reviewed in chapter 2.

In general, the materials seem to be in good conservation condition and mostly deteriorated by external factors such as mishandling or biological contamination.

No deteriorations were identified in the negatives to having been caused by the retouching materials. And even the examples with biological contamination, the deterioration could not be exclusively attributed to the retouching materials. Figure 5.6 shows three examples of fungal contamination. Although the varnished area could not be ascertained with certainty, the first present contamination in a defined central area suggests that the varnish is the most affected. But in the second example, the contamination covers both varnish and unvarnished areas, spreading to almost the entire surface evenly. Other negatives presented visible fungal contamination between the emulsion and the glass support (Figure 5.6c).

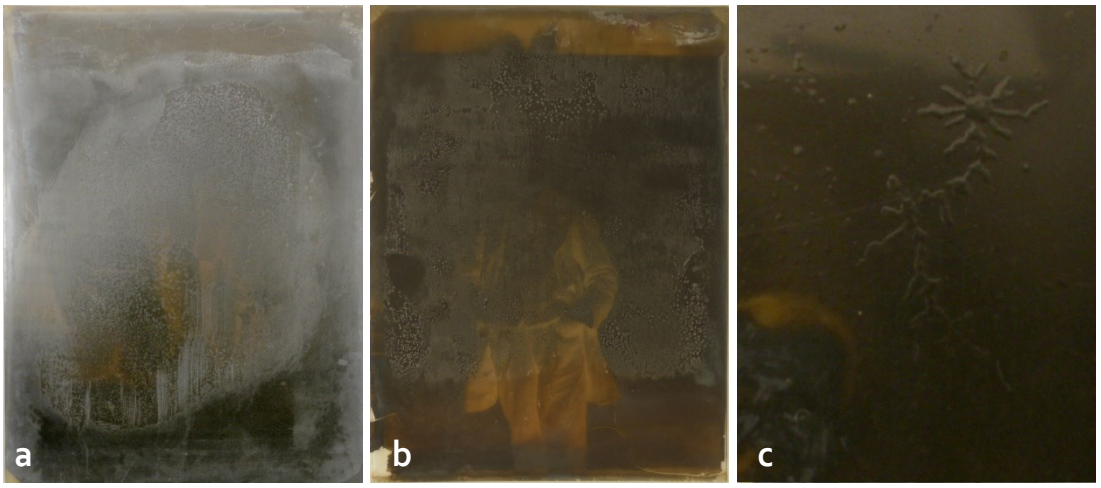


Figure 5.6 – Biological contamination of the emulsion, dry plate negatives, portraits, 13x18 cm, Alvão, 191?: a. group portrait (CPF/ALV, 233, "12059"); b. Male portrait (CPF, /ALV, 216); c. group portrait, detail showing pattern of fungal hyphae inside the emulsion layer (CPF, ALV, 231, "12441")

Even considering that other unknown materials may affect the preservation of negatives, at this time and with these collections, no related deterioration was observed. It is concluded that the most common retouching materials do not pose a risk to the preservation of negatives – below, some examples of the most recurrent findings.

The example of the negative in Figure 1.1 presents an overall stable condition, and the deterioration found is not concerning. The retouchings are in good conservation condition, and the varnish even contributed to the preservation of the negative.



Figure 5.7 – Group portrait, dry plate negative, 18x24 cm, Alvão 190?: a. general view with transmitted light; b. Detail of makeup viewed with transmitted light; c. Detail showing silver mirroring of the emulsion near the borders, not covered by varnish, viewed in reflected light; d. detail with pencil retouching on the emulsion, viewed in reflected light; Alvão, 191? (CPF, ALV, 117/"9366")

As already mentioned, the varnish seems to protect the emulsion, like many other varnishes used for that purpose. The emulsion, in varnished areas, does not have silver mirroring and presents less yellowing. But it is concluded to be a consequence and not the intended effect because negatives are not varnished to its entire surface. Concerning the deterioration of varnishes, natural resins have a yellowish tone that is not perceivable in thin layers. Resins are known to darken as they deteriorate, but possibly, not enough time has passed for darkening of the varnish to occur (Torresi, 2001).

On the contrary, yellowing of the emulsion was observed. In some negatives, the emulsion yellowing seems to be stronger in unvarnished areas.[361] But many emulsions present generalized yellowing despite having localized varnish (Figure 5.7a). Recurrent in all observed negatives, the silver mirroring exists outside the varnish, in the example (Figure 5.7c), only in the small unvarnished areas near the borders.

The same example shows the retouching of the face. The pencil work does not appear in defined strokes, as observed in other instances, Figure 5.7d. This raises the doubt if it was done intentionally or if it was smudged due to improper handling. Graphite is the most stable form of carbon, and consequently, it does not deteriorate, at least under normal thermodynamic conditions.

[361] See above (Figure 2.33).

Finally, still considering the same example, the dye used over the face still presents an intense reddish hue Figure 5.7b. And this is recurrent in all the considered collections. This retouching is done on the glass support with no additional preparation layer, and it is very susceptible to abrasion. This example is in good condition. And it is even possible to observe the fine work removing the red dye in areas intended to be kept darker, like the eyebrows, eyelids, mouth, hair, and top of the ear.

When the dye is applied to the emulsion, it is visibly more adhered to and more resistant to handling. Therefore, the concern is retouchings done onto glass where dyes and other materials are more susceptible to abrasion and handling.

The historical samples of raw dyes, either New coccine from Agfa, or scarlet crocein from the Foto-Carvalho collection (RedETZ) and Kodak, show little deterioration and still high tinting strength. No studies were found on the stability of these dyes. However, they are recognizably lightfast, considering other pigments and dyes used in art.[362] Lightfast means that they have high resistance to light and fading, and it is most likely why they were used in photography.

Some negatives showed yellowish retouching that could not be, at this time, identified. And it was not possible to know with certainty if a yellow dye was used or it is a deteriorated red dye. Gamboge was explicitly named in some manuals, and a raw sample was included in the above section for material analysis, yet no positive identification was made from negatives samples. This natural dye is known to fade exceptionally fast by exposure to light, but some authors also identify that deterioration can occur in the dark due to atmospheric pollutants (Winter, 1997). The already established conservation procedures, such as individual enclosures and storage in a controlled environment, would be enough to protect most such retouchings from external deterioration factors.

This negative received previous conservation treatment in 1992, and it was possible to find the conservation sheet that registered the treatment done at that time (Figure 5.8a). Under "conservation condition," the observations made classify the retouching to be in poor conservation condition and says:

> Support: has ink retouching in poor condition, scratches, flaws in the edges, di...? (grease), and general dirt.
> Emulsion: has varnish, scratches, pencil and ink retouching, emulsion modified by sulfates, oxidation of metallic silver, emulsion missing in small areas, di...? (grease), and general dirt
> Treatment: Support – water, alcohol

[362] As a comparison, the new coccine dye receives its name for close relation in hue with the natural red cochineal, obtained from insects, also referred to as carmine. However, this colorant is known to alter easily with light (Schweppe & Roosen-Runge, 1986), and because of that, not suitable for photography.

Another negative presented a similar description, Figure 5.8b, but added that it was necessary to remove the retouchings on the support because they were in bad condition (highlighted). The treatment description declares that it used water and alcohol to clean the support and Kodak film cleaner to clean the emulsion. The conservation condition appears similar in both negatives when observing the physical objects. However, the second example does not have visible retouchings on the glass or emulsion, attesting that it was cleaned, not just the support, and all retouchings removed.

In other examples, the emulsion was only "partially cleaned" with Kodak film cleaner or only dry cleaned, and in these cases, the retouchings were preserved.

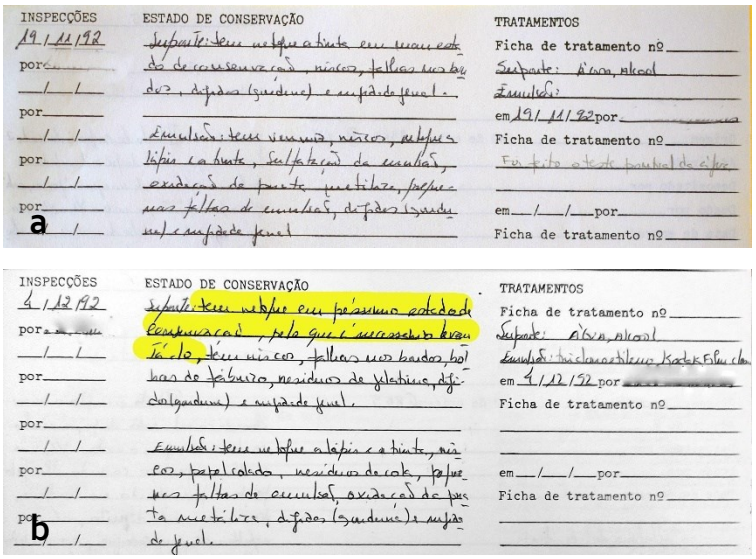


Figure 5.8 – Conservation sheets used for the treatment done to two Alvão negatives in 1992. Both have a similar description but the one highlighted – b – adds that because the retouching is in bad condition, it will be removed and identifies Kodak film cleaner has been used to clean the emulsion. (CPF, ALV 117/"9366"; 556/"6869")

Some negatives show signs of having been retouched, but no pencil work is observed. Also, there is no written memory of retouching removal in the treatment descriptions. The only evidence that retouchings ever existed is the void in the silver mirroring left by the varnish that is now absent; Figure 5.9 shows such an example. There is still makeup on the glass surface in some figures, but there is no pencil retouching on the emulsion side. The void left in the silver mirroring not only indicates that varnish existed but also pencil retouching. In all the collections, as a rule, there is always pencil retouching every time there is makeup, even though the opposite is not always true. This example does not appear to be an exception to this rule but rather the testimony of retouchings being removed, probably, during the conservation treatments, even if no mention was found on its conservation sheet.

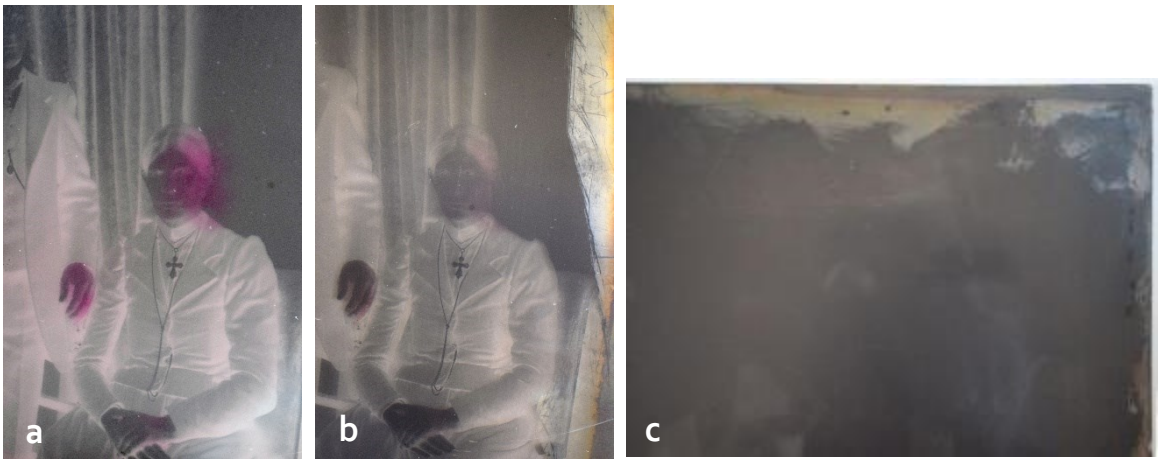


Figure 5.9 – Group portrait, dry plate negative, cleaned in 1992, a. glass side; b and c. emulsion side showing void in the silver mirroring, indicating that the surface was varnished at some point. (CPF, ALV 415).

While conservation assessment is subjective, it is believed that the retouchings removed were not deteriorated. As explained, varnish and graphite were always found to be in good condition in all collections. And that negatives must be in very poor condition to affect retouchings.

Still, these are treatments done in the 1990s, and praise goes to the professionals believed to have done the best to their knowledge.



Figure 5.10 – Sailboat: a. dry plate negative; b. digitally converted positive from the author's image, 2009; b. image available in the online database, 201? (AMLSB, NEG, 3582).

Concerning masks, of note, some negatives show signs of having had masks that at some point were removed. One example is presented in Figure 5.10, photographed in 2009, and how it is at present. It is not known the reason offered for the removal of the masks. However, it is known that it is a general and established practice to remove masks and discard them. Sometimes they are not removed when closely adhered to the emulsion, and the removal is potentially harmful to the negative. And from the same collections, several examples still keep their masks.

Masks were often made with low-quality or discarded papers. Figure 5.11 shows two examples, one using an old calendar sheet and another that uses discarded photographic paper.

Masks can contribute to the deterioration of the emulsion. The negative in Figure 5.11c shows silver mirroring of the emulsion in the sky area, suggesting that at some point, the negative might also have had a mask on the emulsion side.

But in all the examples observed, the areas that are not covered are not affected. It raises the question if there is a real need to remove the masks if they only affect hidden areas.



Figure 5.11 – Masks, dry plate negatives: a. Man with mask, Anthropology collection, 1935? (MHNCUP-FCUP-IA-AF-215); Sailboat: b. glass support viewed with reflective light; c. emulsion side viewed with reflective light; author's images, 2009 (AMLSB, NEG, 3582).

What is being done – assessments to conservation practice

In Portugal, the steps taken for the preservation and conservation of photography collections are similar, and as described by Luís Pavão (Table 5.1).

What is described might be a good workflow for a service, but it is not a conservation plan. It is presented as a recommendation but primarily sold as a service to institutions that do not have their own conservation department. And because of that, it has three significant problems. The gross of the job centers on organization and digitization and less on actual conservation measures for the objects. Restoration treatments are left as the last task, which results in the most neglected step. And it does not provide a long-term preservation plan. The most deteriorated and in need of conservation treatment never get attention and are possibly lost in this process.

It is not disputed the importance of quick serialization and organization for collections that are forgotten. Cataloging has always been the first step in preservation. And unfortunately, institutions do not have the resources to preserve all, and selection or prioritization is necessary.

Is selecting according to conservation conditions the best selection?

Many negative collections are hidden or forgotten. There are no stakeholders to whom to consult or justify. The result is that only small collections receive complete treatment. And most are left untreated. As the first records are made available online, the institution gains stakeholders. However, this means

nothing without a medium to long-term preservation plan and retaining a conservation service or hiring a conservator full time.

One way to turn the situation around is to do a complete treatment to a small sample that can then be used to raise awareness and gather funds to treat the rest and retain the conservator. For example, what was successfully done at the Nederlands Fotomusuem (Pietsch & Fernandes, 2019).[363] Not only did they gather the funds needed, but they also promoted the collection, which will contribute to its preservation in the future.

Table 5.1 – Photography collection processing according to Luís Pavão's book on the *Conservation of photography collections* and as a service provided by his company LUPA.

Pavão: Conservação de colecções de fotografia [Conservation of photography collections] *(1997)*	**Pavão: Evolution of the working criteria in the model of Portugal** *(2016)*
1. Assessment: value and conservation conditions	1. Define goals, and the collections intended use
2. Collection folder: compilation of related documentation	2. Collection survey and inventory – production of a database
3. Labeling: of original containers to be at least kept until the end of the conservation treatment	3. Report with conservation needs and strategy for preservation, public access, and image distribution
4. Observation and pre-inventory: production of a conservation report	4. Project for a storage facility, where parameters are defined considering the collection's specific materials and space available in each institution
5. Segregation of unstable specimens: identification of objects that need restoration treatment	5. Routine treatments: cleaning and housing
6. Organization: separation according to photographic processes, size, and subject, in this order, while keeping records of possible original organization and relations between objects.	6. Digital conversion strategy: criteria and digitization
7. Cleaning and storage	7. Improvement of quality of the digital image
8. Identification: attribution of a sequential number	8. Delivery of digitized information: Untreated digital matrix, metadata, improved digital image,
9. Description: of the image, authorship, object, conservation condition, and storage	9. Group and individual image description
10. Digitization	10. Restoration of objects that need more the routine treatments is done as final steps
11. Reproduction: production of copies	11. Last: definition of collection protection policies, uses, and copyrights.
12. Restoration	

[363] See above.

The sequence described by Pavão is not strictly followed, and archives like CPF, with their own conservation staff, share some of the tasks with other departments. For example, the Archival Department does the description of collections and individual objects, and the Digitization and Reproduction Department does the digitization.

The preservation, conservation, protection, and valuing of cultural heritage are the institutions' purpose and are declared in institutions' mission statements. Therefore, it is a group effort, and the conservation and preservation of collections are not limited to the conservators' work. For example, the CPF's mission statement says:

> The CPF exists since 1997, as a public service created by the then Ministry of Culture to ensure a national policy for photography. It is currently supervised by the Directorate-General of Books, Archives, and Libraries and has the mission to protect, value, and promote photographic heritage.[364]

And the Lisbon's Municipal Archive:

> The Municipal Archive of Lisbon has the mission to collect, keep, treat and preserve the documentation related to the city's memory; promote the integrated management of documents produced by the Lisbon's Municipal Chamber by developing information services in order to meet the needs of stakeholders.
> With the competence to:
> […]
> To protect and value the municipal archival heritage as the foundation of collective and individual memory, a factor of the Municipality's identity and a source for scientific research.
> To develop and offer plans for the preservation and conservation of municipal archival heritage.[365]

And specifically, to the Photography section of Lisbon's Municipal Archive (AMLSB):

> It was created in 1942, from the need for centralization and conservation of the photographic production dispersed by the various city services. […]
> Holder of a collection with a unique heritage value for the history of the city and photography, which goes back to 1850 to the present, it asserts itself as an institution dedicated to the preservation of photography collections and the dissemination of the photographic memory.[366]

Understanding the routes a collection takes inside an institution is necessary to complete the knowledge on factors affecting the conservation of negative collections and retouchings. During this research, it was possible to interview different workers of CPF responsible for various aspects of

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[364] Author's translation. As it is stated in the only official page at http://cpf.pt/ [Retrieved February 2021].
[365] Author's translation. As it is stated in the only official page at http://arquivomunicipal.cm-lisboa.pt/pt/arquivo/missao-e-competencias/ [Retrieved February 2021].
[366] Author's translation, as stated in the only official page at https://.../arquivo-municipal-fotografico [Retrieved February 2021].

collection management and preservation.[367] The following summarizes the competencies that relate to each department and aspects that directly or indirectly affect the preservation and knowledge of negative collections.[368]

Preservation and management at the CPF

The acquisitions department may receive a proposal, which can be submitted online, and a first appraisal is made. A conservation assessment is part of the acceptance or refusal criteria for a new collection even before the acquisition. The appraisal and for an agreed acquisition follow specific normalized procedures:

- After the first contact, an entry form registers the collection's provenance and general characteristics.
- Pre-inventory
- Evaluation of interest, which follows a standardized form. Which attributes an overall classification, reaching more than 230 will be accepted
- The terms of the acquisition are defined, and a protocol agreed upon, including the type of acquisition (donation, deposit, or purchase) and terms of reception of objects.
- Finally the protocol goes to the Portuguese Central Office, the *Direção-Geral do Livro, dos Arquivos e das Bibliotecas* [Directorate-General of Books, archives, and Libraries].

When evaluating interest, the purpose is to identify the value that the collection might have to the institution and include assessment criteria such as the importance of topics depicted historical relevance, or author significance. But also included are more practical assessments such as the size or conservation condition and conservation needs. The first assessment is done with quick research of genealogies, written sources, online search engines, and the images themselves. Other departments of CPF contribute with specific assessments. The conservation department issues an evaluation of the conservation conditions and needs. And the archival department gives input on relevance comparing with existing collections. Finally, an acquisition may not move further if the departments are already

[367] Interviews were done in the Spring of 2017 with the CPF staff members: Sónia Basto, Aida Ferreira, and Dinora Rodrigues from the Archival Department; Ilda Zabumba, Conservation Department; Carla Barros and Sara Ferreira, Digitization and Reproduction Department, and Ângela Carvalho of the António Pedro Vicente Museum Center, responsible for all objects not categorized as archive documents, such as cameras and other materials.

[368] Outside CPF, only another collection is similarly institutionalized, the NEG collection from the AMLSB. The details of the conservation procedures will not be described for the AMLSB as this institution follows Luís Pavão's conservation guidelines, which are summarized above (Table 5.1).

dealing with other recent additions.

The inclusion of the conservation department's participation is most relevant not just as a good practice but also historically because this was only recently implemented. It recognizes the importance of conservation as a multifaceted intervention, not limited to a workstation, and the conservator as an active and knowledgeable professional.

The Archival Department then starts a second archive process. First, it proceeds with a detailed inventory, which might not be needed according to the first assessment's detail, during acquisition. The objective is to quantify and qualify, and the latter includes identifying themes, dates, purpose, and the general description of the collection. It is also done, at this point, a first conservation assessment following a qualitative deterioration scale. If some negatives are identified as having advanced conservation problems, they are segregated from the rest of the collection. The deterioration scale is as follows:

Very deteriorated: unusable image, cannot be exhibited or published, even if it can still be perceived its content. Examples: acetate negatives with bubbles or channels, shattered glass negatives, or albumen prints with little contrast.

Deteriorated: The deterioration clearly interferes with image legibility, but it can still be exhibited or published. Examples: broken glass negatives in just two or three fragments, wavy acetate negatives, prints, and negatives with intense silver mirroring.

Reasonable: clearly presents visible forms of deterioration, which do not significantly disturb image legibility. Examples: slight curvature in acetate support, vinegar scent, yellowing of emulsion or image, fading of contact prints.

Good: presents slight deterioration, with no consequences on the good legibility of the image. Examples: slight silver mirroring in negatives and prints, slight scratches, or slight yellowing.

Very Good: It is in perfect condition, without any deterioration, as it came out of the hands of its author or printer.

The collection then goes to the conservation department. No conservation assessment report is done, at least not as a complete report. Basic cleaning and storage are already standardized treatments and done to all collections. Official step-by-step documents exist according to the type of object. The established procedures for glass negatives include dry and solvent cleaning, removal of tape and paper masks, housing in acid-free paper envelopes, and assignment of a code like PT/CPF/ALV/000001.

Where:

PT – stands for Portugal.

CPF – stands for *Centro Português de Fotografia* / the entity that holds the collections.

ALV – identifies the specific fond or collection. In this case, for *Alvão.*

000001 – last, a sequential number.

Negatives are then stored in conservation boxes, according to size and in sequential order. Finally, a conservation sheet registers all conservation and restoration procedures done.

This sheet does not include a step-by-step restoration, and negatives that present other deterioration problems, such as broken support, emulsion detachment, or biological contamination, are set aside for restoration treatment. This is not done at the end of everything like Pavão suggests, but unfortunately, it is not done right away either. Because no conservation assessment report is done by the end of the cleaning and storage steps, a restoration intervention is only conducted according to resource availability, usually very little.

On cleaning, the step-by-step includes specifics about retouchings and masks. The recommendations are to clean around retouchings and ink masks and preserve any original labels but remove all tape and paper masks, with a detailed description of how to proceed.

The individualized conservation sheets have fields for image and object descriptions, but any retouchings identified are recorded as part of the conservation condition assessment. After all conservation treatments, the collection goes to the digitizing department.

Digitization of negatives is done using a scanner; the obtained image is set to a specific size and is considered a matrix, saved supposedly unaltered. The size does not change with the original object, and the digital image's size is the same, whether a 35mm slide or a 24x30 cm glass plate. Also, all objects are digitized in color, but black and white photographs are digitally converted to grayscale. Negatives are converted to positive images, and other adjustments are also possible to improve legibility. Usual digital improvements are: cropping to eliminate margins, stamp, to eliminate small defects that might have been produced because of dust particles setting on the scanner or the negative surface; Levels, Curves, and Color balance to adjust tones, colors, and high and low keys; Unsharp mask, to improve definition. The result is then visually compared with the original to be as close reproduction as possible. Each image also receives a watermark with the letters CPF. A high-resolution file is saved, and a smaller

JPEG file is created.[369] The JPEG is used for work, either for archival work or to the public. JPEG is also the format available in the online databases, and unless some legal disposition applies, it can be used freely by the public.

After conservation and digitization, the collection returns to the archive department, now to describe each document. This is done using the digitized images. Each document is classified as artistic or not, and analysis of access and reproduction is defined. Finally, all the information is integrated into a central server and made available online. After identifying legal limitations, the digital image may not be made available online but still be viewed at the CPF physical facilities on a computer. Images that are made available are those with no legal limitations or that the CPF owns the rights. Online images can be used as they are, but any person can request a better-quality image than that available and without the watermark. Each request for image reproduction is evaluated. Permissions, limitations, and file size are defined according to use, for example, personal, commercial, or academic uses, to be on a website, for an exhibition, or integrated into an advertising campaign. Legal restrictions and reproductions fees apply and are defined by the central government. For portraits, as already explained,[370] there are legal limitations. They can only be online or reproduced if portraits of public figures or at public events, and entire portrait collections, like Alvão, have restricted use.

For example, during this research, because it is academic research, some portraits were shown in oral communications but not included in the respective meeting proceedings or any other means of dissemination.

The entire sequence of procedures is not always verified, particularly with old collections, in the institution since before such procedures were established, as in the case of the Alvão fond.

After reviewing the conservation condition of retouching materials, a more specific analysis of some of the collection management and preservation steps is examined. It will not be described the preservation of each collection, but all collections are considered in a few specific topics: Classification, Handling, Cleaning, Storage, Identification, and Digitization. These topics were identified as the ones where some risks exist, and improvements can be made to the preservation of retouched negatives. Some

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[369] "JPEG, Joint Photographic Experts Group. The JPEG image file format is standard for low-resolution continuous tone images on the web. It is a lossy [compression] file format. JPEG images cannot be restored to their original file size because the information has been permanently eliminated. JPEG compression also allows the creator to decide between file size and image quality; as the file size increases, so does image quality. JPEG files should not be opened and resaved multiple times because the images will slowly deteriorate (due to the lossy compression scheme) and become soft and pixelated." (Hirsch, 2015, pp. 202-203).

[370] See chapter 4 – The studio portraits and archive.

recommendations are presented either concerning retouchings or collections in general. It is considered the material conservation of retouchings and their value and how can they better be conveyed and understood by the stakeholders, users, either academics or not.

Evaluation and classification

Despite lists and step-by-steps, conservation assessment is subjective. Recommendations are to do an inventory of the deteriorations found, either affecting image, object, or both. And classification of the overall conservation condition is then to be suggested. A qualitative scale, like the one used during archival processing,[371] divided into categories from very good to very deteriorated, is usually used. Each institution has a version of it that in Portugal in the known archives are quite similar.

What is also agreed among conservators is that evaluating varies from person to person[372] and the overall conservation condition of the collection.

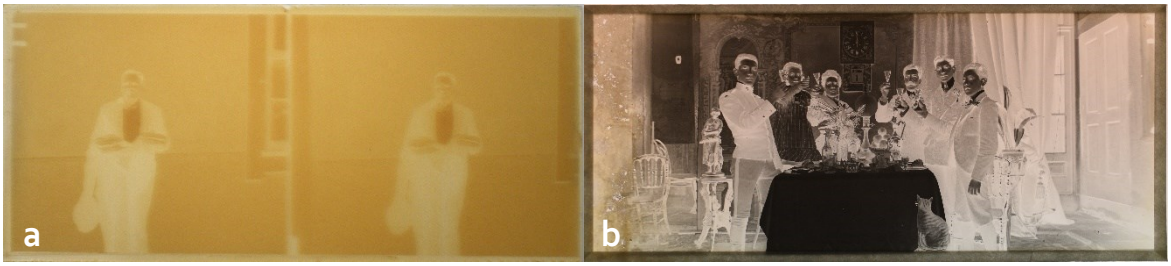


Figure 5.12 – Deterioration assessment, APR collection, stereoscopic dry plate negatives, without retouchings: a. Man with tray, assessment on Feb. 7th, 2000 - "Good," (CPF, APR, 7247); b. Aurélio da Paz dos Reis family greeting to the new year, assessment on Feb. 4th, 2000 - "Deteriorated," (CPF, APR, 7243).

For example, in a collection that overall is in good condition, a negative with glass and emulsion stabilized but with its image faded and yellow is classified as "very deteriorated." But if the collection is overall deteriorated and most negatives are broken, with biological contamination, or with emulsion detaching, similar negative might be considered in "good" condition.

A negative such as that is presented in Figure 5.12a. This negative was considered to be in "good"[373]

[371] See above.

[372] A person's disposition and past experiences may influence the assessment.

[373] The considerable fading and yellowing of the first example were registered in the conservation sheet, not as a deterioration, but the result of a yellow toning. While the toning of negatives is unlikely, the negative might have been treated to improve contrast by chemical intensification or reduction, which might have produced some negative coloration. It is not possible to say that such treatment was done, or not, with certainty. Today, it appears that what is observed was not an intended effect but a deterioration due to improper processing of the negative.

conservation condition, while the one in Figure 5.12b was classified as "deteriorated." Both negatives do not have retouchings. The conservation sheets are dated three days apart, and the treatment was the same for both – "Cleaning of the glass with distilled water and ethanol, cleaning of the emulsion with an air blower."



Figure 5.13 – Deterioration assessment, APR collection, stereoscopic dry plate negative, with retouchings: a. Unidentified actress portrait, assessment on Feb. 7th, 2000 - "Reasonable"; b. detailed of the emulsion showing the varnished area and silver mirroring. (CPF, APR, 7276).



Figure 5.14 – Deterioration assessment, APR collection, stereoscopic dry plate negative, with retouchings: a. Portrait of actress Lucília Simões, assessment on Feb. 4th, 2000 - "Good"; b. detailed of the emulsion showing pencil retouching, unperceivable varnish layer; c. detail of the glass surface showing retouching over the nose. (CPF, APR, 7272).

In another example, in Figure 5.13, a retouched negative was classified as "reasonable." The date is the same as in Figure 1.7a. It received the same treatment, but most relevant, it was evaluated by a second person. On a different day, this second person classified another retouched example as "good" (Figure 5.14).

The example in Figure 5.13 appears to be in good conservation condition, image tones are defined, and no yellowing of the emulsion is observed. However, the varnish was crudely applied, and the surface is irregular (Figure 5.13b).

The last example, although it presents some yellowing of the emulsion, was classified as "good."[374] Its

[374] All images were not corrected for color and done with similar light conditions on the same day. The last example shows some yellowing, but it was not possible to ascertain if it was yellow at the time of the first assessment.

conservation sheet does not mention retouching, but retouching is visible in both glass and emulsion (Figure 5.14b and c).

In these two last examples, a hypothesis is that the retouchings might have influenced the conservation assessment. And the one with a textured varnish was classified worse than the other, where the retouchings are less visible.

The deterioration inventory does not convey an accurate description of the negative's conservation condition and is misleading. For the above example of the Alvão collection, the description only identifies "scratches" without saying where or how much of the surface is affected. The examples from the APR collections were described using a grading, such as "very light scratches," but all the presented examples "good," "reasonable," or "deteriorated" are described as "very light."

Finally, another issue is that the description of deteriorations and treatments performed is immediately outdated and does not include an assessment of further actions. Most, if not all, have the description of "general dirt" that was, presumably, eliminated during cleaning. The negative shown in Figure 5.12 presents a fracture and is now mounted on a secondary glass and fixed with perimetral tape for stabilization. However, if registered, this treatment was done on a different document that, without centralized information, was not possible to cross-reference.

This five-level classification system is not useful for the conservator at the time of first evaluation, nor to further planning, implementing treatments, and monitoring conservation conditions' evolution. What is needed is not an evaluation of conservation conditions but of conservation needs. A "very deteriorated" should classify a negative that requires urgent intervention, and "good" a negative that does not present conservation concerns.

Supposing a collection is to receive general treatments despite any conservation assessment such as cleaning and storage. In that case, these need to be annotated not in the individual conservation sheets but on a general assessment report. That can be used to prepare a general preservation plan. The plan can include descriptions of the general procedures for cleaning and storage, so it is unnecessary to repeat the same information in every individual conservation sheet.

The inventory of deteriorations needs to be more precise to be useful. Saying that an emulsion is detaching near the top edge of the negative is not the same as saying that the emulsion is detaching in 75% of the surface. It is vital to locate and quantify deteriorations.

Some deteriorations, albeit severe, do not pose an immediate threat to the preservation of the objects, while others require immediate action. For example, a faded negative might have lost most of its

information but might be otherwise stable and only needs to be stored protected from light and other contaminants. Because storage is already foreseen in the general plan, this negative is not concerning.[375] But a negative with emulsion and image in good stable condition but with broken support needs urgent attention to prevent further damage or alienation of fragments. If it is not possible to do a permanent housing system, temporary housing of fragments may be considered in the initial general plan.
Or an emulsion that is flaking may need immediate treatment and be temporarily segregated from the rest of the collection, and not receive the generalized treatment of cleaning and storage.
Summing up, the recommendations are:

Start with a general assessment report.

Identify but mostly locate and quantify deteriorations.

Evaluate deteriorations not by the severity of the problem but by the urgency of conservation treatment.

To be useful, this assessment needs to answer the general questions of the collections preservation and conservation needs and establish priorities to allocate time and resources better. This is already observed by some authors, like Donatella Matè and Luciana Rossi:

> [The conservation] plan starts from an initial phase of reconnaissance of the current situation, that is fundamental to proceed, with the collection of data and their subsequent interpretation and correlation, to highlight the critical points of the system, to establish the measures to be implemented in order of priority, to identify the objectives to be achieved in the short, medium and long term and to define the needs in their entirety, avoiding "leopard skin" interventions that risk being isolated, often ineffective and sometimes unnecessarily expensive. (Matè, Fotografie: Orientamenti per la conservazione, 2016, p. 18)

As seen from the list in Table 5.1, the most deteriorated objects are segregated early in the collection processing but only treated in the end. For collections with thousands of objects, this means that the most deteriorated objects will receive treatment only after years, if at all. When doing a preliminary conditions assessment, it is more realistic to consider that the most deteriorated objects will not be preserved, and discard them. Or, if they are deemed worthy of preservation, they should be assigned resources and urgency, as later treatments can be even more resource-consuming or arrive too late.

[375] Faded images were sometimes treated chemically to recover legibility, and the procedure was recommended in some older books. Nowadays, chemical restorations are rarely done. This issue is further explored in the following sections.

The conservation assessment should produce a conservation plan, including a budget and a calendar. And finally, a maintenance plan should be predicted and integrated with the institution's annual activities.

Handling

The primary reason for the deterioration of retouchings is evident at the first observation of collections. While some retouchings are well preserved because most materials appear to be stable, they are very susceptible to abrasion and careless handling, especially the retouchings on the glass surface.

Several books recommend handling procedures. Siegfried Rempel, for example, dedicates more than 30 pages to handling and examining (1987). And although this subject is one of the most important in everyday collection management and preservation, it is absent or reduced in other books. Most recommendations seem to be common sense, but it should not be overlooked because it is indeed one of the most critical risks and reasons for deterioration. Particularly in glass plate collections, that aside all other risks from handling have the risk of breaking.

Some authors call attention to the lack of "personnel etiquette," such as licking the fingers before turning a page or rubbing the skin and then proceed to handle artifacts (Rempel, 1987, p. 23). And Luís Pavão goes as far as to recommend limiting access from people that show ignorance or lack of sensibility to the requirements of handling collections (1997, p. 237).

Glass is susceptible to break, and glass negatives should always be handled flat and transported with both hands inside an appropriate container. The work-surface may be protected from accidental slips, with a matt, like blotting paper. And to help lift and transfer from one surface to another, auxiliary support should be placed under the negative.

The white cotton gloves became a standard, and when people do not use them, they seem to be setting a bad example. This is promoted by different authors like Pavão. But one needs to remember to whom the books are intended, the public or professionals.

White cotton gloves should not be considered standard use. Gloves are used for a reason, and different types of gloves have different purposes. One needs to remember the risks and what is being protected – if the people from objects or objects from people.

The cotton gloves' purpose is to protect from contact with the object. These are recommended for users or even staff members doing routine handling such as observation or even rehousing when objects have previously been cleaned.

However, the cotton gloves get dirty easily and trap dirt and should not be used in conservations treatments, especially when cleaning and using liquid solutions. All types of solutions can be absorbed by the gloves providing extended exposure to skin contact. Many are classified as "lint-free" and can be washed. Still, they are fiber-based that can be caught by the sharp edges of glass negatives. After washing, they do not have the same characteristic as before; the woven becomes more loose and seams undone.

Disposable protection gloves are more suitable for conservation treatments, including cleaning. They should fit closely to the hand, be talc-free, and replaced frequently. They exist in different materials, such as latex, nitrile, or vinyl, and the difference comes down to personal choice. However, vinyl gloves are usually less flexible, and some people are allergic to latex. Nitrile gloves also offer more resistance to puncture and some chemicals.

But most importantly, the use of gloves can lead to a false sense of protection because none of them protects against everything.

For example, all these gloves are permeable to Kodak Film Cleaner – which the main compound is 1,1,1-Trichloroethane[376] – that means that chemical passes through the glove, and none of these gloves gives protection to this and similar chemicals (Weeks & McLeod, 1981).

Trichloroethane is not recommended anymore; still, no safer replacement has been found that achieves the same results and with no damage to the emulsion. If used, the treatment should be performed with appropriate ventilation and wearing a mask and goggles; preferably, any treatment should be done inside a fume hood. The solvent should be applied with a cotton swab instead of a cotton ball to protect from direct contact with the glove and skin.



Figure 5.15 – Handling: personal protection and tools for handling collections, adapting the workspace.

[376] In tests during this research, 1,1,2 Trichloroethane was used as an alternative to 1,1,1 Trichloroethane. 1,1,2 Trichloroethane needs the same protections or more as it is a known carcinogenic (Weeks & McLeod, 1981).

A risk when handling glass negatives with gloves is the loss of sensibility. Therefore, working without gloves is an option, depending on the task and regarding other protection measures, and washing the hands frequently. The glass edge of a plate negative is not protected and can be a risk to the conservator, cutting gloves and skin.

Alternatives exist, and much of the handling can be achieved with no direct contact by using swabs, tweezers, spatulas, and secondary supports (Figure 5.15).

For handling, and from the observations during this research, the recommendations are:

Wash the hands frequently, for example, every 30 min, when handling collections – collections are dirty and contaminated with microorganisms. Transfer occurs after handling contaminated objects, and washing the hands frequently reduces contamination.

Wash the hands after working with collections and avoid touching the skin, mouth, eyes, or nose as contaminants can affect people as well. Skin and respiratory diseases among archivists are frequent from contamination after handling collections.

Avoid personal jewelry such as rings or bracelets, particularly those with sharp edges.

Do not use hand cream or similar products that can leave the skin moist or greasy.

Disposable gloves should be for personal protection only and used during conservation treatments, meaning that they protect the conservator and not the object.

White gloves protect the object from the user and should be worn for consultation tasks only.

For other tasks, cotton gloves may be cut to protect from general contact with surfaces but leaving the index and thumb fingers free for tactile sensibility, as in Figure 5.16a.

Glass negatives can be handled by holding on the edges instead of the surface, as in Figure 5.16a. To protect from the edge of the glass, an alternative can be finger protection Figure 5.16b, used on all fingers or just the index and thumb.



Figure 5.16 – Handling: holding negatives by the edges, alternative protection for conservation treatments.

Cleaning

Established conservation cleaning procedures for dry plate negatives include dry and solvent cleaning. Dry cleaning uses air blowers and soft brushes. Both seem safe for most retouchings, but the use of brush, as soft they may be, can have some abrasion on the surface and remove less adhered retouchings. Solvent cleaning should not be done to retouched negatives because any type of liquid can remove some of the retouchings, such as dyes on the glass surface or pencil.

As with any other conservation treatment, a previous test should be done on a small area before treating the entire surface. And Debra Hess Norris reminds:

> At all times, it must be clearly understood that surface cleaning is not routine. (Norris & Gutiérrez, 2010, p. 612)

The question is, why clean?

Debra Hess Norris also gives some answers:

> The decision to surface clean a photograph is frequently based on the desire to improve visibility of the image or enhance image quality and information. Reduction of surface soil can reveal subtle details in a print as well as increase image contrast, tonal range, and surface reflectance. Conservation professionals may surface clean photographic materials in an attempt to improve their short-term and long-term stability, reducing the potential for damage by removing extraneous materials that may be abrasive, hygroscopic, or otherwise (chemically) degradative. Surface cleaning may also prevent redeposition of soiling materials onto adjacent collection materials. Well-cared-for collections demonstrate committed stewardship and can compel patrons and staff to observe handling guidelines. (Norris & Gutiérrez, 2010, p. 611)

Some of these answers do not seem to consider priority the preservation of the object's integrity. Can these be accepted in accordance with ethical conservation guidelines?

For centuries, a constant controversy in conservation has been cleaning. The issue is discussed by restorers, conservation scientists, chemists, and many others responsible for heritage preservation, particularly in architecture and painting conservation. Cleaning goes against the old conservation ethical principles – reversibility and minimum intervention. After cleaning, the object is visibly altered, and it is not possible to return to a state before treatment. Frequently, what is removed was not contributing to the deterioration of materials. Narayan Khandekar summarizes:

> Cleaning is one of the few conservation procedures that usually has more to do with aesthetics than with preservation of the physical object. Other activities in this category include infilling and inpainting. Although a strict definition of cleaning would be the removal of dirt, grime, or other accretions, in the conservation field "cleaning" is used in the broader sense to include removing unwanted layers of varnish, gilding, or paint from decorative surfaces and removing stains, salts, and other accretions from surfaces or substrates of objects. In a profession whose codes of ethics emphasize

> the principles of reversibility, it also is one of the few conservation processes that is inherently irreversible. Surface cleaning has serious implications in terms of aesthetic and physical changes to the object being cleaned, yet at times it has been undertaken almost routinely. (Stulik, et al., 2004, p. 1)

And again, Norris adds:

> Many conservators conclude that the risks associated with surface cleaning generally outweigh the benefits. […]
> Surface cleaning techniques are intrusive treatments, and conservation professionals must proceed with caution. Conservators generally agree that some photographic materials […] cannot be safely cleaned. Furthermore, many note that evenly dispersed layers of dirt and grime are often not terribly disfiguring. (Norris & Gutiérrez, 2010, p. 611)

So, why clean?

During this research, a small meeting was organized[377] to reunite photography conservators with long experience preserving photography collections (Figure 5.17). It was not possible to bring together all the professionals that work the longest in Portugal. And despite the good reviews by attendees, the question – why clean? – was not answered.



Figure 5.17 – Cleaning: CPF electronic flyer for the meeting *Cleaning photographic negatives fonds and collections*, at CPF, Sep. 14th, 2018.

Cleaning is made difficult by the presence of retouchings, particularly the glass surface that cannot be cleaned as thoroughly. Because of concerns about the toxicity, trichloroethane is no longer used.

[377] Meeting co-organized by CPF and CITAR of the Portuguese Catholic University, held at CPF in Sep. 14th 2018. The author participated with a summary of the research at the time, centered on the cleaning issue.

Therefore, retouchings on the emulsion are safer. But the glass is cleaned with water and ethanol, and it seems there is no reason not to clean. The usual practice is to clean around the retouched areas leaving an uneven surface. This is because there is no known way to clean dirt and leave retouchings on the glass surface. While dye makeup over faces is easier to clean around, more complex retouchings may not allow cleaning in the inner spaces.

For this research, surveyed negatives from Alvão and MHCNUP were cleaned and stored in individual envelopes. And cleaning tests were done to verify the impact on retouching, particularly the solubility and visual changes.

The conclusions were that trichloroethane does solubilize the varnish, and with it, pencil retouching is removed. Other solvents, even water, which do not solubilize the varnish, still remove pencil retouchings. And all tested glass surface cleaning methods remove retouchings. In all cases, the glass does not seem to have deteriorated by the substances on the surface, either retouching materials or dirt. Additionally, residual retouching material exists outside the identified retouched areas. And when cleaning, what seems to be outside retouched areas frequently returns swabs with pink color (Figure 5.18b).

Tests were conducted on negatives that presented deteriorated retouchings, like the example in Figure 5.18. Cleaning around retouchings leaves matt areas that visibly contrast with the shiny cleaned glass. This is perceivable when viewed with reflective light and does not correspond with the retouched area. Note the arrows in Figure 5.18, where the shells' shape was respected during cleaning. The arrows point to areas where retouching was lost, and now dirt appears similar in texture to the surrounding retouching material.

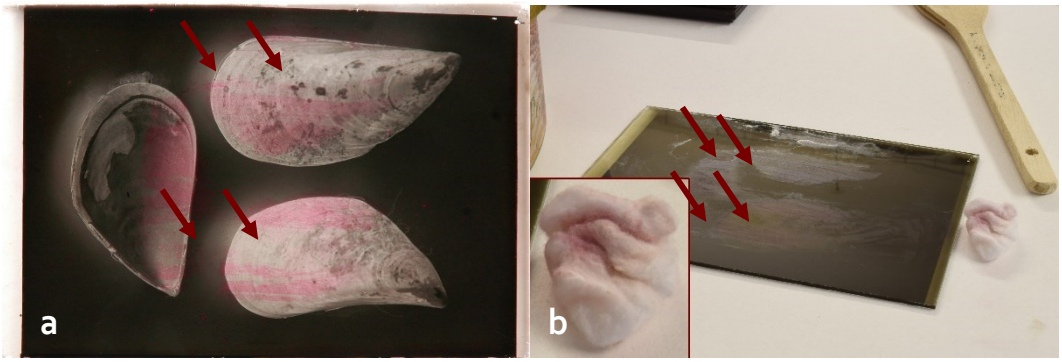


Figure 5.18 – Cleaning test with water and ethanol: a. Shells, dry plate negative viewed with transmitted light; b. residue of retouching material removed from the border where no retouching was perceived. Signalized with arrows are respective areas that did not present perceivable retouching but were not cleaned.

Cleaning close to retouching borders risks unintentional removal of retouchings, and cleaning with a margin creates false retouched areas.

The conclusion might be that "it is ok" because, as seen in transmitted light, Figure 5.18a, it does not affect the image. And in which case, the question becomes: If dirt does not affect the image and does not cause deterioration to the support, why remove it?

Cleaning negatives is also a task that is frequently given to less experienced conservators, and as a point of pride, they like to leave all negatives shining. One question they do not ask is why there is a need to clean. Do negatives need to shine like new to be preserved? Can't they be allowed to be dirty with marks from handling as marks of the passage of time?

Remembering Marguerite Yourcenar:

> Our present attitude represents both a gain and a loss. The need to refashion a complete statue with artificial members resulted in part from the naive desire to possess and exhibit an object in perfect condition, which is inherent to all ages because of the simple vanity of the owners. (Yourcenar, 1983, p. 60)

Negatives that present biological contamination are typically cleaned with trichloroethane (Kodak film cleaner) or other solvents to remove superficial biological contamination and inhibit future growth. As seen, this treatment also removes retouchings.

When asking for an opinion on how to proceed in such situations, the general answer was to do nothing. To store the contaminated negative, as usual, with the rest of the collection.

Then the question became if this procedure does not lead to contamination of the rest of the negatives in the same box? And the answer was it did not because experience assures that if the negative is stored in the recommended conditions of temperature and relative humidity, any biological growth is stopped. This attitude was surprising.

On the one hand, controlling the environment and setting ideal temperature and relative humidity values represent a large investment. Professionals and institutions using such preservation methods have verified its efficacy for a long time, so such recommendation of doing nothing is valid. On the other hand, so why clean?

Negatives such as the ones presented in Figure 5.6 could be cleaned to improve legibility. But this would be done by weighing the loss of varnish and other retouchings. The importance of the negative and the image would be factored in. And such a decision would be made in a case-by-case situation.

Small and localized contaminations pose less risk to retouchings. But cleaning them also represents an investment of time and resources, a risk to the object and the conservator, if using hazardous chemicals,

and less overall improvement.

If not discussed as widely in photography conservation, the cleaning controversy was the subject of different authors in other areas. José Manuel Barros García identified four main reasons for cleaning paintings that also apply to photography: conservation, the revelation of the artist's intent, aesthetic presentation, improving legibility (Barros García, 2015, p. 15).

No definitive answers are given here. Norris' text was initially published in 1999, and an updated, more extensive survey would be needed. And because ultimately, and in most cases, it is not a necessary procedure for the preservation of the object. Finally, it is a choice that can vary according to personal opinion, public perception, the purpose of the collection, or institutional guidelines.

The cleaning of negative collections might be, of the established conservation procedures, that which consumes most time, material, and human resources. So, instead of a conclusion, a final question. Are the results worth the investment?

Storage

Storage is the other most established conservation procedure. For glass negatives collections, this means individualize envelopes, typically the four-flap paper envelope. These give extra support to the weight of the negative, then other envelopes with one side open. A group of envelopes is stored together in a conservation box. The materials for the box and envelopes should be recognized or even certified as compatible with photographic materials.

Institutions like the Image Permanence Institute (IPI) have research and promoted the definition of standards that today are implemented worldwide to photography collections. For example, the Photographic Activity Test (PAT - ISO 18916:2007) can be found in the description of many papers and other storage materials in the manufacturers' product description. Along with different standards such as the ISO 9706:1994 (with symbol ∞) that refers to acid-free permanent paper sometimes designated as "long-life" paper. Not to be mistaken with archival paper, or museum paper, which is used frequently to identify acid-free paper made explicitly from cotton (Figure 5.19).



Figure 5.19 – Symbols attesting photography compatible materials: PAT - ISO 18916:2007; long life permanent paper ∞ - ISO 9706:1994; 100% cotton.

The paper envelope allows for identification and additional information, usually written in pencil, near the top border to be visible in a quick search without removing it from the box. Negatives are separated according to size, and inside one container, all negatives have the same size. This reduces tensions between two negatives and the risk during transport from breaking or deformation for other objects without rigid support.

The methods and reasons for storage seem simple enough, yet sometimes, point of contention between conservators and archivists.

The reason is that negatives, or photographic objects in general, which relate to one another in some way but have different sizes or were done by various processes, are separated by the established practice. There are conservation advantages for preserving similar objects together like the ones just presented. But when segregated, the original relations inside a collection and between specific objects might be lost. This preservation of information is the archivist's job, which is made more difficult by the established conservation procedure.

Nowadays, some of these connections can be preserved in the digital world while still segregating physical objects. But this only works for newly acquired collections.

For example, loss of connection was observed in the NEG collection. During this research, it was possible to identify the photographer Arnaldo Fonseca's authorship because one of the objectives was to consider each collection as a whole, and some lost connections could be re-discovered.

But tracking down connections in collections that have already lost the original organization, and are already inventoried in an altered sequence, is too time-consuming and simply not a priority.

In small collections, where sometimes there are not enough objects of one size to justify extra boxes' expense, objects of different sizes are kept together. In these situations, a rigid paper board, with the maximum size of the box's interior, is put between objects of different sizes. This simple measure resolves the problem of the size difference and allows to maintain the original order.

Like cleaning, storage is a conservation procedure that is done routinely frequently without planning. Big archives that keep collections acquired long before conservation needs were identified, and keep acquiring collections each year, struggle to establish a conservation plan. Boxes and envelopes are not bought within a budget for a specific collection treatment but within the institution's general budget. This means that when a few boxes are acquired, they are routed to the collection that it is, at the moment, being requested or cataloged – and older, larger, and less popular collections are neglected.

This is why, despite being one of the oldest collections in the institution, most of the portrait collection

of the Alvão fond is still unorganized and without minimum conservation like proper storage. And why approximately 2000 negatives of the Alvão's collection were given individual envelopes and boxes during this research.

Identification

The identification of retouchings is the most concerning factor. Some retouchings may appear as deterioration, like etching that might be interpreted as unintentional scratches. But the lack of knowledge of the practice's purposes and even the cultural significance of retouchings is the main factor contributing to their deterioration.

During this research, whenever possible, collections in archives and museums were visited and retouchings debated.

For example, it was possible to search the internal database and compare its information, with the physical objects from the Museum Sorolla's archive, in Madrid.[378] A quick search for "retouching" returned only 16 records, all for prints. Five of these had "retouching" as part of the title, and the rest had "retouchings" described in the field for "marks and signatures." When reviewing the negative collection, it was quickly realized that most negatives presented retouchings, but no mention was found anywhere in the database. The most probable reason is that the description was done using the digital image, in its positive version, and not by direct observation of the object. In the digital image, most retouchings become invisible, and others may lead to false interpretations.

At CPF, the survey to the Alvão portrait collection was first in this research. At that time, 2017, the APR celebrities' portraits were at the second stage of archival descriptions, which happens after digitization when the objects are described individually. Influenced by this research, the archivist started to add information on retouchings for the APR documents in marks and signatures. For a long time, these records were the only ones that included a note on the presence of retouchings. To this date, several more from the Alvão fond now have a reference to retouching.[379] Aside from these, any retouchings were recorded only by the conservator, as part of the conservation condition assessment, and therefore not included in the archive database.

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[378] Visit to the Museum Sorolla's archive on Feb. 28th, 2018, by special courtesy of the archive staff: Rosario López (Archive technician) and Teresa Jiménez-Landi (Documentalist).

[379] It can be verified by a simple search for "retoque" [Portuguese for retouching] at the online archive database: https://digitarq.cpf.arquivos.pt/. [last Retrieved February 2021]

On a visit to another photography archive, another collection was reviewed. It was a collection cared for by a curator renowned in his field.[380] The conservation practice was limited to cleaning and storage and was mostly done by the curator himself. He admitted that, while cleaning, retouchings were frequently removed. In his opinion, the retouchings were ugly and disturbing for the negatives' appreciation not just as images but as objects. He had identified that most were not original but additions, at a later date, to correct material deterioration and prepare for publication. At the end of the visit, he commented on how he started to appreciate the significance of retouchings more and pledge that he would not remove them in the future.

Hopefully, this research will be available to a broader audience and have a similar impact, contributing to changes such as those and more in other collections and institutions. This text aims to contribute to a better understanding of retouching practices, the history of retouching, uses, and intentions and help professionals identify and characterize their retouched collections. Two appendixes were prepared to aid these tasks: Appendix B – Retouching types and Appendix C – Thesaurus.

It was already established that the internet is a useful means of dissemination. How information and objects are represented online became a concern as they can be directly connected to how collections are valued. The subject of online representation of retouched collections was addressed elsewhere[381] and further explored in the following section.

Digitization and digital records – What is lost[382]

Reproduction was welcomed as it brought the damaged,
older works to a new life. Through reproduction, the photograph is
"restored to strength and freshness and suppleness of youth"
and signs of deterioration are no longer visible.
But all that glitters is not gold and youth comes at a price.
(Marchesi, 2017, p. 12)

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[380] The archive and curator are not identified because there are no intentions of blame or criticism but just identifying a symptom of state of the art, which is repeated in other institutions.

[381] The author presented part of the information in this and following sections in two oral communication and a journal article. First, at the meeting *Documentação e Representação Digital em Bens Culturais* [Digital documentation and representation of cultural property], held at Universidade Católica Portuguesa, in Porto, 19-20 October 2018. Second, at the 2019 AIC PMG & ICOM-CC PMWG joint meeting *How and Why: Photograph Conservation Today* held at New York Public Library for the Performing Arts in New York, 20-22 February 2019. It was published as Pereira, Catarina Cortes, et al. (2020). Digitizing collections - A reflection on negative archive collections, prioritizing procedures, and what is lost. *Topics in Photographic Preservation*, 18, 192-201.

[382] *Idem.*

Negative collections are an essential part of our heritage; they show us the proverbial window to our past. For that alone, making them available online is an important endeavor. Although in today's digital initiatives, each object's accurate representation seems to be the primary goal, when looking closely, the concern is frequently focused on the final product's consistency and quality, the filetypes, and metadata. The priority is to achieve the best quality images in the shortest amount of time. Indeed, information can be added later. However, considering the size of collections and the number of resources available, do that really happens, do collections get revisited and revised when so many are still waiting for first attention? And how much of it is lost in the meantime?

Information about retouching frequently remains in conservation reports and is not included in any part of the object's record, and consequently not presented in digital platforms. But the digital image may give enough information if it also truthfully shows the object.

Digitizing conservation objects is not limited to photography. All areas of conservation and cultural heritage, in general, have turned to new media as a way to re-value objects, sites, and culture. Digital photography, including high-resolution images, multispectral imaging, and 3D, such as photogrammetry and 3D reconstructions, are becoming common use. Conservators use such images as tools during conservation assessment and even to help decide conservation procedures.

Many museums make available their collections through virtual tours, 3D representations, and high-resolution images. But the purpose is clear: digital images are there to increase dissemination and value and do not replace the original object. However, this is not true for digitized photographs and more so for negatives, as people quickly take the digital image of a negative as a copy of an original positive.

Therefore, it is necessary to reflect on the purpose of the digitization process: whether it is to create an image database alone or to really contribute to the preservation of the collections.

In most Portuguese institutions, including CPF and AMLSB, the digitizing process follows an established workflow, such as the one described above.

The digital image should be an accurate record of the object, and a "no manipulation" rule is usually recommended. Each institution establishes digitization procedures to follow specific workflows and rules, such as the size of the digital image, color models, such as CMYK or RGB, output format files, addition of metadata, or a watermark. For negatives, common procedures are to convert to grayscale and into a positive image. This is far from the "no manipulation" rule. And even with all standards and guidelines archives, and museums, have double standards for digitizing prints and negatives.

Figure 5.20 is an example of a postcard as presented in the online database from the AMLSB. The

record keeps two images in color – front and back – to give a more complete record of the document, the object, and content.



Figure 5.20 – Digitizing: actress Palmira Bastos in the play *A viuvinha* [The widow], portrait by Arnaldo Fonseca, postcard, as presented online, 190? (AMLSB, TMSL 175)

Another example in Figure 5.21 shows a digitized stereoscopic film diapositive from the APR collection. The online record shows two images, one taken with reflective light with a color scale, which better represents the object, and another with transmitted light, which better represents the image.

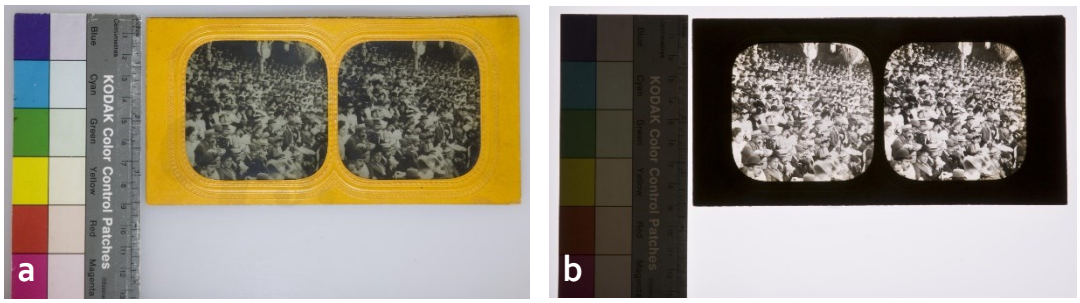


Figure 5.21 – Digitizing: At the bull arena "Alegria", stereoscopic diapositive, 8x18 cm, Aurélio da Paz dos Reis, 1902 (CPF, APR, 8922A)

As a normal rule, the prints, even monochrome images, are presented in color, some with a color reference scale. The online record sometimes shows more than just one image to represent the object and information better. While the practices presented in these examples are observed for positive photographs, the same methodology is not used for negatives. The negative object is stripped of its materiality. First, color information is removed, then it is converted into positive. Any retouchings are made invisible or cannot be interpreted. Other alterations are introduced, some less perceptible than others. For example, at Lisbon's Archive, the images are slightly cropped, possibly to give a more

defined form or hide parts of the negative without information, like plate holder markings. This further erases evidence of materiality.

Undoubtedly an advantage of digitization is the possibility to recover faded negatives, even those that seem almost blank. Figure 5.22 shows an example of a retouched faded negative from the APR collection. After digitization, the image was enhanced to recover tone values. The white lines on the face are the extreme conversion of the pencil retouching lines. Although the image is now visible, it does not represent any probable positive that might have existed.

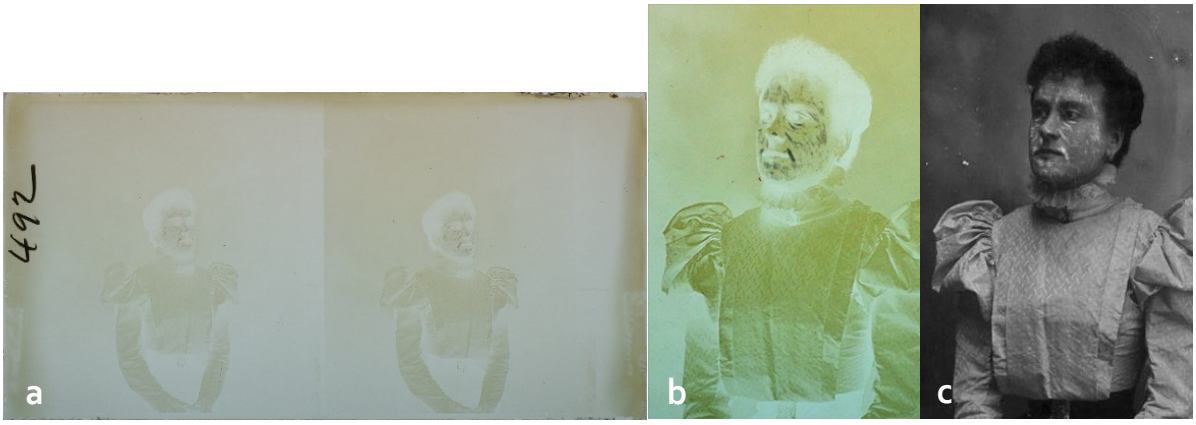


Figure 5.22 – Faded negative, Actress portrait, a. stereoscopic dry plate negative viewed in reflected light; b digitally enhanced detail showing retouching on the face; c. same detail from digital positive available online, APR 190? (CPF, APR, 7349).

The images available online cannot accurately represent a negative as an object or image. But in everyday practice, these alterations are accepted and unquestioned.

Value is given only to the image disregarding the nature of the object. All negatives look alike, regardless if they are glass plate or film negatives. The daguerreotype loses its natural characteristics, becoming similar to an ambrotype. The sharpness of the daguerreotype loses relevance in the low resolution of online images. And a salted paper print might seem just blurred or unfocused as they become made of pixels. The object's material knowledge and all associated information about its production are missing in its single-image digital representation.

The photographer's intention is also lost. Interpreting the digital image as a copy of the original object eliminates all the photographer's creative decisions for type of print, and all its variables, with direct impact on the perceived image, its meaning, and value. This is even more of an issue in the case of negatives. It is common to find exhibitions of museums and archives collections showing a photographer's life work through reproductions of negatives alone. Although, as already demonstrated, negatives have relevant values to be preserved, studying a photographer by analyzing exclusively

digitally processed images of negative collections implies the loss of information and value. The lack of original prints on display in the exhibition has been criticized. For example, in the exhibition in 1998, about the work of Aurélio da Paz dos Reis,[383] a Portuguese critic, Alexander Pomar hopes:

> In short, we expect a refocus on the research of the history of photography on original prints and resist the temptation to regard the author's negatives from decades ago as materials that can freely be manipulated according to today's taste and techniques.[384] (Pomar, 1999)

The awareness expressed by this critic's comment is that what had been shown did not truthfully reflect the photographer's intention, and the original work might not be recognized in future generations if the databases' transmitted information is always incomplete.

There are already generations that never used a film camera and do not realize what a negate-positive process is. Despite a caption mentioning that it is a negative, the person viewing its digital record may not know what it means, what a negative is, and how the original physical object looks like.

Figure 5.23 shows an example of a negative from the AMLSB. The first image was taken from a negative with transmitted light. The second is as presented online, and the third a digitized version of an original *carte-cabinet* made from the same negative. This is just one example of how the online record does not represent either the negative or the original print that was done from it.



Figure 5.24 shows an example of a print corresponding negative with transmitted and reflected light, and the positive images as presented in the archive database. The differences between the images are apparent. As it is also evident that the black and white, digitally converted positive does not give an accurate representation of the negative as an object and document or as a print. This negative did not have any retouchings on the glass, but a fourth image should be included to show those retouchings

[383] Exhibition *Manual do Cidadão Aurélio da Paz dos Reis: Fotografias e filmes de Aurélio da Paz dos Reis* [Citizen's Manual: photographs and films by Aurélio da Paz dos Reis], held from December 1998 to February 1999 at the CPF, Porto, curated by Maria do Carmo Serén, CPF.

[384] Author's translation

when that is the case. And others, as needed, to give a full record of the image and the object.

When collections hold both the print and its negative, in some institutions, the policy was to digitize only the negative, and the negative's digital positive now represents both objects in the online database. For all that has been said, this means a devaluation of both objects with repercussions in interpreting their respective meaning and cultural significance.

Additional collections were explored through their representation in platforms online. The information available is varied, but little or nothing is mentioned about retouchings in the available individual digital records.



Figure 5.23 - Portrait of D. Manuel II of Portugal, by Arnaldo Fonseca, 190?: a. dry plate negative, 18x24cm (7x9,45 in.), in transmitted light; b. print screen of the negative's online record (AMLSB, NEG, 655); c. carte-cabinet, private collection; *IP* 121 1908 / Officinas Photographicas sob a direcção de Arnaldo Fonseca, B-P 1222 1904

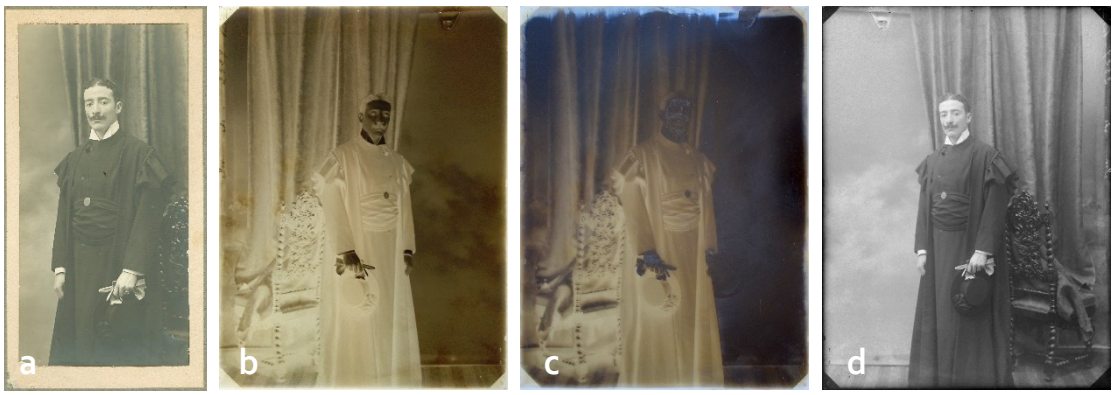


Figure 5.24 – Digitizing, Portrait of Judge Artur Lopes Cardoso, later Minister of Justice, Alvão, 1903: a. Mounted print in the promenade format, 10x19 cm (4x7,5 in), (private collection); b. dry plate negative viewed in transmitted light; c. dry plate negative viewed in reflected light; d. digitally converted positive, 18x24 cm (CPF, ALV, 141-"2527").

There are many types of online platforms, but aside from aesthetic aspects, they fall into few categories. They can be divided according to the institution: museums, libraries, or archives; and according to the

type of information presented, they are simple image databases or collection catalogs. Some institutions make available both types, for example, the US Library of Congress or the Bibliothèque National de France (BnF) [France's National Library].[385] The same call number can be searched as an image with minimum identification information and access to the complete catalog record on different platforms (Figure 5.25). Usually, a link to toggle between platforms is available on each page.

It is not uncommon to find commercial image hosting services, such as Flickr, being used as image collections for archives, as is the case with the US Library of Congress, the US National Archives, or the Portuguese Art gallery of the Calouste Gulbenkian Museum.



Figure 5.25 – Bibliothèque National de France (BnF), a.screen capture of the catalog page, b. the digital library page, c. the image bank, Grand lame, albumen print, 32,3 x 41,2 cm, Gustave Le Gray, 1857 (BnF, RESERVE FOL-EO-13 (3)).

Archive catalogs treat collections as documents and usually present complete records following standardized descriptions, and sites frequently resemble each other, at least in content, for example, the one for CPF (https://digitarq.cpf.arquivos.pt/) or the Canadian Library and Archives (https://www.bac-lac.gc.ca/).

Museums usually describe their photograph collections the same way as any other museum objects. And although general identification information is the same as for archives, more frequently for museum catalogs, some objects have additional images. However, there is no clear rule.

From all the reviewed databases, only a few present negatives as negative images, namely the Museé d'Orsay (https://www.musee-orsay.fr/fr/collections/catalogue-des-oeuvres/), the Victoria & Albert Museum (http://collections.vam.ac.uk/), which holds, among others, the photograph collection of the Royal Photographic Society, and the Société Française de Photographie

[385] Examples accessed from:
Library of Congress - https://www.loc.gov/pictures/ and https://www.flickr.com/photos/library_of_congress/.
Bibliothèque National de France - https://catalogue.bnf.fr/index.do; https://gallica.bnf.fr/accueil/en/ and https://images.bnf.fr/. [Retrieved February 2021]

(https://sfp.asso.fr/photographie/).

Others do not have the unifying criteria for the entire collection, and some negatives are shown as positives. In contrast, others have multiple images, including positive and negative images, and done with transmitted or reflected light. A possible reason could be a change in time of digitizing criteria and procedures. Notably, this is visible in pioneer institutions that started collection digitization much earlier than the rest. Figure 5.26a shows an example with positive and negative images for the same record from the Eastman Museum's catalog. And Figure 5.26a shows an example from the Metropolitan Museum of Art collection, which includes two negative images done with transmitted and reflected light. In the "notes" section, this record also includes information about retouchings: "Sky blocked out with black pigment recto and verso." However, the catalogs of both museums show most negatives in their converted positive images.[386] Comparatively to many archive databases, those from museums present less record information.

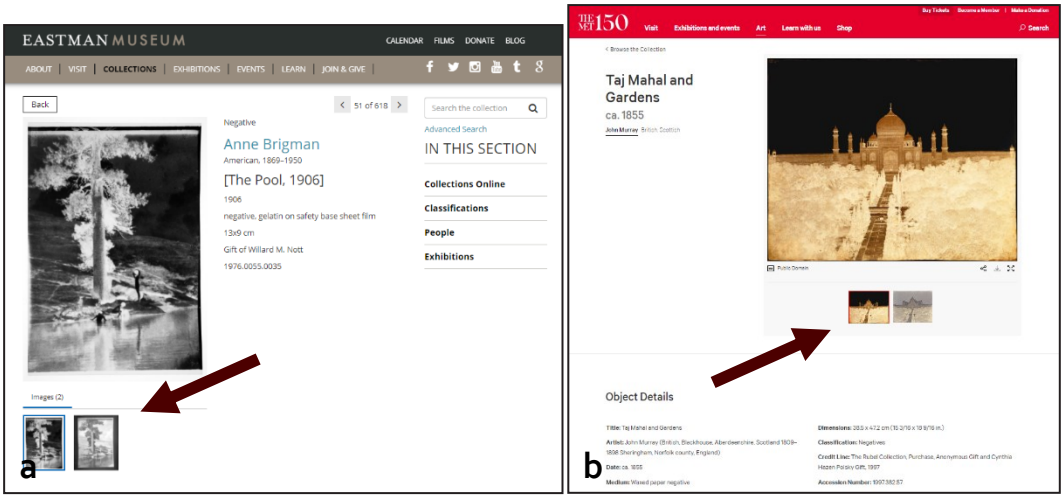


Figure 5.26 – Screen capture: a. Eastman Museum record for "The Pool," negative, gelatin on safety base sheet film, positive and negative images, Anne Brigman, 1906 (Eastman Museum, 1976.0055.0035); b) The MET catalog record for Taj Mahal, and Gardens, waxed paper negative, viewed with transmitted and reflective light, John Murray, c 1855 (MET, 1997.382.57).

For a more accurate record, the recommendation is that all types of images should be presented in the database record:

> Images of the emulsion and support sides done with reflected light and color reference scales,
>
> Images were done with transmitted light,
>
> For educational purposes, and because photography is always also a document, the digital

[386] Examples accessed from: Eastman Museum - https://www.eastman.org/collections-online.
The Metropolitan Museum of Art collection - https://www.metmuseum.org/art/collection/. [Retrieved February 2021]

converted positive image.

Other imaginative ways to present collections can contribute to a different experience with the images and add value. For example, for stereographs, there are alternative ways beyond 2D. Some institutions are already considering presenting stereographs with 3D effects, such as anaglyphs or animated GIFs.[387] The anaglyph is not a modern innovation, and some will still remember playing with red-cyan glasses to see 3D images. They also work with digital images. Figure 5.27 shows one such example. When observed with the red-cyan glasses, the tridimensionality of the image becomes apparent.[388] The animated GIF is done similarly (an example is available here: Animated Gif Chapter5 (CPF, APR, 7161)). The two images are superimposed and alternate rapidly to give the illusion of one image in 3D.



Figure 5.27 – Anaglyph, Actress reading a letter, APR, 190? (CPF, APR, 7161)

The prints are not often available in collections. However, if an original print exists in the same collection, a link between records can be added to allow such a comparison. But never one image to represent both print and negative.

Ideally, in the same way, some records show information on signatures and other markings; the identification and a short description of retouchings should be added, similar to what is now being included with the CPF's collections and in some discrete examples.

[387] GIF - Graphics Interchange Format is a digital image file format. Animated GIFs store multiple images in the same space and alternate rapidly between them, resulting in animation and apparent movement.

[388] A pair of red-cyan glasses is included with this thesis.

The recommendation is for images, representing the negative as an object, to be done in color accompanied by color scales and other reference information. Images in transmitted light should also be recorded with calibrated devices with color scales made for transparencies. Calibrate also monitors where images are processed. These images should not be altered in color, cropped, or otherwise digitally manipulated. The converted positive should be done by developing a protocol that best resembles the printing process. This would include: the use of filters during capture or post-production to compensate for yellowed emulsions, but most special reproducing panchromatic emulsions that are blind to reds, as this highly influences the accurate rendition of the effects of retouching with the red dyes. Finally, the image databases should present all these images.

Yet to be done

An initially proposed task was to conduct interviews and questionnaires to conservators active in international institutions, museums, and archives, to learn about the collections' conservation procedures. A few questionnaires were sent out, and some interviews were done, namely interviews with Nora Kennedy, the Sherman Fairchild Conservator in the Department of Photograph Conservation at The MET, and a questionnaire by Diana Diaz, senior conservator of photographs, at the Harry Ransom Center of the University of Texas at Austin, among others.

The purpose was to find differences relating to the institution's mission and its use of the photography collection. For example, differences between museums and archives, or photographic objects from one source or varied, or collections reunited for their artistic and historical value or only documental value. The answers, however, showed that more than procedural differences. There are differences in the size, structure, and organization of institutions and even cultural differences. Some institutions have complete conservation departments for a long time. Others only recently began to value their photography collections as cultural heritage. The tasks delegated to conservators also change and with it the possibility to contribute to the overall preservation process.

All this showed that, despite standardize guidelines, there is no quick review of procedures if considering conservation of collections as a whole and as a task beyond just the conservator. Finally, it was opted to review the online databases presented above.

Summary of observations and recommendations

it is entrusted to the Professional Conservator the privilege
and responsibility to intervene, or not to intervene,
in the physical well being of the object.
[…] The Nuremberg excuse that you were
following orders is not sufficient to the responsible conservator.
(Orraca, 2010, pp. 589-590)

Many texts had and have influence making conservation today. Charters and reports usually focus on one topic, one area of conservation. Their conclusions, however, can in some measure transfer to other areas, but none has universal applicability, and none was written for the specificities of photographic collections. Some conservation concepts and procedures can, however, be adapted. Having rules exculpates the conservator that needs to justify his work to stakeholders. And implementing standardized procedures is helpful when managing collections with a large number of objects.

Nevertheless, preserving most of a collection is not the same as preserving the part with the most significance, most value. Established practices are more focused on keeping information and less concerned with the object's specificities. Objects in need of more urgent and direct intervention fall outside the standards and are left forgotten, awaiting special treatment that comes late or not at all. It is the survival of the fittest.

The most deteriorated objects may well be the most valuable. This does not conform with current, or even past, conservation principles. And can only please the statistician and look good on annual production reports.

What is missing from the current conservation strategies is a quality control focused on heritage values and a maintenance plan that could provide a proper assessment of the collections' value, and reclaim those objects that fall outside general standards.

A review of some of the established procedures was done, and below is presented a table summarizing issues and recommendations. Any suggestion should not be taken as a rule, which would have similar pitfalls as the ones already established.

Table 5.2 – Summary of observations and recommendations

Preliminary assessment	Classification of conservation conditions should describe conservation's needs and not image quality. It should define the urgency of conservation intervention. Should identify further action, including preservation measures, passive conservation, and curative conservation. Additionally, it should define if the object is stable for handling, loan, and exhibition.
Conservation plan	After a preliminary assessment, a conservation plan should be produced with a budget for all conservation needs and a calendar for each task. The report should include all objects that need more than preservation measures. The most deteriorated negatives are also the ones left forgotten. Not least important, the report should include maintenance measures to be integrated with the institution's daily/month/year plan.
Restoration	In case there is a need for remedial conservation/restoration procedures, these should be included in the conservation plan and should be done as a priority and not left for the last step of conservation.
Handling	Question why? Choose the gloves appropriate for each task. It is not wrong not to wear gloves if and when other requirements and protection are assured.
Cleaning	Question why? Consider if it is truly necessary a standard cleaning procedure. Not clean can be a viable option.
Storage	Storage in controlled conditions should be a priority as it is already established, from years of experience, that controlled light, temperature, and relative humidity are effective preservation measures. Choose compatible storage materials according to the type of photographic process and the collection's use.
Identification	The conservator is the one that identifies retouchings and has the overall most contact with objects. Procedures should be established so these and other observations are not forgotten in conservation reports and passed on to the object's records and catalogs and are available to archivists, digitization departments, and all who work with the images.
Digitization	Acquire as many images as necessary to have a complete record of the object, emulsion and support, and any features on both surfaces. Calibrate all equipment, particularly monitors where any digital manipulation is done. Another image obtained in transmitted light to capture the negative's image is to be kept without changing color and in negative form. All images should be in color using color reference scales. A duplicate may be made to convert to a positive. Consider using filters to correct localized and general yellowing, color masks, and color retouchings. Other adjustments can be made to recover faded images digitally. Also to be considered are alternative ways to present images beyond 2D. Any such corrections and alterations should be done only when an alternate untouched digital image is also kept and made available.

When photography practices and the collections themselves are hidden, the knowledge and value fall

into a limited number of stakeholders, not enough to guarantee preservation. Value and stakeholders justify and explain why collections are preserved today. Embracing the internet as the preferred way of dissemination is one way. There are advances every day, new ways to share cultural heritage that always bring benefits raising stakeholders. However, some years have passed since the first photograph collections started to be duplicated. There is a real concern to what is just dissemination and what indeed contributes to conservation. This was also manifested by others, for example, James Reilly that said:

> it is essential to keep clearly in mind the difference between actions taken to ensure the long-term preservation of an image and actions taken to make it more accessible for research. (Reilly, 2010, p. 571)

Even if his comment denotes some lack of awareness of the physical object's importance, today, the issue is similar. It is necessary to recognize if actions taken assure collection conservation or just better access to its images. To this, the conservator can much contribute. Understanding production processes, context, and uses in time is at the core of the conservator's work. In the conservation process, gathering knowledge is key, not just the materials and techniques used but also their intentions and meaning. This implies acknowledging interventions such as retouching and masks as part of the photographic object. Retouching is done using stable materials, in general. Frequently it is the deterioration of the emulsion that affects retouchings and not the other way around. Because retouchings have deteriorated is not an acceptable reason to remove them. Nor to clean indiscriminately. Yes, retouching makes preservation more challenging in some situations, but conservators do not usually shy from facing challenges.

And concerning masks. Removing a mask reveals more of the image, but the result is an entirely different object than that envisioned by the photographer. Removing it should not be a policy, but a reasoned process, weighing all the associated values and of those, the original intention is not the least.

As José Orraca put it:

> What I hope is to start you down the road of analytical thinking that will lead you to develop your own treatment criteria in the conservation of photographs. (Orraca, 2010, p. 590)

Chapter Overview

Concerns about the conservation of photographs exist since its invention. However, as expertise among others in conservation, photography came at a later date. While photography conservators were born and trained in modern conservation and science, the accumulated knowledge is not yet enough to

understand all conservation problems. The production of photographs is not limited to one process, and the compilation of collections had exponential growth. In addition, gelatin emulsion collections only recently were considered worthy of conservation.

Contemporary conservation lays on core concepts such as value and stakeholders. Nevertheless, many photographic collections have little of both, especially negative collections. These are not museum objects on display, they are hidden collections, and their value is being lost for lack of exhibition and dissemination. In later years, the internet has help on the last part, dissemination, but at a cost.

The new users only access one image, which does not represent the object or the photograph's original intent. They are allowed access to reinvented image collections, and consequently, the objects remain unknown and not valued.

Conservators have privileged access to objects and can rediscover historical practices, including retouchings. The conservator can contribute to raising value and stakeholders by raising awareness and advocacy initiatives. This can be accomplished by updating established procedures, promoting research dissemination, and actively contributing to outreach programs.

Final remarks & onward

It was a journey into the past and future. Getting to understand retouched collections took this research in many directions. Into the history of photography, to learn about how the various sectors of society define photography for themselves and how they saw the work of others. Either a technical accomplishment, an art, or simply a visual medium, either part of science, a profession, or pastime, photography is a process. Retouching is not a beginning or end in photography but part of the process and part of the photographic object. And that is the first reason for the preservation of retouchings.

It was essential to understand why it was done, and still is, when so many express against it. Retouching was intended to construct the final image, perfecting shortcomings and matching the photographer's eye with the lens.

Among the many retouching examples, truth and vanity were center stage, and portrait photography, the one type where retouching is a constant and both are clearly identified. It was intentional and led to the construct of the final image. Preserving it means preserving the photographer's intention.

If photography was made easy at the turn of the twentieth century, and anyone could do it, retouching was not. Before the digital age, retouching was done by hand. It was not an art but demanded many of the drawing and painting skills. Those writing about retouching, similar to an artist manual, recommended best learning strategies, materials, techniques, when and why it should be done, and why and how to avoid it. Some authors defended that anyone could be a retoucher with practice, but being a good retoucher would be in the ability of a few. The most successful professional portrait photographers would be those who dominated the *art of retouching*. All materials and instruments needed were constant in any photography studio, but with time got forgotten. While they are simple and limited, the possibilities were endless. This is a forgotten practice remembered only in the preserved retouched negative collections.

The research had several objectives, grouped into three groups of goals: To know about the *Identification* (materials and techniques), *Uses* (intentionality, context, and visual culture), and

Conservation (values and practice). This was then reflected in the division of chapters accepting, however, some overlap.

It starts with a historical framework (chapter 1). It was first imagined as a small introduction to retouchings found in the selected collections. It was then quickly realized that the typologies found were also used far back, and the text receded until the birth of photography. Arriving in the 1950s, it felt incomplete, leaving the future of retouching untold. So, even if only summarized in some key points, history was brought until the present day. It was satisfying to find that the changes in photography aesthetics cannot be separated from technology and science evolutions. The same motivations affected retouchings, not just in the first half of the twentieth century but can even explain photography and retouching today. Portrait studios evolved naturally since the fathers of photography were the first to recognize its economic potential. Not long after, inside the studio, the retoucher was indispensable, as pleasing the client guaranteed success. Negative retouching quickly became a standard practice among professional photographers. The objective was to produce a flawless product that could be printed multiple times with the same result. Artists would see retouching as either a necessity or the artist's tool. Art objects are valued for their uniqueness or the artist process uniqueness. They would also manipulate their images with other less permanent techniques such as dodging and burning or retouching on translucid paper, creating one-of-a-kind objects.

Aside from the negative itself, manuals and technical texts were a great source to learn about retouching materials and techniques. So, a review was done of a few authors from different countries as they may have influenced the retouching of Portuguese photography in the first half of the twentieth century (chapter 2). The conclusions were that the author's background and country influenced the type and extent of retouchings. While everyone advised against excess, how much was acceptable was different for each. Authors from Austria or Germany, or those with an artistic background, would promote broad use of retouchings, not only to overcome technical difficulties but as part of the image creation. Whereas the few Portuguese texts show mostly influence from French authors and a more restrained attitude. However, it was not limited to correct photography's technical shortcomings, and the objective was to get a truthful image as they had imagined. That is, much is influenced by the accepted visual culture. They were either still repeating models from paintings or photography itself, as it began to have a more common presence in everyday life. One thing that is common to all manuals is the retouching of portraits, particularly skin treatment. While the extent was debated, they all include

makeup and *interference patterns* as defined in this text. Materials and basic techniques were described relating with possible and most found uses.

Nevertheless, each photographer and retoucher would have a personalized way of working, and retouching practices were different in each studio. Not much was found on other studios or photographers that relate retouching techniques with a general photographer's process. Notable exceptions are the studies mentioned about the archive from the Viennese studio D'Ora-Benda at the Austrian National Library and the Thomas Walther Collection at The MoMA.[389]

The analytical characterization of retouching materials (chapter 3) was the most challenging part of this research. Because the selected collections have countless objects, any representative sample was still too much to be analyzed in the research timeframe. However, it was possible to characterize raw retouching materials and some historical samples of commercial retouching materials, namely Agfa and Kodak. The result was a FT-IR spectra database that can be used as a reference in future research.

The selected collections were analyzed (chapter 4) in a twofold perspective: first, with a view to the theoretical questions raised by their characteristics; second, relating the written sources and what was observed on the negatives. From that, the retouching process for each one was outlined. Unlike the two examples above, the selected collections are not the product of artist photographers and present more systematic and repetitive retouchings. It was possible to identify styles, and in the Alvão negatives, even a change in taste and techniques in time. Different pencil and dye patterns and locations of highlights were identified. This demonstrated the premise of retouching being used as an identifier and a way to characterize different photographers' processes.

The research is completed by a reflection on contemporary conservation as well as by reviewing the conservation conditions of retouch negative collections (chapter 5). Established conservation procedures were also analyzed to fully understand the conditions today, the deficiencies, and what improvements can be made.

The conclusion is not a miracle solution that makes the image like new or a treatment that makes retouched negatives last forever. What is suggested is an evolution of the contemporary conservator. One that actively promotes its work and cultural heritage, an amphibian conservator. That is defined as someone who does research to figure out the best treatment for an object and at the same time

[389] See above, *Introduction.*

promotes advocacy programs to share research results and explain conservation needs, fostering and enhancing cultural values and reach more users.

Conservation was already using digital platforms as a dissemination tool, even before the health concerns of 2020 and how it affected everyone's lives. In the current situation, it seems more evident the importance and value of virtual communication. Many institutions adapted, to this, by sharing even more information on websites and social media and promoting lectures and meetings via the internet. Of all issues and recommendations given above, how retouched negative collections are being represented online was a concern since early in this research.

Conservators are not information technicians or web designers but are the ones with the most intimate knowledge of objects. Conservators should contribute so the representation of online collections be in accordance with cultural values. Most databases about negatives are strongly inclined towards image value alone, and in some cases, no information about the object is given. Other more complete databases provide a full description of the object. Some include images obtained in reflected light instead of or complementing converted black and white positives, which only represent the image. The fear is that this may not be enough. Knowledge about traditional or historical photographic processes might not be understood by younger generations that never used a film camera and only know digital photography. Negatives are passed on and interpret as positives. Most databases' information on retouching is still absent, even if a keen eye can perceive retouching work on positive digital images. This distorts the interpretation of the photographers' techniques, understanding of that time's visual culture, and the history of photography in general.

Conservators can turn this trend around by working with the digitization and reproduction departments, finding innovative ways to represent negatives better. Furthermore, they can contribute by promoting negative collection through advocacy, collaborating with existing educational programs, sharing research, or engaging directly with people promoting collections and conservation.

On retouching, the conclusion is the premise. Retouching exists as another step of the photographic process, is part of the object, and therefore it needs to be preserved. While not all photography is retouched, the practice and profession existed since there were negative-positive photography processes. Controversies against retouching, albeit many in every period and if analyzed individually, are usually a response to bad examples of retouching or when used with the intention of moral and ethical deception.

Going forward, hopefully, this text will raise awareness in others of the importance of retouching and

how to interpret negatives when studying a photographer. Negatives valued as negatives, as objects, and as Alexandre Pomar said:

> Resist the temptation to understand an author's negatives from seven or eight decades ago as freely manipulable materials according to today's tastes and techniques.[390] (Pomar, 1999)

It was included as part of the methodology the participation in meetings as a networking strategy and to promote the dissemination of results. The tables below list all the research productions, including communications, articles, posters, the organization of a meeting, and an exhibition.

Table a – List of the research results.

SCIENTIFIC EVENTS

Out/Dec 2018	Coordinator, curator, and conservator of the exhibition Memória Recapturada – O estúdio Foto-Carvalho (1936-2000) [Memory recaptured - The Foto-Carvalho Studio (1936-2000)]. Org. Catarina Pereira, Estúdios Correia and with collaboration of Câmara Municipal de Estremoz, Palácio dos Marqueses de Praia e Monforte, Estremoz, Portugal. http://artes.porto.ucp.pt/pt/central-noticias/exposicao-fotografia-memoria-recapturada; http://www.cm-estremoz.pt/noticias/exposicao-de-fotografia-memoria-recapturada-em-estremoz.
Sep 2018	Initiative and organization committee Limpeza de fundos e coleções de negativos fotográficos. Limpar para quê? [Cleaning of negative collections. Why clean?], Joint meeting CITAR & CPF.

PAPERS IN PEER-REVIEWED JOURNALS

[*Submitted*]	Pereira, C. C., Castro, L., Barata, C., & San Andrés, M. [submitted]. Retouching the third dimension – Aurélio Paz dos Reis's stereoscopic negatives collection. International Journal on Stereo & Immersive Media
Dec 2019	Pereira, C. C., & Castro, L. (2019). Memória recapturada: Imagens de uma comunidade [Recaptured memory: Images of a comunity]. ARTis On, 9, 125–139. https://doi.org/10.14568/aion.v0i9.245
Apr 2018	Pereira, C. C., & Castro, L. (2016). Retouching glass plate negatives. What do old manuals say? Estudos de Conservação e Restauro, 8, 59–70. https://doi.org/10.34618/ecr.8.14226
Dec 2017	Pereira, C. L. C., Barata, C., & Castro, L. (2017). Retouching scientific photography – the glass plate negatives collection at the Natural History and Science Museum – University of Porto. Ge-Conservacion, 12, 101–110. https://doi.org/10.37558/gec.v12i0.540
Dec 2010 Before Doctoral research	Pereira, C. (2010). O retoque do negativo fotográfico - estudo de uma colecção do Arquivo Fotográfico da Câmara Municipal de Lisboa [Retouching of photographic negatives - Study of a collection at AMLSB]. Estudos de Conservação e Restauro - ECR, 2, 38–57. https://doi.org/10.34618/ecr.2.3153

[390] Author's translation.

Oral Presentations

[Sep 2021]	Perfecting the portrait – Retouching practice at the Fotografia Alvão Studio – Integrated with CPF's activities celebrating 120 years of Fotografia Alvão, CPF Portuguese Center for Photography, Porto, Portugal [dates to be anounced].
[Jun 2021]	Retouching the third dimension – Aurélio Paz dos Reis's stereoscopic negatives collection, 4th International Conference, Stereo & Immersive Media - Photography, Sound and Cinema Research, Universidade Lusófona, Lisbon, Portugal [Delayed from 2020, new date 17th – 19th, June 2021]
Nov 2019	Retouching the third dimension – The Aurélio da Paz dos Reis stereoscopic negatives archive, III Conference on Research in History of Photography: Stereoscopic or 3D photography, 19th and 20th centuries, Instituición Fernando El Católico, Zaragoza, Spain.
Feb 2019	Digitizing collections - A reflection on negative archive collections, prioritizing procedures and what is lost, 2019 ICOM-CC PMWG & PMG joint meeting in New York, New York.
Oct 2018	Reflexões sobre a digitalização de colecções de negativos fotográficos e a perda de «aura». [Reflections on digitizing photography negatives collections and the loss of Aura], 2nd meeting for Documentação e Representação Digital de Bens Culturais (DRD-BC) [Digital Documentation and representation of Cultural Heritage], 19-20 Oct. 2018, Universidade Católica Portuguesa, Porto, Portugal.
Sep 2018	Identificação de vernizes de retoque em negativos de vidro e gelatina da coleção de retratos do estúdio Alvão – Desenvolvimento de metodologia analítica [The identification of varnishes used for the retouching of dry plate negatives at the Alvão Photographic Studio – Development of a analitical methodology], ll colloquium Investigações em Conservação do Património [Research in Heritage Conservation], 27, 28 y 29 September. Faculdade de Belas Artes da Universidade de Lisboa, Portugal
Sep 2018	O Retoque em Negativos de Gelatina e Prata Sobre Vidro, de Colecções Fotográficas Portuguesas [The retouching of dry plate negatives from Portuguese collections], joint meeting CITAR & CPF Limpeza de fundos e coleções de negativos fotográficos. Limpar para quê? [Cleaning of negative collections. Why clean?], 14 September, 2018, CPF - Centro Português de Fotografia, Porto, Portugal
May 2018	Memory recaptured in a small community – Preserving retouched photographic negatives, discussing visual culture, International Multidisciplinary Congress - Web of Knowledge: A look into the Past, embracing the Future, 17-19 May 2018, Universidade de Évora, Évora, Portugal.
Jul 2017	O Retoque, Intenções e Cultura Visual [Retouching, Intentions and Visual Culture], Jornadas de Doutoramento 13 Jul 2017 – School of Arts, UCP-Porto, Porto
2016	O Retoque dos negativos de vidro – O que dizem os manuais [Retouching of dry plate negatives – What do old manuals say], Jornadas de Doutoramento 2-3 May 2016 – School of Arts, UCP-Porto, Porto

Posters

2017	O Retoque de Negativos Fotográficos de Gelatina e Prata Sobre Vidro em Colecções Portuguesas [Retouching dry plate negatives from Portuguese Collections], Meeting Science and Tecnology in Portugal - Encontro Ciência '17 3-5 July, Lisbon, Portugal
2016	O retoque na fotografia científica – a colecção de negativos de vidro do Museu de História Natural e da Ciência da Universidade do Porto (MHNC-UP) [Retouching Scientific Photography – A collection at the Natural History and Science Museum of the Oporto University], I Colloquium – Research in Heritage Conservation (Investigações em Conservação do Património), 29-30 Sept., 2016, Lisboa, Portugal http://hdl.handle.net/10400.14/23213
2015	Materials and techniques for retouching glass plate photographic negatives at the beginning of the 20th century, RECH3, III International Meeting on Retouching of Cultural Heritage, 23-24 Oct., Porto, Portugal

LECTURES

2019	Research on Photography Collections – Seminar Integrated into the Doctoral Programs of Conservation and Restoration of Cultural Heritage and Studies in Cultural Heritage.
2017	The Invention of Photography – Seminar Integrated into the thematic unity of Fundamentos de Imagem Course – For the Degree in Sound and Image

PROCEEDINGS

[in press]	Pereira, C. C., Castro, L., Barata, C., & San Andrés, M. [2021]. (in press). Retouching the third dimension – The Aurélio da Paz dos Reis stereoscopic negatives archive. In J. A. Hernández Latas (Ed.), III Conference on Research in History of Photography: Stereoscopic or 3D photography, 19th and 20th centuries. Instituición Fernando El Católico.
2019	Pereira, C. C., Castro, L., Barata, C., & San Andrés, M. (2019). Digitizing collections - A reflection on negative archive collections, prioritizing procedures and what is lost. Topics in Photographic Preservation, 18, 192–201.
Jan 2019	Pereira, C. C., Castro, L., Barata, C., & San Andrés, M. (2019). Memory recaptured in a small community – Preserving retouched photographic negatives, discussing visual culture. In S. Albuquerque, T. Ferreira, M. F. Nunes, A. C. Matos, & A. Candeias (Eds.), Web of Knowledge - A Look into the Past, Embracing the Future, May 17-19, 2018 (pp. 78–81). Sílabas & Desafios.
2016	Pereira, C. (2016). Materials and techniques for retouching glass plate photographic negatives at the beginning of the 20th century. 3rd International Meeting on Retouching of Cultural Heritage - RECH3: Postprints, 65–72. https://www.dropbox.com/s/cxueiwvcjx01121/RECH3_%5B2015%5D%20BOOK_ABSTRACTS.EN.pdf?dl=0.

From all imagined, it seems a lot was done. Still, some things were left out. A thorough analytical identification of retouching materials in collections could have provided a complement to the characterization retouching methodologies in each one. It was also an initial intention to produce dry plates from historical recipes, which could then be tested for retouching techniques. This was discarded as no recipe could genuinely replicate the industrial plates in the collections.

In the beginning, it was considered a cross-analysis with Spanish collections. For different reasons, it was not possible to accommodate it in the planned timeframe. However, it could have provided comparison and verification with the findings in manuals and the Portuguese collections.

Going forward, the objective is to add the dimension of retouching to the study of other collections. To gather more information and complete what was started in this research.

More specifically, it is already planned a study of the Carlos Relvas archive.[391] It is mostly composed of negatives and many present retouchings. This time it will be a team approach, including photographers

[391] See above, chapter 1 - *Carlos Relvas – A very professional amateur photographer.*

and historians. Aside from a similar methodology exploring the collection, it will include developing a specific digitization workflow – one addressing the issues discussed of lack of representation of materiality and with particular attention to retouchings. Carlos Relvas photographed with both collodion and gelatin negatives and is a good complement to Portugal's earlier retouchings. It is also from a time before the industrialization of photographic materials, and differences are expected to be found, particularly in the type of retouching varnish and colorants used.

Finally, this study contributes to updating conservation practices and coordinates the study of retouched collections with the overall panorama of the history of photography.

Still, the subject of conservation of retouched collections has much to be explored in all directions. All the observations and considerations suggest that further research on the practice of retouching and the materiality of the object can go beyond conservation. It can be included in research on negative collections from individual photographers, particular photography uses, the impact of the photographic image of negative collections in their value, and understanding photography heritage today, or the digitization of these collections and their impact.



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E.C.C.O. European Confederation of Conservator-Restorers' Organization, http://www.ecco-eu.org/

IIC, International Institute for Conservation of Historic and Artistic Works, https://www.iiconservation.org/

ICCROM, International Centre for the Study of the Preservation and Restoration of Cultural Property, https://www.iccrom.org/

ICOM-CC, International Council of Museums – Committee for Conservation, http://www.icom-cc.org/

ICOMOS, International Council on Monuments and Sites, https://www.icomos.org/

American Institute for Conservation, https://www.culturalheritage.org/

Image Permanence Institute, https://www.imagepermanenceinstitute.org/

International Council no Archives, https://www.ica.org/en

IFLA, The International Federation of Library Associations and Institutions, https://www.ifla.org/

Internet archive, https://archive.org/

UNESDOC, Digital Library, https://unesdoc.unesco.org/

Project Guttenberg, https://www.gutenberg.org/

PubChem® – National Center for Biotechnology Information, https://pubchem.ncbi.nlm.nih.gov/

Institute of chemistry University of Tartu – Database of ATR-FT-IT spectra of various materials, https://spectra.cs.ut.ee/

Museum of Fine Arts of Boston – Conservation and Art Materials Encyclopedia Online (CAMEO). http://cameo.mfa.org/

National Institute of Advanced Industrial Science and Technology (AIST), Spectral Database for Organic Compounds SDBS. https://sdbs.db.aist.go.jp/sdbs/cgi-bin/cre_index.cgi

Appendix

Appendix A – Experimenting with negatives at the AMLSB

Appendix B – Retouching types

Appendix C – Thesaurus

Appendix D – Table used for recording findings

Appendix E – Material analysis

Reference retouching materials' data sheets

FT-IR spectra collection

UV-Vis spectroscopy of two red dyes

Appendix A – Experimenting with negatives at the AMLSB

Retouching techniques experimented on three negatives from the AMLSB. By courtesy of Luís Pavão and the AMLSB, Kodak retouching medium and Agfa neo-coccin and three negatives were provided for testing retouching, one dry plate negative (1), and two film negatives (2 and 3) 9x12 cm. The glass negative shows a reproduction of a portrait, and the two film negatives show reproductions of framed drawings.

The negatives were first cleaned with an air blower, and the glass support was cleaned with a water and ethanol solution (1:1). Kodak retouching medium was applied over the areas to be retouched with the pencil using a cotton ball. On the portrait, the word "teste" [test] was written twice with an HB pencil on unvarnished and varnished areas of the emulsion. An interference pattern was drawn over the face, and additional exaggerated highlights were drawn on the collar and eyes. Several pattern types were drawn with the pencil on the film negatives.

The Agfa neo-coccine was touched up with the tip of a finger on the glass surface over the face. Features were opened using a needle on the eyes, eyebrows, nose, mustache, and mouth. The film negatives were covered in selected areas with Agfa neo-coccin at different dilutions using a brush.

Contact prints were done for all negatives to see the results of retouching in a printed paper. The portrait was printed twice before and after retouching. The images below record the results.

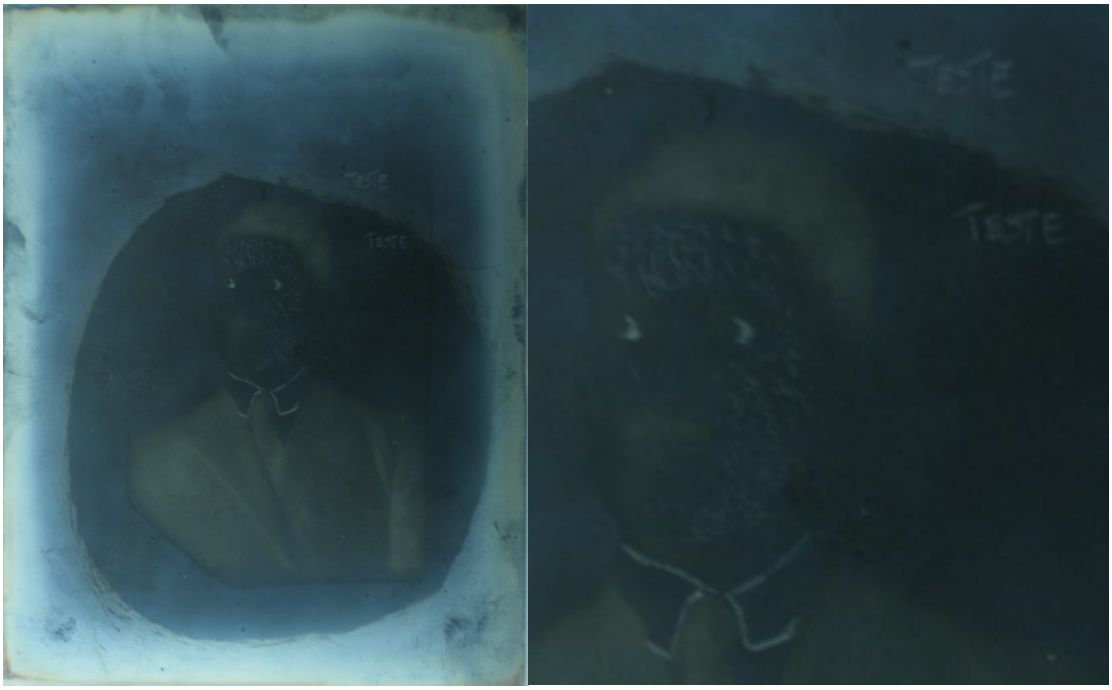


1 – Some of the materials and utensils used: air blower, cotton, water, and ethanol solution (1:1); Kodak retouching medium and Agfa neo-coccine.





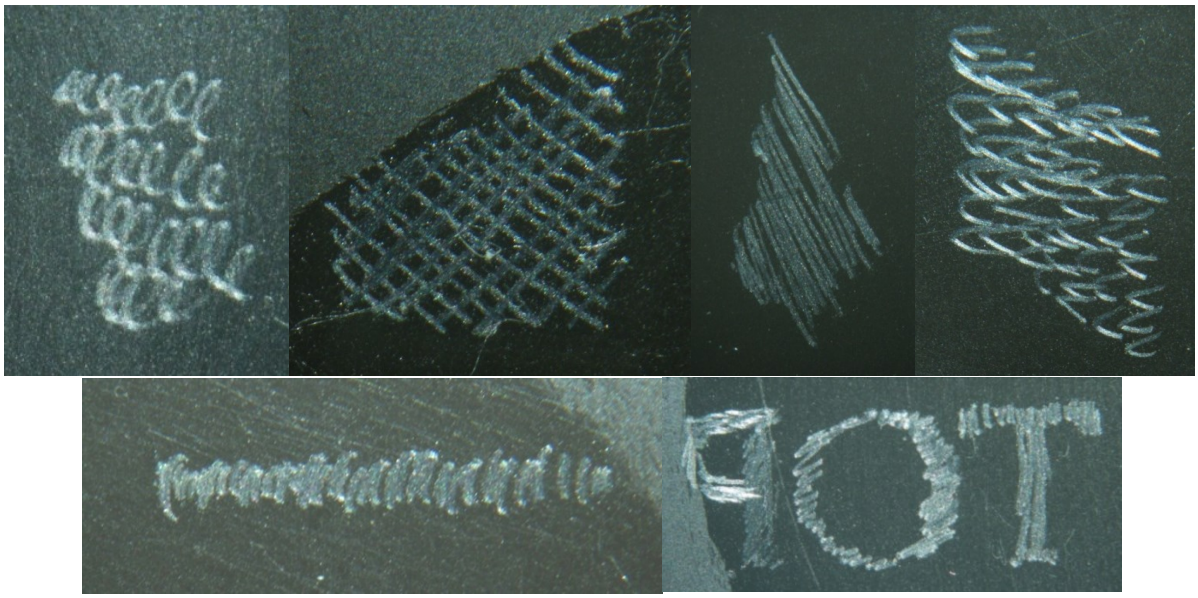
2 – Negatives in transmitted light: 1 dry plate negative; 2 and 3 film negatives.



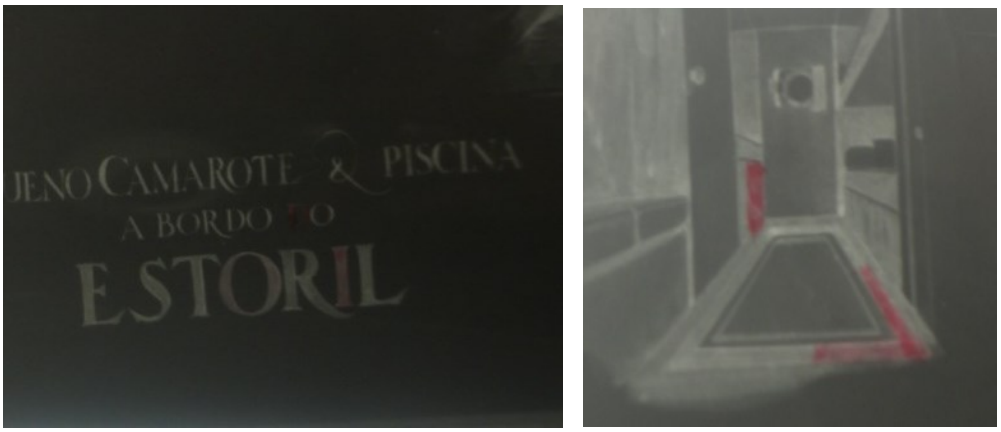
3 – Dry plate negative, after retouching with *Kodak Retouching fluid* applied with a cotton ball, on the right, a detail showing the retouching done with HB pencil.



4 – Makeup on a glass support, done with Agfa Neu coccine, features etched with a needle.



5 – Different pencil interference patterns experimented on negative 2.



6 – Retouching with red dye *Agfa Neu coccine* at different concentrations on negative 3.



7 – Negatives 2 and 3 after retouching: on the left with *Kodak Retouching fluid* and pencil; on the right negative retouched with *Agfa Neu coccine*.

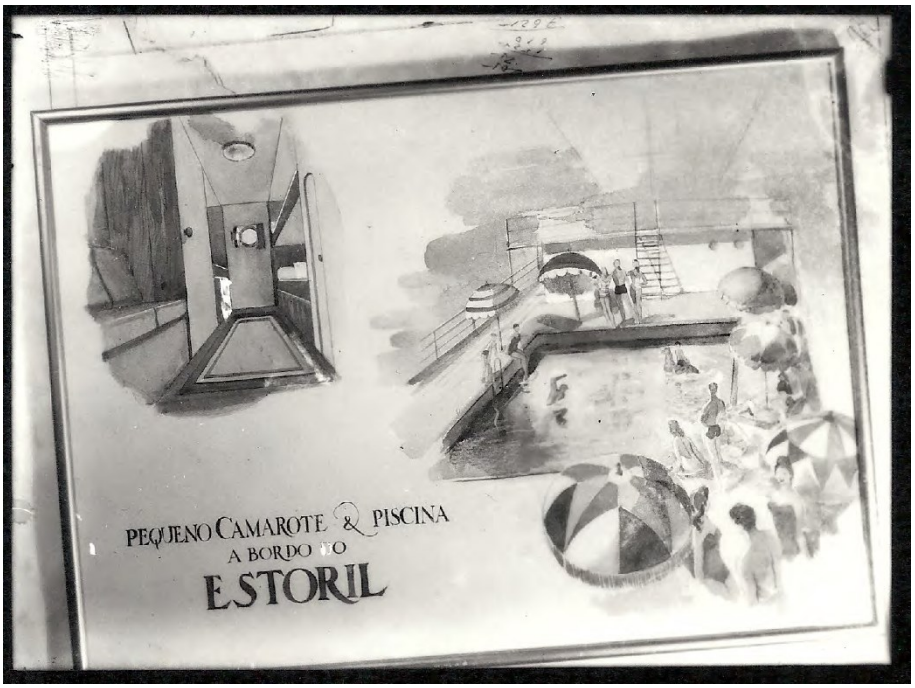


8 – On the left, negative one viewed in transmitted light.
On the right, digitally converted positive showing the effects of retouching.



9 – Negative one, contact prints before and after retouching (both times with f8 e 5seg).





10 – Negative two and three, contact prints before and after retouching (obtained with f8 e 5seg).

Appendix B – Retouching types

This appendix summarizes the retouching types, materials, and techniques, addressed in chapter 2.4. It aims to give a quick visual reference for conservators, cataloguers, and archivists to easily identify types of retouching techniques and uses in a collection. It complements appendix BB with a dedicated thesaurus.

While some retouchings are more quickly recognized, others are only perceivable by changing light at different angles. This makes it sometimes difficult to identify and do a photographic record, and some images are taken at an angle or changing lighting.

Mattolein – retouching varnish

In dry plate negatives, the retouching varnish usually does not cover the entire surface and can be identified as a difference in the emulsion surface's sheen. As it was pointed out several times throughout the text, varnishes protect the emulsion surface, and silver mirroring is expected to occur only in unvarnished areas (Figure 1).

Spotting

A corrective technique to cover transparent holes, spots in the emulsion. Frequent causes are bubbles in the emulsion from a defective manufacturing process or dust that settled on the negative's surface during capture. It is done with a pencil over a varnish layer or with diluted red dye applied with a fine brush.

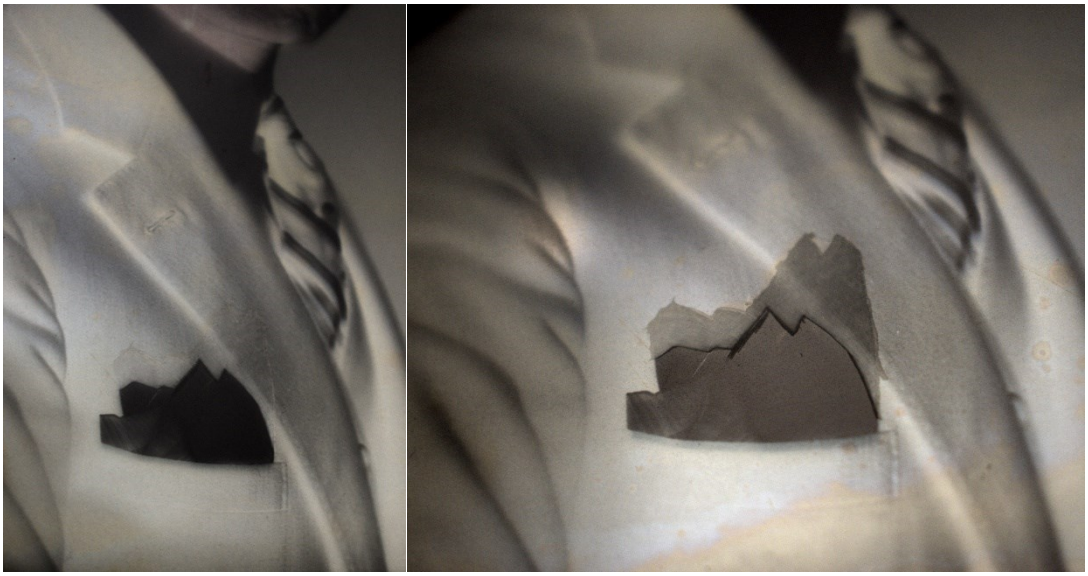


1 – a. Varnish applied over the areas to be retouched, man's portrait with varnish over the head, b. intensive spotting with red dye, detail of a man's portrait.

Etching and abrasion

The etching is done to remove emulsion using an etching knife or needle. Not as readily identified, can sometimes be mistaken as pencil retouchings or scratches. Considering the intended effect helps differentiate the techniques as they have opposite effects. Etching always reduces emulsion's density, intensifying or adding dark features.

Abrasive powders can achieve a similar purpose for large areas, but it is hard to identify. After abrasion, the surface becomes more fragile, and it was recommended that the surface be polished and varnished for protection. The abrasion of the surface makes a slight depression that the varnish layer can conceal. It was difficult to identify with certainty and impossible to photograph with regular photographic cameras, and no example is included in this text. Because these are permanent retouchings that the established conservation treatments cannot eliminate, they pose less concern.



2 – Etching, this example illustrates how light and camera positions influence hoe a retouching is visible or not.

Pencil

Pencil retouchings are identified for the graphite characteristic metallic sheen. In portraits, it is frequently found on faces, and other skin areas, in random patterns. It can be used as a more standard drawing tool adding details, erasing others, highlighting contours, and more.



3 – The pencil is applied over the varnish: a. and b. pencil used over the face and outlining features in the air and hands. c. the same negative as b, seen with transmitted light for comparison.



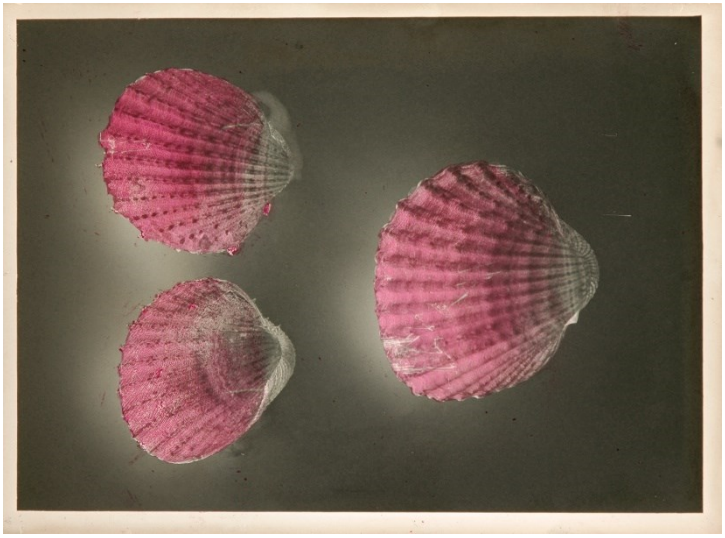
4 – The pencil is applied over the varnish: a. and b. pencil used over the face and outlining features in the clothes. c. same negative in b. viewed in transmitted light for comparison.

Dyes and pigments

The presence of dyes and pigments is easily identified for their colors and textures when not deteriorated. Retouching with colorants can be done either on the emulsion or glass surfaces. They can be used in diluted, transparent layers or thick opaque layers using different mediums and types of colorant. A red dye is more commonly used. In modern negatives, it is likely to be new coccine or crocein scarlet. Nevertheless, more opaque layers may be pigment-based, possibly typographic inks and earth pigments.



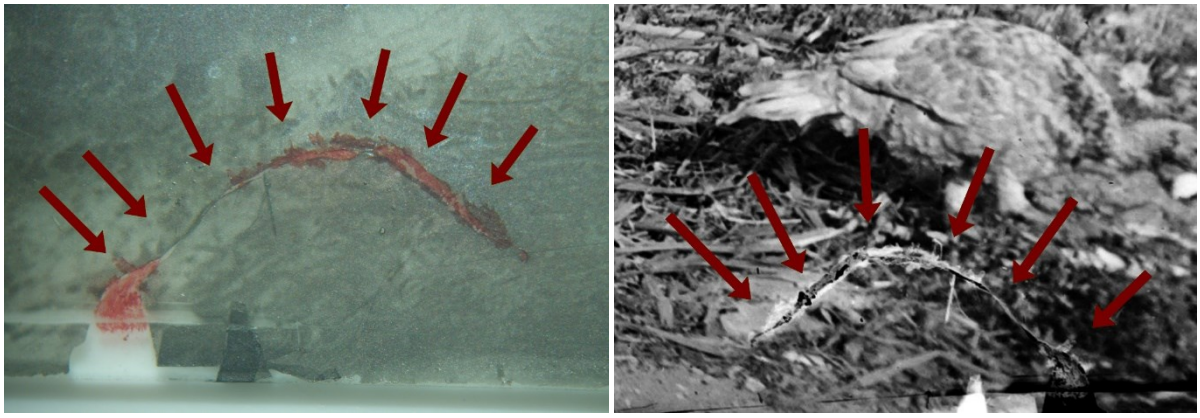
5 – The colorants can be applied over the emulsion or glass support; these examples have on both. a. Faded children's portrait with red dye, b. Couple's portrait, a composition from two positives, with red pigment sample.



6 – Red colorant applied to add density, having a lightened effect on the print.

Mending defects

More extensive retouching can be done to correct mishaps and other flaws. It corrects lacuna, tears, and scratches. It is usually done with a red dye in a similar density as the surrounding area.





7 – Tears can be concealed with a red dye; there is no need for a perfect job; the ground's texture and retouching hide the defect: detailed of the tear's reintegration; b. same detail converted digitally to positive;
c. view of the entire image and result.

Interference patterns

It is a retouching technique done to portraits over the face and other skin areas, done with a pencil over a varnish layer. It is used to remove minor defects and create smooth, unblemished skin.



8 – Interference patterns; the bottom example shows a detail of the interference pattern. The result is on the center image, of a negative digitally converted to positive, also a second un-retouched portrait of the same man, for comparison, Augusto Pina, scenographer (190?).

Makeup

It is a retouching technique done to the faces and other skin areas with a red dye over the glass support. The makeup is used to lighten the skin tone by increasing density in the negative. It can be applied with a brush in areas, dots, lines, or hatching patterns. However, it is frequently touch-up with the fingertips. Fingerprints are often perceived on the glass surface; this may be purposefully done to create an interference that conceals the intervention when printing.

It is done to compensate for ordinary plates, which were not sensitive to reds, resulting in excessively dark skin tones. It is frequently etched to free the areas meant to be kept dark, like eyebrows, lips, or mustaches.



9 – Makeup with red dye applied by different methods using a brush or the fingertips.

Defining blurred lines

The etching and pencil are also used to sharpen features. It is done like a drawing tool defining blurred lines, usually following contours.



10 – Defining blurred lines: a. two moving little dancers, sharpen features by etching; b. sharpening the frame of unfocused eyeglasses using a pencil.

Correcting shadows

Dyes are used to generally correct densities in dark areas or intense shadows. Even if the negative is correctly exposed, this technique can be used to compensate for high contrast papers and avoid loss of detail in shadows.



11 – Red dye applied in dark areas to correct improper lighting, extreme shadows, and high contrasts.

Highlights

It is similar to the previous examples but highlights features in low contrast dense areas of the negative – white on white in the print. For the same reason, it is done to compensate for high contrast papers and avoid loss of detail in highlights.



12 – Giving more contrast in highlights: drawing lines in the feathers with a pencil allows more detail. Otherwise, it would be an undefined white mass on top of the helmet:
Portrait of Manuel II (1889-1932), King of Portugal, 190?, by Arnaldo Fonseca.

Intensification of whites

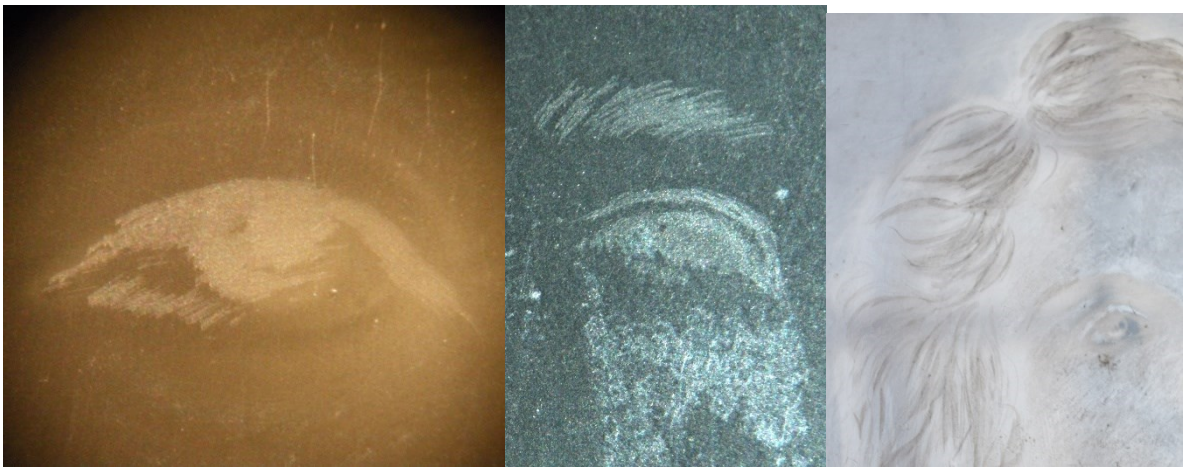
When the objective was to print an area completely white, the best way was to block out the surface. This technique is the base principle of masking (see below). Frequently the negative is retouched on both sides to guarantee opacity.



13 – Keeping a nun's wimple and veil perfectly white. Negative retouched on both sides with a black bituminous material.

Intensification of blacks

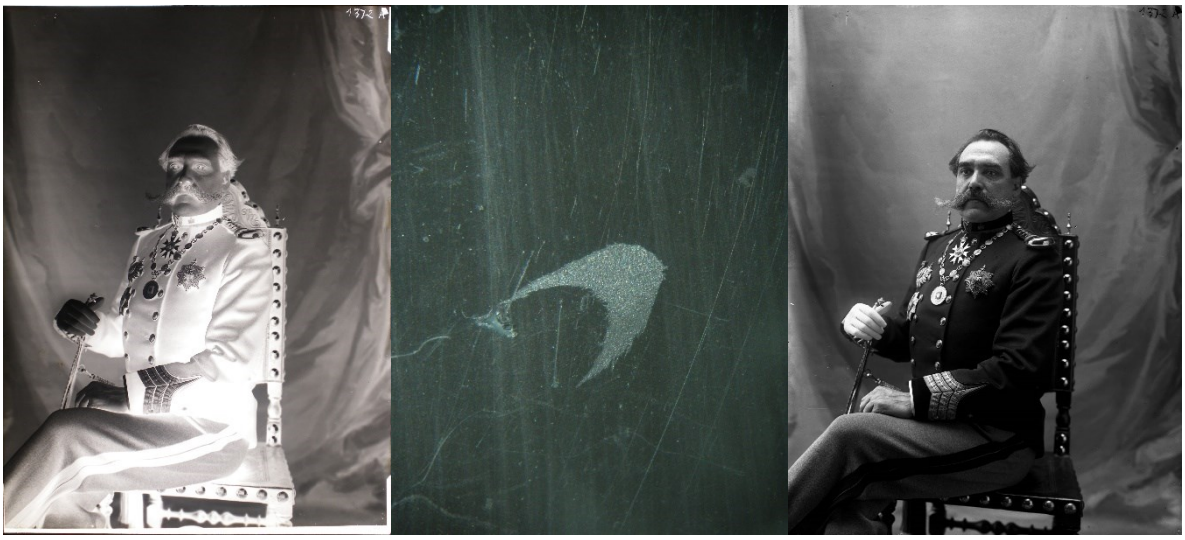
It is the opposite of the two previous examples. Blacks could be intensified by etching, either in a drawing-like manner or in parallel strokes to cover a large area. The purpose is to intensify contours, dark lines, or areas. The eyes are frequently etched to produce a defined line of the eyelid and intense pupils. Eyebrows, mustaches, and dark hair were also frequently intensified.



14 – Etching to intensify blacks. From left to right: drawing a black eye-line, eyebrows, and hair.

Erasing elements

Unwanted elements can be erased by etching, pencil, or dyes. Choosing the correct technique follows the principle that a feature gets erased when it assumes a density identical to its surroundings. Whites are erased by etching, and blacks with pencil or dyes.



15 – Erasing a finger that stuck out. The white glove is erased by etching.
Portrait of Colonel Joaquim José Machado, 190?, by Arnaldo Fonseca.

Drawing by etching

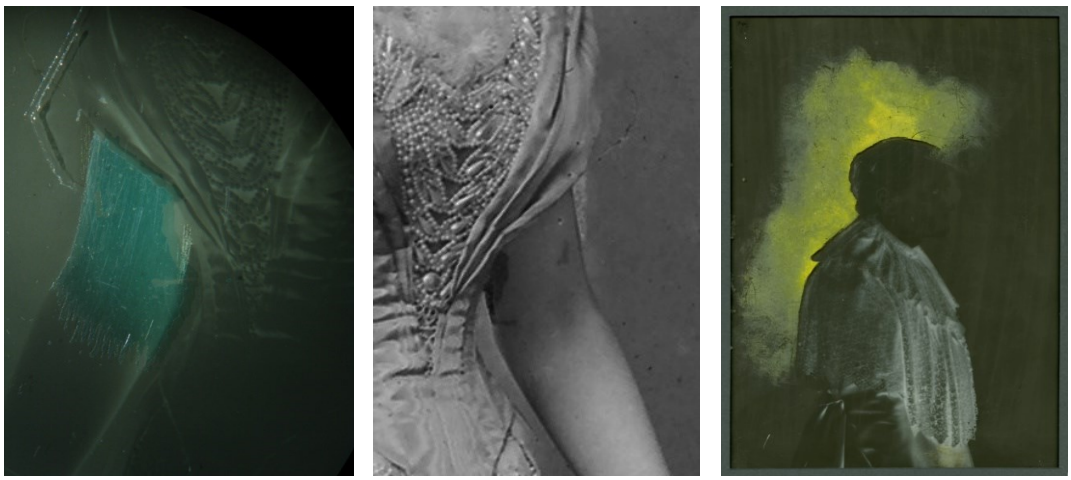
The same as the previous example but adding lines or other elements where they did not exist.



16 – Etching mustaches, with a few strokes of the knife or in combination with pencil working on rearranging a droopy mustache.

Dye color filters

Red dyes are the most common color found in retouched collections. Less common is the use of colors, such as greens, yellows, and blues. Like camera filters, these colors compensate for exposure and contrast and can be used to alter the image in small localized or over large areas, but with less intensity than reds.



17 – Color dyes on the emulsion: green color corrects a mid-tone, and the yellow dye gives contrast to the white hair on a white background without completely removing it.

Mate varnish

Like the previous example, negatives that are underexposed can be corrected by applying a colored dye, this time, to most of the surface. To allow other retouchings, this dye is applied on the glass side. If the dye readily adheres to the emulsion, on the glass, it needs to be mixed with a varnish – mate varnish.



18 – Two examples with a red mate varnish. On the left, the faces were further lightened with makeup, and the dresses etched to retain their intensity. On the right, the shoulder is also etched. The strange texture on the left and upper part is due to a biological infestation.

Blocking out

The purpose of the mask is to block out the negative entirely. It removes unwanted elements or cuts out the only part of the image that is to be reproduced. It can be done with various colors but always in a concentration to render the area opaque. It is done on both the emulsion and glass sides.



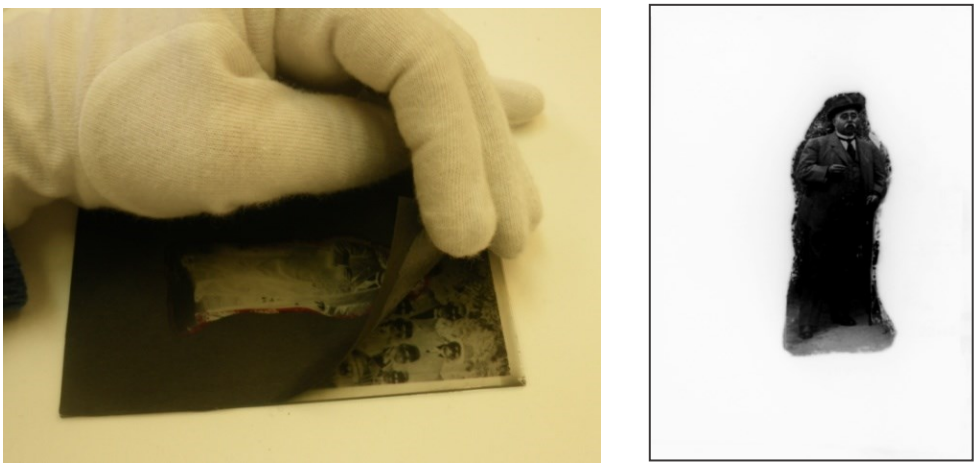
19 – Blocking out, on the left to transform a double portrait in another with just one girl; on the right, to remove the background, possible in preparation for double printing.

Paper masks

The purpose is to block out unwanted areas of the negative, like the previous example. It is done by fastening an opaque paper with the cut-out of the desired area. It is a quicker, easier, and cheaper way than to block out with inks. It can be used to frame and crop an image to a relevant part in perpendicular lines or in any shape desired.



20 – Framing paper mask, the purpose is to crop the image to a more interesting composition.



21 – Paper mask cut-out to the figure's general shape to block it out from the rest of the group.

Mixed material masks

This combines the two previous techniques and is used to cut-out a mask around complex shapes. The more detailed elements are surrounded by ink, and the rest is covered with a paper mask to be more economical.



22 – Clearing the skies. This example shows a process found throughout history. The area renders completely white and can be left like that or add an artificial sky.

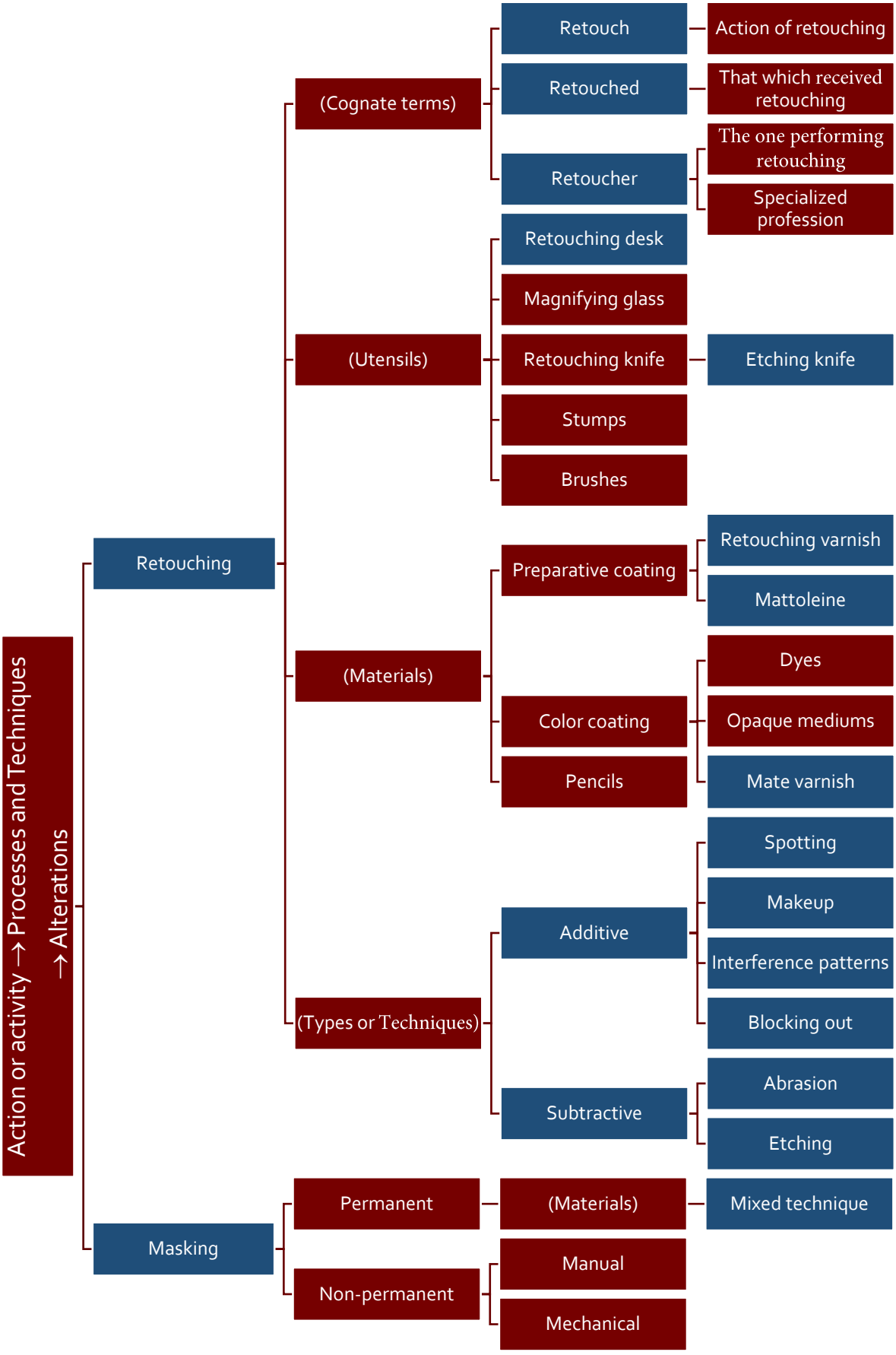
Appendix C – Thesaurus

The technical nature, specificity, and in a sense, the novelty of the subject of retouching requires a compilation of a Thesaurus. It is intended to be used as a tool for describing retouched negative collections. It also provides short definitions for selected concepts.

Many sources, recent or historic, describe retouching of dry plate negatives. Although not opposite or truly different, each definition found reflects the author's knowledge and, sometimes, ethical position. More recent technical and historical sources about photography often define retouching as adulterations to the photographic process and only valid when remedying mistakes and technical difficulties. However, the historical review in chapter 1 revealed that retouching was common and beyond simple remedy. The definitions presented reflect this accepted view, including retouching for esthetic and even artistic reasons and a photographer's choice. They are conclusions from what was observed in this research, historical references, and the selected collections, including some more specific to the retouching of portraits. More information and characterization of all the terms are found in chapter 2; appendix B provides a visual aid for identifying these terms when observing collections.

This thesaurus follows the Art & Architecture Thesaurus© (AAT) organization and picks up on the term *retouching* as it exists on that database.[392] Thesauri are usually presented as lists of terms or with a hierarchy tree of relations between terms, and both are presented below. First, it is presented a hierarchy tree. It is then followed by a list of terms specific to negative retouching – identified in blue and presented in alphabetical order.

[392] The AAT is published by the J. Paul Getty Trust and is available online at http://www.getty.edu/research/tools/vocabulary/aat/. [Retrieved February 2021]



Hierarchy tree for terms relating to retouching and masking, the ones in blue are considered specific to the retouching of dry plates, the retouching of portraits, and are further developed below.

Abrasion

Note:	Alteration to the photographic emulsion's surfaces by using abrasive powders to reduce density.
Terms:	abrasion (English) dry reduction (English) abrasão (Portuguese) abrasión (Spanish) rebajado (Spanish) redución en seco (Spanish) abrasion (French) abrieb (German) abrasione (Italian)
Hierarchical Position:	Action or activity ...Processes and Technique (hierarchy name) ……..Alteration (process and technique) ……Retouching — Types or Techniques (hierarchy name) — Subtractive retouching — Abrasion
Related concepts:	Etching (associated technique) Retouching (genus to species abrasion) Subtractive retouching (genus to species abrasion)

Additive retouching

Note:	Alteration by adding non-photographic materials to the negative surface. (see retouching)
Terms:	additive retouching (English) retoque aditivo (Portuguese) retoque aditivo (Spanish) retouche additive (French) Additive retusche (German) ritocco additivo (Italian)
Hierarchical Position:	Action or activity ...Processes and Technique (hierarchy name) ……..Alteration (process and technique) ……Retouching — Types or Techniques (hierarchy name) — Additive retouching
Related concepts:	Retouching (genus to species additive retouching) Subtractive retouching (opposite technique)

Blocking out

Note:	Alteration with an opaque medium that completely removes the image, resulting blank in the print
Terms:	blocking out (English) máscara de tinta (Portuguese) siluetado (Spanish) supresión (Spanish) tapado (Spanish) partielle Abdecken (German) ritocco colla vernice opaca (Italian) Vernice opaca (Italian)

Hierarchical Position: Action or activity
...Processes and Technique (hierarchy name)
……..Alteration (process and technique)
……Retouching — Types or Techniques (hierarchy name) — Additive retouching — Blocking out
Related concepts: Spotting (associated technique)
Makeup (associated technique)
Interference patterns (associated technique)
Retouching (genus to species blocking out)
Additive retouching (genus to species blocking out)

Etching

Note: Retouching technique. It is done to alter the photographic emulsion's surfaces using a knife, reducing the negative's emulsion density, with a darkening effect on the positive.
Terms: etching (English)
raspado (Portuguese)
raspagem (Portuguese)
raspado (Spanish)
retoque con cuchilla (Spanish)
grattage (French)
schaben (German)
raschiatura (Italian)
Hierarchical Position: Action or activity
...Processes and Technique (hierarchy name)
……..Alteration (process and technique)
……Retouching — Types or Techniques (hierarchy name) — Subtractive retouching — Etching
Related concepts: Abrasion (associated technique)
Retouching (genus to species etching)
Subtractive retouching (genus to species etching)

Etching knife

Note: Utensil. Knife or blade used for etching
Terms: etching knife (English)
retouching knife (English)
raspadeira (Portuguese)
raspadeira-retoque (Portuguese)
raspador (Spanish)
grattoir (French)

Hierarchical Position: Action or activity
...Processes and Technique (hierarchy name)
……..Alteration (process and technique)
……Retouching — Utensils — Retouching knife — Etching knife
Related concepts: Etching (associated technique)

Interference patterns

Note:	Retouching technique. It is usually done to face and skin areas, with a pencil over a varnish layer. It is used to remove minor defects and create a smooth surface.
Terms:	interference patterns (English) hatching (English) padrão de interferência (Portuguse) anediar (Portuguese) entonar y armonizar (Spanish) comeado (Spanish) sombreado (Spanish) hachures (French) Korn -Retouche (German) Schattirnng (German) Schraffur (German) Tratteggio (Italian) Tratteggio a matita o pennello (Italian) ritocco a tratti (Italian)
Hierarchical Position:	Action or activity ...Processes and Technique (hierarchy name) .....Alteration (process and technique) .....Retouching — Types or Techniques (hierarchy name) — Additive retouching — Interference patterns

Makeup

Note:	Retouching technique. It is usually done to face and skin areas with a red dye over the glass support. It is used to lighten the skin tone by increasing density in the negative.
Terms:	makeup (English) maquilhagem (Portuguese) protecções (Portuguese) maquillaje (Spanish) maquilhage (French) maquillage (Italian)
Hierarchical Position:	Action or activity ...Processes and Technique (hierarchy name) .....Alteration (process and technique) .....Retouching — Types or Techniques (hierarchy name) — Additive retouching — Makeup
Related concepts:	Spotting (associated technique) Interference patterns (associated technique) Blocking out (associated technique) Retouching (genus to species makeup) Additive retouching (genus to species makeup)

Masking

Note:	Alteration. It is done to remove part of the image by covering the undesired parts in the negative with opaque paper and/or opaque ink.
Terms:	masking (English)

	mask (English)
	máscara (Portuguese)
	máscara (Spanish)
	masquer (French)
Hierarchical Position:	Action or activity
	...Processes and Technique (hierarchy name)
	……..Alteration (process and technique)
	……Masking
Related concepts:	Retouching (associated technique)
Related concepts:	Spotting (associated technique)
	Makeup (associated technique)
	Blocking out (associated technique)
	Retouching (genus to species interference patterns)
	Additive retouching (genus to species interference patterns)

Mate varnish

Note:	(another coating material)(another coating material)
Terms:	mate varnish (English)
Hierarchical Position:	Action or activity
	...Processes and Technique (hierarchy name)
	……..Alteration (process and technique)
	……Retouching — Materials — Color coating — Mate varnish
Related concepts:	Retouching varnish (another coating material)
	Mattolein (another coating material)

Mattolein

Note:	Type of varnish, a material used to prepare the emulsion surface for retouching
Terms:	Mattolein (English)
	retouching varnish (English)
	retouching medium (English)
	matoléne (Portuguese)
	matoleina (Portuguese)
	matolaina (Spanish)
	mattoleïne (French)
	Mattoleïn (German)
	mattoleina (Italian)
Hierarchical Position:	Action or activity
	...Processes and Technique (hierarchy name)
	……..Alteration (process and technique)
	……Retouching — Materials — Preparative coating — Mattoleine
Related concepts:	Retouching varnish (generic term for the type of varnish mattolein)

Mixed technique

Note:	Masking technique. Any combination of a variety of materials plus the associated techniques used in masking or creating other alterations to the negative
Terms:	mixed technique (English)

	mixed media (English)
	mixed materials (English)
	técnica mista (Portuguese)
	técnica mixta (Spanish)
	medio mixto (Spanish)
	technique mixte (French)
	Mischtechnik (German)
	tecnica mista(Italian)
Hierarchical Position:	Action or activity
	...Processes and Technique (hierarchy name)
	……..Alteration (process and technique)
	……Masking — Permanent — Materials — Mixed technique
Related concepts:	Retouching (genus to species mixed technique)
	Masking (genus to species mixed technique)

Retouch

Note:	The action of retouching, altering negatives by any additive or subtractive intervention.
Terms:	retouch (English)
	retocar (Portuguese)
	retocar (Spanish)
	retoucher (French)
	retuschieren (German)
	ritoccare (Italian)
Hierarchical Position:	Action or activity
	...Processes and Technique (hierarchy name)
	……..Alteration (process and technique)
	……Retouching — Cognate terms — Retouch
Related concepts:	Retouching (cognate term)

Retouched

Note:	A negative that has received retouching.
Terms:	retouched (English)
	retocado (Portuguese)
	retocado (Spanish)
	retouché (French)
	retouchirten (German)
	ritoccato (Italian)
Hierarchical Position:	Action or activity
	...Processes and Technique (hierarchy name)
	……..Alteration (process and technique)
	……Retouching — Cognate terms — Retouched
Related concepts:	Retouching (cognate term)

Retoucher

Note:	The one performing retouching. A specialized professional
Terms:	retoucher (English)
	retocador (Portuguese)

retocadora (Portuguese)
retocador (Spanish)
retoucheur (French)
Retoucheur (German)
Ritoccatore (Italian)

Hierarchical Position: Action or activity
...Processes and Technique (hierarchy name)
.....Alteration (process and technique)
.....Retouching — Cognate terms — Retoucher

Related concepts: Retouching (cognate term)

Retouching

Note: Retouching is any additive or subtractive intervention done to the photographic negative.

Terms: retouching (English)
retoque (Portuguese)
retocar (Portuguese)
retocado (Spanish)
retocar (Spanish)
retouche (French)
Retouche (German)
Retusche (German)
ritocco (fotografico) (Italian)
fotoritocco (Italian)

Hierarchical Position: Action or activity
...Processes and Technique (hierarchy name)
.....Alteration (process and technique)
.....Retouching

Related concepts: Masking (associated technique)
distinguished from inpainting (a restorative process or technique)
overpainting (painting technique)
coloring (painting technique)

Retouching desk

Note: Utensil. A supporting structure used for negative retouching.

Terms: retouching desk (English)
pupitre (Portuguese)
estante de retoque (Portuguese)
pupitre (Spanish)
bastidor de retoque (Spanish)
pupitre (French)
Retouchir Pult (German)
Retouchirpultes (German)
Retouchir-Tisch (German)
leggio per ritocco (Italian)

Hierarchical Position: Action or activity
...Processes and Technique (hierarchy name)
.....Alteration (process and technique)
.....Retouching — Utensils — Retouching desk

Related concepts:	Retouching (associated technique)

Retouching varnish

Note:	(see mattolein) Type of varnish, a material used to prepare the emulsion surface for retouching.
Terms:	retouching varnish (English) retouching medium (English) Mattolein (English) Verniz de retoque (Portuguese) barniz de retoque (Spanish) vernis de retouche (French) Retouche Lack (German) Negativ lacke (German) vernice di ritocco (Italian)
Hierarchical Position:	Action or activity ...Processes and Technique (hierarchy name) .....Alteration (process and technique) .....Retouching — Materials — Preparative coating — Retouching varnish
Related concepts:	Mattolein (one type of retouching varnish)

Spotting

Note:	Retouching technique. Usually done with a pencil over a varnish layer or diluted red dye. It is used to remove small transparent spots in the negative.
Terms:	spotting (English) repicar (Portuguese) punteado (Spanish) tapado de puntos (Spanish) repiquer (French) otturazione dei punti (Italian) punteggiatura (Italian)
Hierarchical Position:	Action or activity ...Processes and Technique (hierarchy name) .....Alteration (process and technique) .....Retouching — Types or Techniques (hierarchy name) — Additive retouching — Spotting
Related concepts:	Makeup (associated technique) Interference patterns (associated technique) Blocking out (associated technique) Retouching (genus to species spotting) Additive retouching (genus to species spotting)

Subtractive retouching

Note:	(see retouching) Alteration by removing material from the photographic emulsion.
Terms:	subtractive retouching (English) retoque subtractivo (Portuguese) retoque sustractivo (Spanish) redución mecánica (Spanish) retouche soustractive (French)

	subtraktive Retusche (German)
	ritocco sottrattivo (Italian)
Hierarchical Position:	Action or activity
	...Processes and Technique (hierarchy name)
	……..Alteration (process and technique)
	……Retouching — Types or Techniques (hierarchy name) — Subtractive retouching
Related concepts:	Retouching (genus to species subtractive retouching)
	Additive retouching (opposite technique)

Appendix D – Table used for recording findings

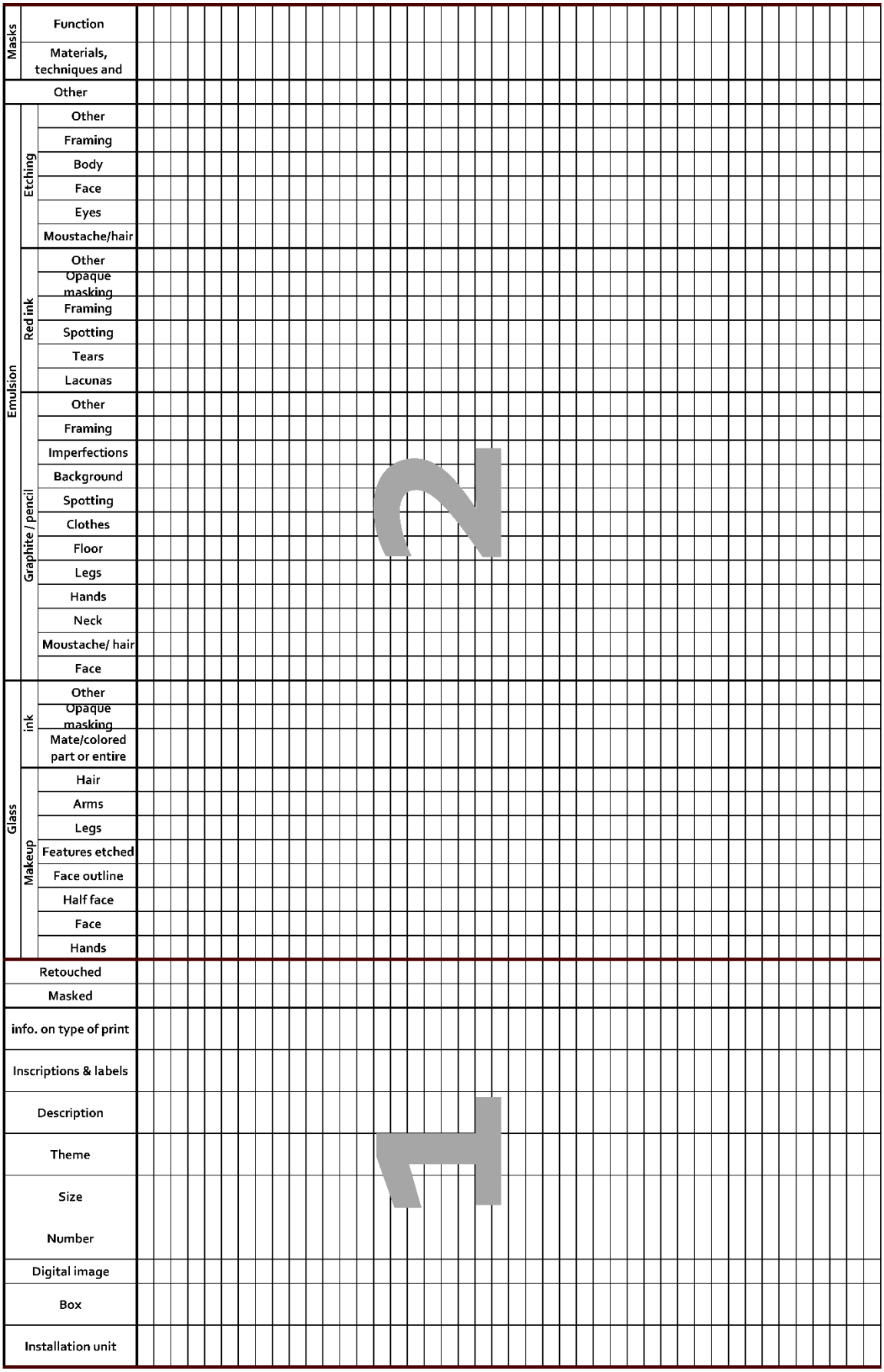
Initially, it was hypothesized to do a digital database of all the findings, including images. This was, however, not possible as most of the collections or part of the collections are protected by property and image laws, more affected the portraits that were central to the research. Throughout this text, all images shown from collections do not show perceivable portraits unless they are of public figures or at public events. All other portraits and examples are shown only in their negative form.

Still, in chapter 5, it was argued that current practices overlook the importance or even the existence of retouchings as part of the photographic object.

Information about retouchings is currently more frequently included in the conservation assessment and does not transfer to the archive or museum catalog database. The catalog sometimes refers to retouching in the object's description or the inscriptions, but without explaining or describing what type of retouchings exist.

This appendix shows a table used to record and provide some statistical information on the retouchings in each collection. The first part of the table includes the more general identification information on each negative and was filled descriptively. The second part was only checked for the existence or non-existence of each predicted type of retouchings.

The first part serves as a suggestion to be added to the existing archive and museum catalog databases. It adds retouching and mask columns and a third column for information on the type of print. As seen, particularly for studio collections, this information is frequently inscribed on the negative and gives clues to the photographer's final intention and resulting print. All this information can help decide on the type of images to be shown in online databases. When presenting a positive version of the original negative, these can be considered to do any digital adjustments and correction and better relate, historically, to the original print – for example, treating the images digitally to reproduce better "ordinary" and "orthochromatic" emulsion which were blind to reds.


Masks
Function
Materials, techniques and
Other
Emulsion
Etching
Other
Framing
Body
Face
Eyes
Moustache/hair
Red ink
Other
Opaque masking
Framing
Spotting
Tears
Lacunas
Graphite / pencil
Other
Framing
Imperfections
Background
Spotting
Clothes
Floor
Legs
Hands
Neck
Moustache/ hair
Face
Glass
ink
Other
Opaque masking
Mate/colored part or entire
Makeup
Hair
Arms
Legs
Features etched
Face outline
Half face
Face
Hands
Retouched
Masked
info. on type of print
Inscriptions & labels
Description
Theme
Size
Number
Digital image
Box
Installation unit

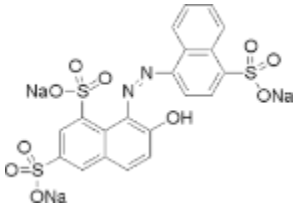
Appendix E – Material analysis

Reference retouching materials' data sheets

The first part of this appendix collects general information on the reference materials listed in chapter 3. The second part reunites a spectra collection of the same materials, including retouching materials and others used in their preparation or sample preparation. Because the materials included in this section have very different characteristics, the information included about one material may not be available for another. However, for each one, it is summarized the essential identification and characterization aspects.

Each material includes the reference to specifically consulted sources, either on material characterization or FT-IR spectra interpretation. A complete list of cited references is presented at the end, divided into two sections: the references that deal with information relevant to several materials (i-xii) and the more specific references (1-37).

New coccine – Agfa, Globo, Riesgo

Alternative names:	Ponceau 4R, C.I. 16255, Cochineal Red A, C.I. Acid Red 18, Brilliant Scarlet 3R, Brilliant Scarlet 4R, Food Red no. 102, E124, New coccine, Neu-coccin, Cocim, Coccin Red. IUPAC: trisodium (8*Z*)-7-oxo-8-[(4-sulfonatonaphthalen-1-yl)hydrazinylidene]naphthalene-1,3-disulfonate
Formula:	$C_{20}H_{11}N_2Na_3O_{10}S_3$
Family	Azo dye
Source:	It is a synthetic colorant from the azo dye family. Ponceau 4R is manufactured by coupling diazotized naphthionic acid to G acid (2-naphthol-6,8- disulphonic acid) and converting the coupling product to the trisodium salt. Ponceau 4R is described as sodium salt. Calcium and potassium salt are also permitted.
Molecular structure:	
CAS Number:	2611-82-7
Properties:	Molecular weight: 604,5 g/mol, color index no. 16255, solid reddish powder or granules, soluble in water. Lightfastness: good to excellent
Uses:	Photographic dye, arts and crafts dye, food coloring identified as E124.

Samples: Three different samples were considered for the study on new coccine dye, all prepared in KBr pellet:
Agfa Neu-Coccin, liquid, photographic dye, a historical sample with >50 years, sample courtesy of Luis Pavão and the AMLSB (analysis done to a dried sample).
Globo, E124, liquid, commercially available food colorant (analysis done to a dried sample).
Riesgo, Manuel Riesgo, Rojo cochinilla, E124, commercially available food colorant in powder form.

References: [i] [ii] [iii] [iv] [1] [2] [3] [20]

Crocein scarlet – Kodak Crocein, Redetz

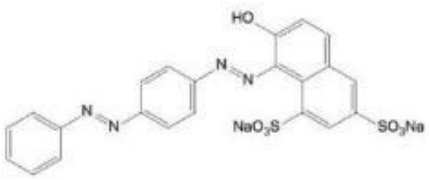
Alternative names: *Alternative names*
Acid Red 73, CI 27290, Brilliant crocein, Crocein Scarlet MOO, 5413-75-2, Woodstain Scarlet, Crocein Scarlet 3B, woodstain scarlet.
IUPAC: 7-Hydroxy-8-(4-phenylazophenylazo)-1,3-naphthalenedisulfonic acid disodium salt

Formula: $C_{22}H_{14}N_4Na_2O_7S_2$

Family: Azo dye

Source: Synthetic colorant

Molecular structure:



CAS Number: 5413-75-2

Properties: Molecular weight: 556,5 g/mol, color index no. 27290, irritant and health hazard, soluble in water. Lightfastness: good

Uses: Photographic dye, arts and crafts dye, cosmetics (hair dye)

Samples: Crocein, Kodak crocein scarlet, powder, photographic dye, courtesy of Mark Osterman and the Eastman Museum. RedETZ, powder, photographic dye, red colorant from the Foto-Carvalho collection. Samples prepared in KBr pellets.

References: [i] [ii] [iii] [iv] [1] [2] [20] [33]

Mattolein – Varnishes 1, 2, 4

Alternative names: Retouching varnish, Mattoleine, Mattoleïn, retouching dope, retouching medium, Matollene, Matolina, Matollein
Portuguese: verniz de retoque, Matolene
Spanish: barniz de retoque
French: vernis de retouche, vernis à retoucher, Matollene
German: Firnis, Mattoleïn
Italian: vernice per ritocco, Matolina

Family:	Natural resin varnish
Source:	See Dammar
Composition:	Varnishes are composed of a resin dissolved in a liquid that dries to form a hard glassy film. Most resin or "gum" varnishes consist of a natural, plant- or insect-derived substance dissolved in a solvent, called spirit varnish or solvent varnish. The solvent may be alcohol, turpentine, or petroleum based. Some resins are soluble in both alcohol and turpentine. Generally, petroleum solvents, i.e., mineral spirits or paint thinner, can substitute for turpentine. The resins include amber, dammar, copal, rosin, sandarac, elemi, benzoin, mastic, balsam, shellac, and many lacquers.
Uses & history:	Dammar varnish, made from dammar gum mixed with turpentine, was introduced as a picture varnish in 1826, commonly used in oil painting, both during the painting process and after the painting is finished Varnish recipes from the 19th century contained a natural resin, such as myrrh, rosin, mastic resin, or sandarac, dissolved in hot linseed oil. By the early 16th century, spirit varnishes are used. Spirit varnishes contained a natural resin dissolved in an evaporating solvent, such as ethyl alcohol or turpentine essence. By the 19th century, spirit varnishes containing mastic and dammar were commonly used for picture varnishes, while shellac varnishes were used for furniture finishes. By the mid-20th century, synthetic resin varnishes were used for many types of coatings. Damar varnish is a clear varnish used to prepare the photographic emulsion, in negatives, for retouching.
Properties:	Soft translucid varnish suitable to write on with pencil, protective layer.
Samples:	Varnish 1, prepared with 12 g Dammar resin + 75 cc (ml) Turpentine + 75 cc Benzine (Petroleum ether) + 2 cc Lavender essence (essential oil of lavender); Varnish 2, prepared with 15 g Dammar resin + 150 ml Turpentine; Varnish 4, Kodak retouching medium, photographic varnish, from Foto-Carvalho collection. Preparation: all varnishes were left to dry and collected with cotton swabs with trichloroethane, the same procedure used for the historical samples.
References:	[ix] [xii] [4] [5] [38]

Shellac varnish – Varnish 3

Alternative names:	Varnish Portuguese: verniz Spanish: barniz French: vernis German: Firnis Italian: vernice Russian: лак
Family:	Natural resin varnish
Source:	See Shellac
Composition:	Varnishes are composed of a resin dissolved in a liquid that dries to form a hard glassy film. Most resin or "gum" varnishes consist of a natural, plant- or insect-derived substance dissolved in a solvent, called spirit varnish or solvent varnish. The solvent may be

alcohol, turpentine, or petroleum based. Some resins are soluble in both alcohol and turpentine. Generally, petroleum solvents, i.e., mineral spirits or paint thinner, can substitute for turpentine. The resins include amber, dammar, copal, rosin, sandarac, elemi, benzoin, mastic, balsam, shellac, and many lacquers.

Uses & history: Varnish recipes from the 19th century contained a natural resin, such as myrrh, rosin, mastic resin, or sandarac, dissolved in hot linseed oil. By the early 16th century, spirit varnishes are used. Spirit varnishes contained a natural resin dissolved in an evaporating solvent, such as ethyl alcohol or turpentine essence. By the 19th century, spirit varnishes containing mastic and dammar were commonly used for picture varnishes, while shellac varnishes were used for furniture finishes. By the mid-20th century, synthetic resin varnishes were used for many types of coatings.
Thin solutions of white shellac dissolved in ethanol were used as a size for gesso and as an adhesive in gold tooling and blocking.
Shellac is a very widely used single-component resin varnish that is alcohol-soluble. It is not used for outdoor surfaces or where it will come into repeated contact with water.

Properties: It dries to form a hard glassy film.

Samples: Varnish 3 prepared with 15g Shellac resin + 150 ml Ethanol. Varnish left to dry and collected with cotton swabs with trichloroethane, the same procedure used for the historical samples.

References: [ix] [xii] [4] [38]

Oil varnish – Varnish 5

Family: Oil varnish

Source: See Linseed oil

Properties: Oil varnishes formed dark, strong, insoluble films.

Samples: Varnish 5, historical sample with expected composition Linseed oil + turpentine. Analyzed in ATR mode

References: [ix] [xii] [4] [38]

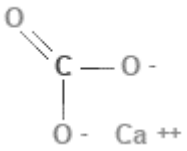
White Etz – $CaCO_3$

Alternative names: Calcium carbonate, crete white, chalk, marble, calcite, limestone, Iceland spar, dogtooth spar, dog-tooth spar, nailhead spar, satin spar, calcareous spar, calc spar, calcspar, calcium salt of carbonic acid, Pigment White 18, CI 7720, English white, Paris white, gilder's whiting, Champagne chalk, limestone, marble white
Portuguese: cré, calcite
Spanish: calcita, tiza
French: craie, calcite, blanc de crete
German: Kreide
Italian: calcare, calcite
Russian: мел

Formula: $CaCO_3$

Family: Carbonic salt

Source: Material unknown, from Foto-Carvalho Collection.
Identified as $CaCO_3$ by FTIR analysis
Naturally found minerals in sedimentary rocks, such as calcite, are widely distributed as Chalk, Limestone, and Marble. Significant deposits were formed from ancient sea beds and hard water deposits (e.g., stalactites). Ground calcium carbonate (CAS: 1317-65-3) results directly from the mining of limestone. The extraction process keeps the carbonate very close to its original state of purity and delivers a finely ground product either in dry or slurry form. Precipitated calcium carbonate (CAS: 471-34-1) is produced industrially by decomposing limestone to calcium oxide followed by subsequent recarbonization or as a by-product of the Solvay process (which is used to make sodium carbonate). Precipitated calcium carbonate is purer than ground calcium carbonate and has different handling properties.

Molecular structure: 

(source: Pubchem)

CAS Number: 471-34-1

Properties: Calcium carbonate appears as a white, odorless powder or colorless crystals. Practically insoluble in water.
Rhombohedral crystal system. Perfect cleavage in three directions. Fracture = conchoidal. High birefringence. Can doubly refract light. Aged calcite surfaces may fluoresce purple or blue in ultraviolet light, freshly cleaved surfaces are white to yellow. Reacts with acids to evolve carbon dioxide. Luster = vitreous. Streak = white. Lightfastness: very

Uses: White pigment, filler in the preparation of inks. An ingredient in steel, cement, and glass manufacture, antiacid, food-grade ingredient, and more. Limestone and marble are used for sculpture and construction.

Samples: White ETZ, powder, white pigment from the Foto-Carvalho collection. Samples prepared in KBr pellets.

References: [i] [v] [x] [xi] [12] [13]

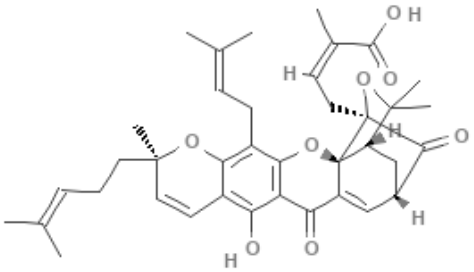
Black Etz – Black pigment

Source: Material unknown, from Foto-Carvalho Collection

Properties: Black powder with magnetic properties. It was identified as a mineral pigment in the family of clays or micas. However, no references were found with a similar spectrum, except for an almost identical spectrum in the Omnic software's database (from FT-IR spectroscopy instrument) for Mineralite Mica. It suggests a potassium aluminum silicate with iron oxide and possibly magnesium, closely related with the biotite, illite, or muscovite.
Initially thought to be Mars black for its magnetic properties, it could still be a mixture of Mars black pigment (iron oxide) and silicates added as fillers or a mineral black or black earth with magnetite.

Uses:	Pigment
Samples:	Black ETZ, powder, black pigment from the Foto-Carvalho collection. Samples prepared in KBr pellets.
References:	[i] [iii] [vi] [x] [xi] [14]

Gamboge

Alternative names:	Garcinia sp., Natural Yellow 24, camboge, cambogia, gum gutta, gutto gumbo, guti ambar, gambogium, rattan yellow, wisteria yellow, gummi-gutti, Siam gamboge, Ceylon gamboge, gokatu gamboge. Portuguese: goma-guta Spanish: gomaguta or gutagamba French: gomme-gutte German: Gummigutt Italian: gomma gutta, giallo Cambogia Russian: гуммигут Chinese: teng huang (pinyin), t'eng huang Japanese: to-o or gamboji, sometimes shio, kiyo
Family:	Xanthonoid, natural phenolic with a xanthone backbone
Source:	A yellow-orange gum-resin produced by several species of Garcinia tree found in India, Thailand, Cambodia, Vietnam, and Ceylon
Composition:	Gamboge is composed of a yellow resinous component (70-80%), more common the Gambogic acid, and a clear water-soluble gum (20%).
Molecular structure:	
CAS Number:	2752-65-0 (gambogic acid)
Properties:	The yellow resinous portion is soluble in ethanol. The colorless carbohydrate portion is soluble in water. It burns with an odor of resin. It turns red in dilute alkali solutions. The small amorphous particles are transparent in transmitted light. Lightfastness: very poor.
Uses & history:	Gamboge was used as a yellow pigment as early as the 8th century in Asia and Japan. It was regularly imported to Europe in the 17th century, but a few earlier deliveries may have occurred Gamboge is marketed in the form of dull, brownish-yellow cakes or lumps. When powdered, it has a rich golden color. Gamboge is used as a transparent colorant in glazes, varnishes, and watercolors. The carbohydrate gum acts as a natural binder. The yellow color fades when exposed to light or ozone. In some cases, it has recovered its color when placed in the dark.

Samples:	Gamboge raw sample in lumps from supplier Manuel Riesgo, Madrid. Preparation: ground powder from lumps in KBr pellet.
References:	[iii] [vii] [ix] [x] [xi] [15]

Bitumen

Alternative names:	Bitumen of Judea, or Syrian asphalt Portuguese: betume, betume da Judeia, betume judaico, bréu Spanish: bitumen, betún de Judea French: bitumen, bitume de Judée German: Bitumen, Naturasphalt, Erdpech, Bergteer genannt Italian: bitumen, bitume di Giudea Russian: асфальт
Family:	Petroleum derivate
Source:	A common name for the organic, or hydrocarbon, portion of Asphalt. Ancient Egyptians used it as an adhesive.
Composition:	A complex mixture of hydrocarbons, including naphthalenes, partially hydrogenated polycyclic aromatic compounds, high molecular weight phenols, and carboxylic acids, saturated hydrocarbons, Asphaltenes
Properties:	Bitumen is a dark brown or black solid to semisolid material. Combustible. It softens at slightly elevated temperatures. Ages poorly in dried oil films resulting in movement, disfigurement, and cracks. Light-sensitive material used by Nicéphore Niépce in the first photographic process using a camera.
Uses:	Bitumen is currently is used in hot-melt adhesives, coating, paints, sealants, roofing, and road coating. The name bitumen has been used as a synonym for Asphaltum, Tar, and Pitch and was also used as a commercial product name for a transparent, brown artist's pigment made from asphaltum.
Samples:	Bitumen from Titan. Preparation: drop measured in ATR.
References:	[iii] [ix] [x] [xi] [16] [17]

Carmine (Cochineal)

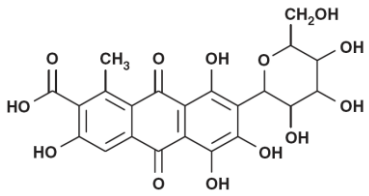
Alternative names:	Natural Red 4 (carminic acid), CI 75470, crimson lake, grana, purple lake, red lake, Florentine lake, Venice lake, Paris lake, Vienna lake, nochestli, Nupal's blood, globe lake, karmesin lake, Munich lake, metica, mestique, grana finial, grana silvestra, zacatilla (black cochineal), Dactylopius coccus, Coccus cacti, E120. Portuguese: carmim, cochinilha Spanish: carmín, cochinilla French: carmin, cochenille German: Karmin, Cochenille, Nopalschildlaus, Koschenille, Karmin Italian: carminio, cocciniglia Russian: кармин
Formula:	$C_{22}H_{20}O_{13}$ (Carminic acid)

Family: Anthraquinone dye

Source: A natural, bright red dye obtained from the body of the female insects *Dactylopius coccus* Costa (formerly *Coccus cacti*) that live on nopal cactus (*Cactus oputia* or *Cactus coccinilifera*) in Mexico, the Canary Islands, and in Central and South America. Cochineal was imported to Europe as early as 1540, where it quickly replaced kermes as the primary red dyestuff. The insects are collected from the cacti, then killed and dried in the sun or an oven. The dye is extracted from dried insects using water or alcohol.

Composition: It contains about 10% Carminic acid, 2% coccerin wax, and 10% fat.

Molecular structure:



Carminic acid

CAS Number: 1260-17-9 (carmini acid)

Properties: Cochineal produces a transparent lake pigment that has poor lightfastness and fades in strong sunlight. Acid-base indicator: a 1% alcohol solution is red when acidic and changes to violet above pH 6.
Lightfastness: very poor

Uses: The colorant was usually used as either a red solution or precipitated to make carmine, an aluminum or aluminum-tin lake.

Samples: Cochineal dye prepared by the ethanol method, from cochineal insects from supplier Productos conservacion. The solution was left to dry, and samples were prepared in KBr pellets.

References: [iii] [ix] [x] [xi] [18]

Alizarin

Alternative names: Alizarine, pigment red 83 (calcium lake), mordant red 11, CI 58000, permanent violet, permanent crimson, alizarin crimson, crimson madder, alizarin red, turkey red, 1,2-dihydroxyanthraquinone
IUPAC 1,2-dihydroxyanthracene-9,10-dione
Portuguese: alizarina sintética, garança, laca de garança
Spanish: alizarina sintética, lacca de rubia
French: rouge d'alizarine, laque de garance
German: Alizarin synthetisch, Krapplack
Italian: alizarina sintetica
Russian: ализарин

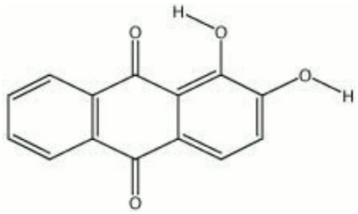
Formula: $C_{14}H_8O_4$

Family: Anthraquinone dye

Source: A synthetic form of alizarin was first made in 1868 by Carl Graebe and Carl Lieberman from *anthracene*, a coal tar product. Before that time, alizarin was obtained from the root of the madder plant, *Rubia tinctorum* L. To prepare alizarin

crimson pigment, alizarin is precipitated on a neutral base of alumina trihydrate producing a brilliant, transparent color that has fair to good permanency.

Molecular structure:



CAS Number: 72-48-0

Properties: The orthorhombic, orange-red crystals of alizarin appear brownish-yellow in powder form. The shade produced depends on the metal present: aluminum yields a red, iron, a dark violet, and chromium, a reddish-brown. Soluble in aromatic solvents, acetone, hot methanol, and ether. Partially soluble in ethanol and water. Alizarin does not fluoresce in ultraviolet light. It turns blue-purple in dilute alkaline solutions. Lightfastness: poor to very poor

Uses: Alizarin is mostly used for the derivatization of other dyes, but it is also known as a textile dye, a pigment, and an indicator. Alizarin will turn blue to purple in basic aqueous solutions and is sometimes used a pH indicator. Alizarin is also used in spot tests as a reagent for various metals. As a textile dye, the cloth (Cotton, Wool, or Silk) must be mordanted with a metal oxide.

Samples: Alizarin, red colorant powder from the supplier Panreac. Samples prepared in KBr pellets.

References: [iii] [v] [ix] [x] [xi] [19] [20] [21] [22]

Mars black

Alternative names: Magnetic black iron oxide, pigment black 11, mapico black
Portuguese: negro de Marte
Spanish: negro de Marte
French: noir de Mars
German: Marsschwarz
Italian: nero di marte

Formula: (Fe_3O_4)

Family: Iron oxides

Source: Synthetically prepared black iron oxide pigment that was developed in the early 20th century.

Properties: Mars black is a permanent pigment that has a warm brownish-black color. It is a dense, heavy powder, and unlike most naturally produced black iron oxide pigments, it is magnetic (the exception is ground magnetite). Mars black absorbs oil readily, and unlike lampblack, it is a good drier. Mars black can also be used with watercolors, and it does not effloresce when used in mortars and cements.

Uses: Pigment

Samples: White ETZ, powder, white pigment from the Foto-Carvalho collection. Samples prepared in KBr pellets.

References: [viii] [x] [xi] [23]

Red oxide

Alternative names: Red ochre, red earth, earth red, iron oxide red, red iron oxide, Indian red, brun rouge, ruddle, Spanish brown, Venetian red, English red, Spanish red, caput mortuum, Indian red, light red, burnt sienna, iron (III) oxide or ferric oxide. (artificial: Mars red)
IUPAC: oxo(oxoferriooxy)iron
Portuguese: ocre vermelho (sint. vermelho de Marte)
Spanish: ocre rojo,
French: l'ocre rouge
German: Roter Ocker
Italian: terre rosse, rubrica, terra rossa di Venezia, rosso di Venezia
Russian: красная охра

Formula: Fe_2O_3

Family: Iron oxides

Source: Any of several naturally occurring red earth pigments. Red ochres contain Hematite (red iron oxide) mixed with clay (containing silicates) and vary widely in hue. Ground finely from red earth or clay, red ochres are lightfast, unreactive pigments that have been used since ancient times. They can also be manufactured by calcining Yellow ochre (Goethite).

Composition: Iron (III) oxide or ferric oxide, hematite

CAS Number: 1309-37-1

Properties: Lightfast, permanent pigment

Uses: Pigment

Samples: Red oxide, red pigment powder from the supplier Agroquímicas dell Valles. Samples prepared in KBr pellets.

References: [viii] [x] [xi]

Dammar

Alternative names: Dammar, damar, dammer, dammar gum, Malay dammar, Mata Kuching, cat's eye, Penak, gum Batu, Kalulut, Siput, Daging, Saraya, Kepong, Bata gum, Singapore dammar, Batavia dammar, Padang, Dipterocarpaceae
Portuguese: goma damar
Spanish: goma damar
French: résine dammar
German: Dammar, Dammarharz
Italian: gomma dammar
Russian: Древесная смола
Chinese: dá mǎ

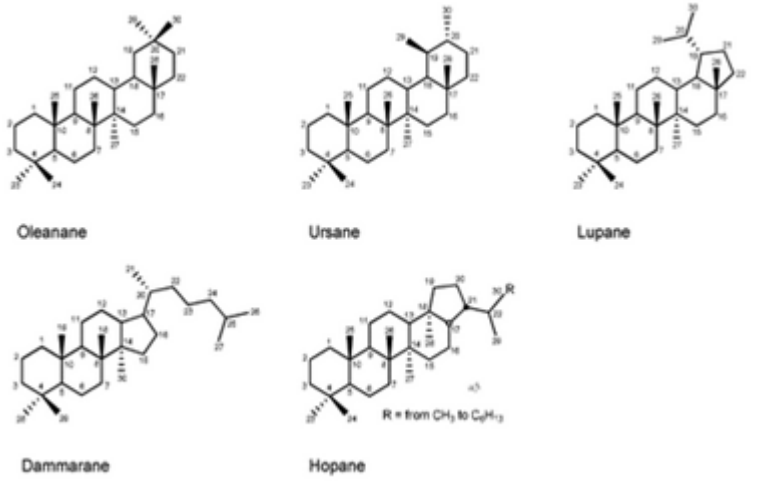
Formula: $C_{30}H_{48}$ (general formula)

Family: Triterpenoid resin

Source: Natural resin derived from *Dipterocarpaceae* trees growing in southeast Asia. The principal trees that supply dammar resin are of the genera *Shorea, Balanocarpus,* or *Hopea.*
Any of various resins obtained from various trees of the genera *Shorea*, *Agathis*, or *Hopea*, growing in the East Indies, New Guinea, and New Zealand. It is obtained by tapping trees or, more rarely, from fossilized specimens from the ground. The gum varies in color from clear to pale yellow, while the fossilized form is grey-brown. Dammar is used as a glazing or clouding agent in cooking, as incense, for caulking ships, and as varnish, especially as a picture varnish.

Composition: In fresh resins (unoxidized compounds): Dammaradienone, nor-b-Amyrone, Dammaradienol, nor-a-Amyrone, Dammarenolic acid, a-Amyrin, Oleanonic acid, Hydroxydammarenone, Oleanonic aldehyde, Dammarenediol, Ursonic acid, Ursonic aldehyde, Hydroxyhopanone.
Oxidation products: Hexakisnor-dammaran-3,20-dione, 20,24-Epoxy-25-hydroxy-3,4-seco-4(28)-dammaren-3-oic acid, 3,4-Seco-2-carboxy-25,26,27-trisnor-4(28)-dammareno-24,20-lactone, 20,24-Epoxy-25-hydroxy-dammaran-3-one, 20,24-Epoxy-25-hydroxy-dammaran-3-ol, 3-Oxo-25,26,27-trisnordammarano-24,20-lactone, 17-Hydroxy-11-oxo-nor-b-amyrone, 11-Oxo-oleanonic acid, 17-Hydroxy-11-oxo-nor-a-amyrone, 11-Oxo-ursonic acid, ocotillone type oxidation products.

Molecular structure:



CAS Number: 9000-16-2

Properties: Soluble in turpentine, oil, chloroform, and aromatic hydrocarbons. Slightly soluble in ethanol. Insoluble in water or mineral spirits.

Uses: Picture varnish, printing ink, mounting thin sections, alkyd baking enamels, paper, and textile coatings.

Samples: Damar resin sample in pearls from supplier Productos conservacion, Madrid. Preparation: ground powder from pearls in KBr pellet.

References: [iii] [v] [ix] [xii] [4] [5] [6] [7] [8] [10] [37]

Shellac

Alternative names: Laccifer lacca (also listed as Coccus lacca), Ficus religiosa, lac, lacca, shell lacca, shell-lacca, gum lac, bleached shellac, lemon flakes, orange flakes, garnet lac, refined shellac, kiri, black buttonlac, buttonlac, sticklac, stick-lac, seedlac, kusmi, katki, kusmi, shellack, Diatite, Smiths Patent American Composition
Portuguese: goma-laca
Spanish: goma laca
French: gomme laque, shellac
German: Schellack, Tafellack, Plattlack, Lacca in tabulis, Gummi Lacca, Gummilack
Italian: gommalacca
Russian: Шелла́к

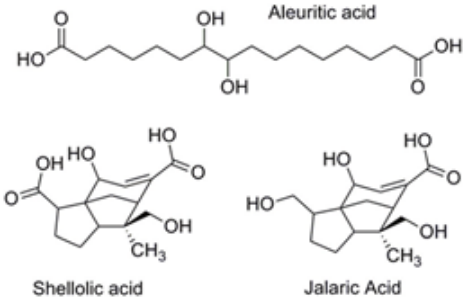
Formula: $C_{30}H_{48}$ (general formula)

Family: It is a natural bioadhesive polymer

Source: The source of shellac resin is a brittle or flaky secretion of the female lac insect, *Kerria lacca* or *Laccifer lacca*, from Tailand and India's forests and harvested from the trees' bark where she deposits it to provide a sticky hold on the trunk.

Composition: It varies in exact composition depending upon the source of the shellac and the season of collection. The aliphatic's primary component is aleuritic acid, whereas the main alicyclic component is shellolic acid.

Molecular structure:



CAS Number: 9000-59-3

Properties: The color of shellac ranges from a pale yellow to a deep red. Fresh shellac is soluble in ethanol, acetone. Shellac becomes insoluble with age. Insoluble in water, turpentine, or mineral spirit. Autofluoresces orange: shade depends on the initial color of shellac. Naturally thermoplastic.

Uses & history: Lac was used as early as about 1200 BCE in India. Shellac and Lac dye were imported to Europe in the 17th century. The resin-coated twigs, also called sticklac, undergo several processing steps to extract useful components. The raw lac is washed, heated, and drawn out into thin sheets. Once cooled, the shellac is broken into small flakes for sale as flake shellac.
Shellac is the basis of French polish, which has been the preferred finish for fine furniture for centuries. Specified "dewaxed" shellac has been processed to remove the shellac's waxy substances and can be used as a primer and sanding-sealer substrate for other finishes such as polyurethanes, alkyds, oils, and acrylics.
Dry shellac is available as refined flakes, "sticklac," "button lac," or "seedlac."
It is used as a coating material, natural plastic, and high gloss coating varnish. It is also used as a protective coating for plaster molds and casts. In the 19th century, shellac was filled with wood flour and used for molded composition products such as buttons, picture frames, daguerreotype and ambrotype cases, and gramophone

records. Black pigmented, mineral-filled shellac was used for 78 rpm phonograph records, mirror frames, brooches, and dressing table sets.

Samples: Shellac sample in flakes from supplier Productos conservacion, Madrid. Preparation: ground powder from flakes in KBr pellet.

References: [iii] [ix] [v] [ix] [4] [6] [9] [11]

Mastic

Alternative names: *Pistacia lentiscus*, mastich, mastica, gum mastic, Chios mastic, Indian mastic, Bombay mastic, khinjak, Turkish mastic, pistacia galls, lentisk
Portuguese: mástique, mastique, mastic, miski
Spanish: resina almáciga
French: mastic, lentisque, pistachier lentisque
German: Mastix
Italian: resina mastice
Russian: Мастика

Formula: $C_{30}H_{48}$ (general formula)

Family: Triterpenoid resin

Source: A pale, yellow natural resin produced by the evergreen mastic shrub, *Pistacia lentiscus*, from southern Europe and northern Africa.
Gum exudation of small evergreens native to the Mediterranean countries

Composition: Shares several compounds with dammar resin, although more varied and not as well known

CAS Number: 61789-92-2

Properties: Soluble in oil, turpentine, ethanol, diethyl ether, benzene, acetone, chloroform. Insoluble in water and ligroin. Soluble in both alcohol and turpentine

Uses and history: It is used for artists' paint and coating lacquer. Mastic varnish becomes yellow and brittle with age. Mastic was used in 16th and 17th-century recipes for oil-resin varnishes, in the 19th century, mastic was a popular clear, glossy spirit varnish for oil paintings and was also used as an additive in oil medium. By the 20th century, its use was superseded by dammar.
It is used as a picture varnish, additive in oil media, printing ink, chewing gum

Samples: Mastic sample in pearls from supplier Productos conservacion, Madrid. Preparation: ground powder from pearls in KBr pellet.

References: [iii] [v] [ix] [4] [5] [6] [9] [10]

Rosin

Alternative names: Colophony, Greek pitch, wood rosin, sound glue, balsam, gum thus, pine resin, yellow resin, abietic anhydride, violin rosin, colophonium, gum rosin
Portuguese: Breu, colofónia
Spanish: colofonia
French: colophane

German: Kolophonium
Italian: colofonia
Russian: Канифоль

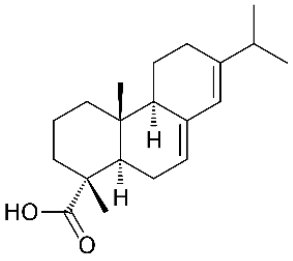
Formula: $C_{20}H_{32}$ (general formula)

Family: Diterpenoid resin

Source: Resin from a naturally occurring organic compound, turpentine gum, secreted from pine trees, such as Longleaf pine *Pinus palustris*, Cuban pine *Pinus caribaea*, Loblolly pine *Pinus taeda*, cluster pine *Pinus pinaster*, or Scotch pine *Pinus sylvestris* A large portion of turpentine gum is a resinous residue, rosin, what is left from the distillation of turpentine essence, which makes approximately 20% of the gum.

Composition: Primarily composed of abietic acid (about 80%),

Molecular structure:



abietic acid

CAS Number: 8050-09-7 (abietic acid)

Properties: Rosin is a brittle, clear resin with a color ranging from yellow or reddish-brown. It becomes sticky when warm and has a faint pine-like odor. It reacts in hot alkaline solutions to form rosin soaps. Rosin weathers poorly, becoming oxidized and brittle with age. It also has poor moisture resistance. Soluble in ethanol, acetone, turpentine, acetic acid, carbon disulfide. Insoluble in water.

Uses: It is used as an ingredient in paint, varnish, ink, adhesive, sealing wax, soldering flux, and linoleum. Because it increases sliding friction, it is commonly used for coating bows of some stringed instruments and as a slip preventative on the floors of stages and shoes of dancers. The inexpensive resin is also used for sizing paper.

Samples: Mastic resin sample in pearls from supplier Productos conservacion, Madrid. Preparation: ground powder from pearls in KBr pellet.

References: [iii] [v] [ix] [4] [5] [6] [9]

Copal

Alternative names: Zanzibar, Demerara, Benguela, Sierra Leone, Mozambique, red Angola, white Angola, Congo, kauri, Manila, Pontianak, Madagascar, Accra, Loango, Gaboon, Borneo, Singapore, South American, Cochin, Brazilian, Bursera, Benin, swamp gum, anime, cowrie
Portuguese: copal
Spanish: copal
French: copal
German: Copal, Kopal
Italian: copale
Russian: Копа́л

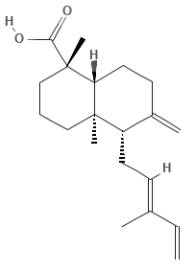
Formula: $C_{20}H_{32}$ (general formula)

Family: Diterpenoid resin

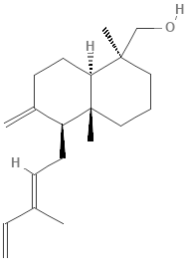
Source: A large variety of hard, natural resins obtained directly from trees such as *Trachylobium* species (Africa), *Hymenaea courbaril* (South America) and *Agathis australis* (New Zealand). Copals are also obtained as fossil resins from Zaire and Zanzibar. Classified as copal dur, the hardest copal resin is Zanzibar. Sierra Leone, Kauri, and Congo are of medium hardness (le demi-dur). Manila and Borneo are soft copals (le tendre). The oldest, most fossilized, resins are the hardest.

Composition: Copals resins contain communic acids, communol resene, and volatile oil.

Molecular structure:



communic acid



communol

Properties: It is a fossil resin, very hard and almost completely insoluble. range in color from colorless to a bright yellow-brown. Copal resins may be purchased as large lumps or small tears. After melting, copals are soluble in oil and turpentine. Soft copals are partially soluble in ethanol, chloroform, glacial acetic acid. Most copals fluoresce white in short-wave UV light.

Uses & history: They were used as oil varnishes for coaches in the 18th and 19th centuries, but they darken and become insoluble with age. They also have been used in commercial varnishes, linoleum, oilcloth, and as an amber substitute.

Samples: Copal sample in tears from supplier Productos conservacion, Madrid. Preparation: ground powder from tears in KBr pellet.

References: [iii] [v] [ix] [5] [6] [9]

Gum Arabic

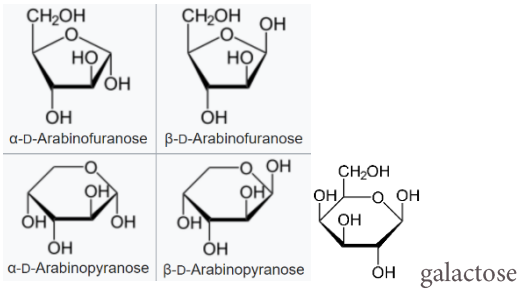
Alternative names: Gum Arabic, gum Sudani, acacia gum, Arabic gum, gum acacia, acacia, Senegal gum, Indian gum, kordofan, picked turkey, white sennar, ghezineh gum, gomme blonde, gomme blanche, gum acacia, East India gum, kami, wattle gum. E-414
Portuguese: goma-arábica
Spanish: goma arábiga
French: gomme d'acacia, gomme Arabique
German: Gummi arabicum, Gummiarabikum, Arabisches Gummi
Italian: gomma di acacia, gomma Arabica
Russian: Гуммиара́бик

Family: Gum Arabic is a complex mixture of glycoproteins and polysaccharides

Source: Gum Arabic is the amorphous exudate from the stem of several species of Acacia trees, especially *Acacia senegal* and *Acacia arabica*, found in tropical and subtropical areas of the world. Most gum Arabic coming from the sub-Sahara region in Africa.

Composition: Gum Arabic contains several polysaccharides ($C_x(H_2O)_y$), predominantly arabinose and galactose, also rhamnose and glucuronic acid.

Molecular structure:



(source: Wikimedia commons)

CAS Number: 9000-01-5

Properties: Gum Arabic is completely soluble in hot and cold water, yielding a viscous solution. However, heating a gum Arabic solution to the boiling point will cause it to darken and change its adhesion properties. Aqueous solutions of gum Arabic will precipitate or gel with the addition of ferric salts, borax, alcohol, or sodium silicate.

Uses: Gum Arabic is used in watercolor paints, inks, lithographs, and textile sizing.

Samples: Gum sample in pearls from supplier Productos conservacion, Madrid. Preparation: ground powder from pearls in KBr pellet.

References: [iii] [v] [ix] [9] [24]

Sandarac

Alternative names: Sandarach, gum sandarac, sandarach, sandarac tree *Tetraclinis articulata*, alerce tree *Callitris quadrivalvi*), gum juniper, Berenice, Mogador, white gum, Cyprus pine, Australian pine gum *Callitris reessii*, vernice liquida
Portuguese: sandarac, sandaráca
Spanish: sandaráca
French: sandaraque
German: Sandarak, Sandarach
Italian: sandracca
Russian: Сандарак, Сандарака

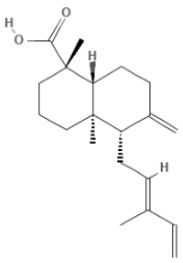
Formula: $C_{20}H_{32}$ (general formula)

Family: Diterpenoid resin

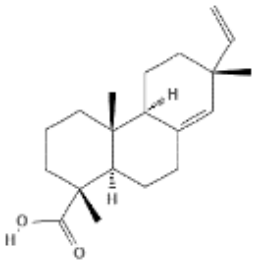
Source: Natural resin from the alerce tree *Callitris quadrivalvis* that is native to Australia and from the sandarac tree *Tetraclinis articulata* that native to northern Africa

Composition: Sandarac is composed primarily of polycommunic acid (~70%) with some Sandaracopimaric acid and small amounts of phenols and labdanoid compounds.

Molecular structure:



communic acid



sandaracopimaric acid

Properties: Pale yellow resin. Sandarac tears are hard and brittle with a white powdery surface due to oxidation. It forms a clear, hard film that becomes darker and redder with age. Soluble in ethanol, ether, acetone, amyl alcohol, and hot alkali. Insoluble in water, mineral spirits, and turpentine.

Uses: Varnishes

Samples: Sandarac sample in tears from supplier Productos conservacion, Madrid. Preparation: ground powder from tears in KBr pellet.

References: [ii] [iii] [v] [ix] [4] [5] [6] [9]

Starch

Alternative names: Fecula, amylum
Portuguese: amido
Spanish: almidón
French: amidon
German: Stärke
Italian: amido
Russian: крахмал

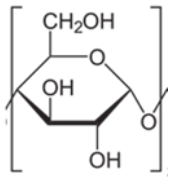
Formula: $(C_6H_{10}O_5)_n$ / $C_{12}H_{25}NO_{11}$

Family: Polymeric carbohydrate, glucose units joined by glycosidic bonds.

Source: Starch is primarily obtained from rice, wheat, corn, potatoes, cassava (tapioca), sago, and arrowroot.

Composition: A mixture of the soluble straight-chain amylose molecules and the insoluble, branched-chain amylopectin molecules

Molecular structure:



amylose
(source: Wikimedia Commons)

CAS Number: 9005-25-8

Properties: White powder

Uses: Binder, glue, priming canvas

Samples: Starch, powder from the supplier Quimicen. Samples prepared in KBr pellets.

References: [iii] [v] [ix] [25]

Cotton

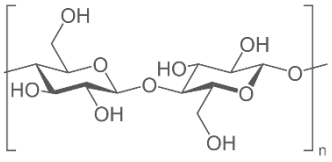
Alternative names: White gold, qutun, kutun, Gossypium (genus)
Portuguese: algodão
Spanish: algodón
French: coton
German: Baumwollfaser, Baumwolle
Italian: cotone
Russian: хлопок

Family: Polysaccharide

Source: Fibers from the seeds' protective case, of the cotton plant, genus *Gossypium*.

Composition: Mostly cellulose

Molecular structure:



cellulose

(source: Wikimedia Commons)

Properties: As fibers, it is naturally absorbent, insulator and hydrophilic.

Uses: It is used to produce textile and paper products. It is the base for celluloid and several adhesives and binders. It is used as purified fibers, cotton wool, in medicine, and cosmetics, etc.

Samples: Laboratory grade cotton. Fibers analyzed in ATR.

References: [iii] [v] [ix] [26]

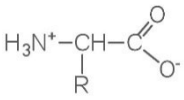
Gelatin

Alternative names: Gelatine, glue, Gelfoam, Puragel, hydrolyzed collagen, collagen hydrolysate, gelatine hydrolysate, hydrolyzed gelatine
Portuguese: gelatina
Spanish: gelatina
French: gélatine
German: Gelatine
Italian: gelatina animale
Russian: Желати́н
Chinese: Míngjiāo
Japanese: Zerachin

Family: Protein

Source: It is a mixture of proteins prepared by hydrolyzing, collagen obtained from skin, ligaments, and tendons via boiling.

Composition: Gelatin is composed of a mixture of peptides and proteins, with amino acids in the following proportions: glycine (25.5%), proline (18.0%), hydroxyproline (14.1%), glutamic acid (11.4%), alanine (8.7%) along with small amounts of arginine, leucine, and aspartic acid.

Molecular structure:  general structure, with many variations, there are numerous naturally occurring amino acids (20 in the genetic code and common in proteins)

CAS Number: 9000-70-8

Properties: It is translucent, colorless, flavorless food ingredient commonly derived from collagen taken from animal body parts. It is brittle when dry and gummy when moist.

Uses: It is commonly used as a gelling agent in food, beverages, medications, drug and vitamin capsules, photographic films and papers, and cosmetics. And the main component of many photographic emulsions.

Samples: Gelatin sample in powder from supplier Difco. Preparation: sample in KBr pellet.

References: [ii] [iii] [v] [ix] [27]

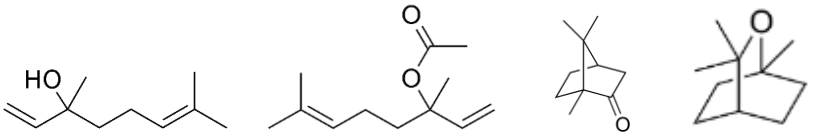
Lavender essence

Alternative names: Essential oil, vegetable oil, essence, Lavandula angustifolia, Lavandula latifolia, lavender oil, extract of lavender, lavender extract.
Portuguese: óleo essencial de alfazema, de lavanda
Spanish: aceite esencial de lavanda, aceite de espliego, aceite de lavanda
French: huile essentielle de lavande
German: Lavendelöl
Italian: olio essenziale di lavanda
Russian: Лава́ндовое ма́сло

Family: Terpene oil

Source: It is an Essential oil extracted from the small purple flowers of Lavender plants of the genus *Lavandula*, such as *Lavandula angustifolia*.

Composition: Several terpenes and ketones, most representative, include linalool, linalyl acetate, eucalyptol, camphor.

Molecular structure: 

Linalool Linalyl acetate Eucalyptol Camphor
(source: Wikimedia Commons)

CAS Number: 84776-65-8

Properties: Lavender oil is poisonous. A colorless to yellowish aromatic essential oil. Soluble in ethanol, carbon disulfide, carbon tetrachloride, chloroform, ligroin, and fatty oils. Insoluble in water.

Uses: Lavender oil is used in perfumes and general cosmetics. It has also been used for fumigating and is placed in sachets in closets as a moth repellent. It is a powerful solvent and can make oil paints and varnishes sticky. It was used as a solvent in oil painting. It is an alternative to distilled turpentine, and a mixture of both is found in recipes.

Samples: Lavender essence sample from supplier Manuel Riesgo, Madrid. Preparation: drop measured in ATR.

References: [iii] [28] [29]

Linseed Oil

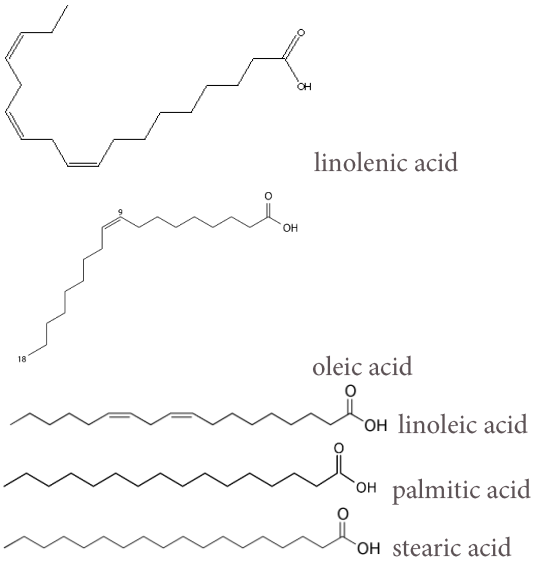
Alternative names: Linum usitatissimum, flaxseed oil, flax seed oil, linum oil
Portuguese: óleo de linhaça
Spanish: aceite de lino, aceite de linaza
French: huile de lin, huile de graines de lin
German: Leinöl
Italian: olio di lino
Russian: Льняно́е ма́сло

Family: Triglyceride

Source: It is obtained from the seeds of the common flax *Linum usitatissimum* plant.

Composition: Linseed oil contains the following fatty acids: linolenic (48-60%), oleic (14-24%), linoleic (14-19%), palmitic (6-7%), and stearic (3-6%)

Molecular structure:



(source: Wikimedia Commons)

CAS Number: 8001-26-1

Properties: Yellow-gold color oil. As a liquid, it is soluble in ether, chloroform, carbon disulfide, ligroin, and turpentine. When dry, it is insoluble in most solvents.

Uses: A drying oil used in artist paints, as varnish, production of synthetic resins, linoleum, or soaps.

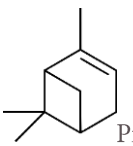
Samples: Bleached Linseed Oil from Talens. Preparation: drop measured in ATR.

References: [iii] [v] [ix] [4] [5] [9] [30] [35]

Petroleum ether

Alternative names:	Light ligroin, light petroleum, pether, benzine (light petroleum distillate), benzoline, BP 2, BP 2 (solvent), canadol, ligroin, ligroina, ligroine, mineral spirits, naphtha, painters' naphtha, petroleum benzine, petroleum spirit, refined solvent naphtha, Skellysolve F, Skellysolve G, V.M.&P. naphtha, varnish makers' and painters' naphtha. Portuguese: éter de petróleo, benzina Spanish: éter de petróleo French: éther de pétrole, gasoline, ligroïne German: Petrolether Italian: etere di petrolio, ligroina, petroletere Russian: Петролейный эфир
Family:	Mostly, aliphatic hydrocarbons of low molecular weight
Source:	Petroleum fraction. Although it is called "ether," it is not classified as an ether, the term probably refers to its high volatility.
CAS Number:	8032-32-4
Properties:	It is a clear, colorless liquid, extremely volatile, very low flash point, and a fire hazard.
Uses:	Solvent
Samples:	Petroleum ether from Panreac. Preparation: drop measured in ATR.
References:	[iii]

Rectified turpentine spirits

Alternative names:	Spirits of turpentine, gum spirits, wood turpentine, gum turpentine, turpentine, oil of turpentine, turps Portuguese: essência de terebentina, essência de terebintina Spanish: esencia de trementina rectificada French: essence de terebenthine rectifiee German: Rektifiziertes Terpentinöl Italian: essenza di trementina, spirito di trementina Russian: Скипида́р
Family:	Terpenes, general formula $(C_5H_8)_n$
Source:	It is a distillate from a naturally occurring organic compound, turpentine gum, secreted from pine trees, such as Longleaf pine *Pinus palustris*, Cuban pine *Pinus caribaea*, Loblolly pine *Pinus taeda*, cluster pine *Pinus pinaster*, or Scotch pine *Pinus sylvestris* A large portion of turpentine gum is a resinous residue, rosin, what is left from the distillation of turpentine essence, which makes approximately 20% of the gum.
Composition:	It contains pinene, $C_{10}H_{16}$, and other terpenes. terpenes, mainly the monoterpenes alpha-pinene and beta-pinene with lesser amounts of carene, camphene, dipentene, and terpinolene
Molecular structure:	 Pinene, a major component of turpentine (Source: Wikimedia Commons)

CAS Number: 8006-64-2

Properties: It is a clear liquid with a strong characteristic odor. It has fungicide action in paints. Not miscible with water. Flammable and harmful.

Uses: It is an organic solvent for paints and varnishes. It mixes readily with the various substances, and it evaporates quickly, causing the paint or varnish to dry. It is also used in making such things as sealing wax and shoe polish. Very pure grades of turpentine, the oleoresin, are used medicinally.

Samples: Rectified turpentine sample from Lefranc Bourgeois. Preparation: drop measured in ATR. This is a mixture of compounds, and no research was found using FTIR to characterize them, which precluded the assignment of bands. The region 3100-2500 cm^{-1} has a quite characteristic structure and can be used to identify the presence of turpentine essence in unknown samples.

References: [iii] [v]

Ethanol

Alternative names: Ethyl alcohol, alcohol, grain alcohol, absolute alcohol, EtOH, anhydrous alcohol, dehydrated alcohol, ethyl hydrate, ethyl hydroxide, cologne spirits, colonial spirits, rectified spirits, spirits of wine, fermentation alcohol, grain alcohol, drinking alcohol, spirits, alcohol. IUPAC: ethanol
Portuguese: etanol, álcool etílico, álcool
Spanish: etanol, alcohol etílico
French: éthanol, alcool éthylique, alcool
German: Ethanol, Ethylalkohol, Äthanol, Äthylalkohol
Italian: etanolo, alcol etilico
Russian: Этано́л

Formula: C_2H_5OH, C_2H_6O

Family: Alcohols, ethanes

Source: Naturally produced by fermentation of sugars and yeast, or artificially.

Molecular structure: 

CAS Number: 64-17-5

Properties: It is a colorless, volatile, highly flammable, water-miscible liquid, which is the intoxicating principle of fermented and distilled liquors.

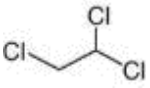
Uses: Organic solvent, alcoholic beverages.

Samples: Ethanol sample from Panreac. Preparation: drop measured in ATR.

References: [ii] [ix] [31]

1,1,2 Trichloroethane (Tce)

Alternative names: 79-00-5, Vinyltrichloride, Ethane, 1,1,2-trichloro-, beta-Trichloroethane, Vinyl trichloride, Ethane trichloride. IUPAC: 1,1,2-trichloroethane

	(1,1,1 Trichloroethane, 1,1,1-TCA, methyl chloroform, chlorothene, Solvent 111, R-140a, Genklene)
Formula:	TCE - $C_2H_3Cl_3$ or $CHCl_2CH_2Cl$ (TCA - $C_2H_3Cl_3$ or CH_3CCl_3)
Family:	Chloroethanes, organochloride solvent
Source:	Artificial
Molecular structure:	
CAS Number:	79-00-5
Properties:	1,1,2 Trichloroethane is a colorless liquid. Insoluble in water and slightly denser than water. With characteristic sweet odor, like chloroform. Irritant and health hazard. Possibly human carcinogen.
Uses:	Solvent for fats, oils, waxes, resins, and polymers. Chemical intermediate.
Samples:	1,1,2 Trichloroethane sample from Acrös. Preparation: drop measured in ATR
References:	[ii] [32]

FT-IR spectra collection

Interpretation key:

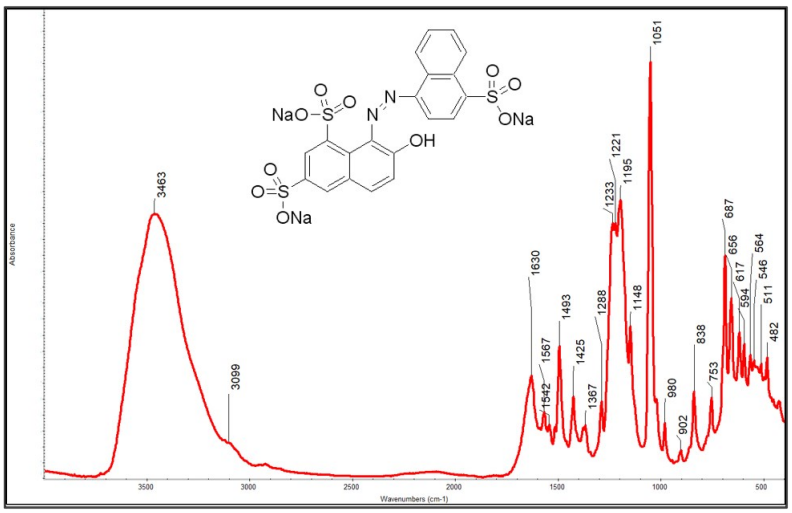
sh – shoulder; ↑ – strong; w – wide; sp – spurious bands;

IR vibration modes:

ν stretching; δ bending; s symmetric; as asymmetric; γ rocking; ω wagging; τ twisting.

Agfa

Agfa Neu-Coccin



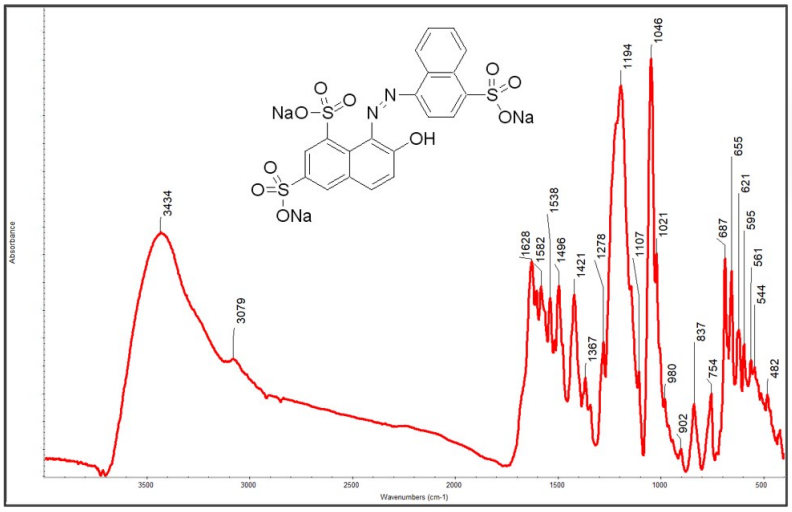


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Neu-coccin Agfa (KBr pellet, after drying)	$3463sp_{water}$	$1630sp_{water}$; 1567; 1542; 1493; 1425; 1367	1288; 1233; 1221; 1195; 1051; 980; 902; 838; 753; 687; 656; 617; 594; 564; 546; 511; 482

Bands (cm^{-1})	Assignment
3463; 1630	~3400 νO-H; ~1640 δO-H
3099	ν C-H aromatic
1567; 1542	1600-1500 ν -N=N-
1493↑	1620-1505 ν C=C aromatic
1425	1465-1380 ν Aromatic azo
1367	1380-1350 ν_s S=O (SO_3-H)
1288; 1233↑; 1221; 1195↑; 1051↑	1304-1043 ν_s C-S (SO_3-H)
980; 902; 838; 753; 687↑; 656↑; 617; 594; 564; 546; 511; 482	Various ring deformation vibrations

Globo

Globo rosa food colorant E124



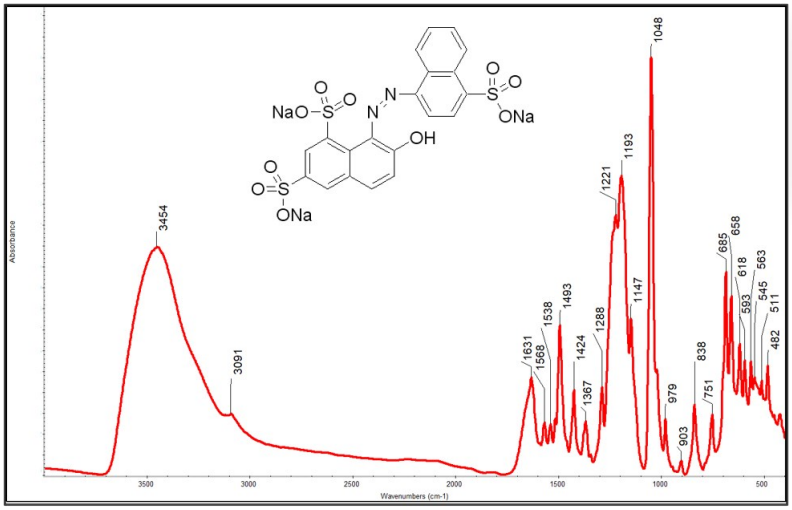


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
E124 Globo (KBr pellet, after drying)	$3434sp_{water}$	$1628sp_{water}$; 1582; 1538; 1496; 1421; 1367	1278; 1194; 1107; 1046; 1021; 980; 902; 837; 754; 687; 655; 621; 595; 561; 544; 482

Bands (cm^{-1})	Assignment
3434; 1628	~3400 νO-H; ~1640 δO-H
3079	ν C-H aromatic
1582; 1538	1600-1500 ν -N=N-
1496↑	1620-1505 ν C=C aromatic
1421↑	1465-1380 ν Aromatic azo
1367	1380-1350 ν_s S=O (SO_3-H)
1278; 1194↑; 1107; 1046; 1021	1304-1043 ν_{as} S=O (SO_3-H)
980; 902; 837; 754; 687; 655; 621; 595; 561; 544; 482	Various ring deformation vibrations

Riesgo

Manuel Riesgo red food colorant E124



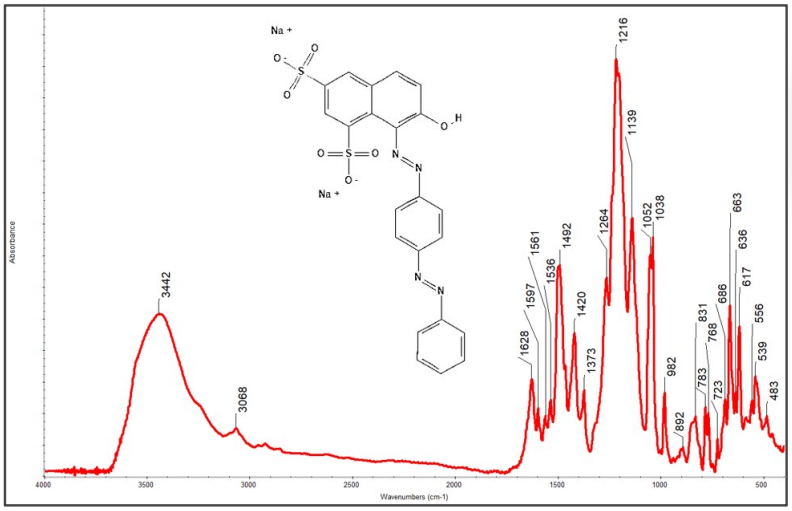


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
E124 Manuel Riesgo (KBr pellet)	$3454sp_{water}$; 3091	$1631sp_{water}$; 1568; 1538; 1493; 1424; 1367	1288; 1221; 1193; 1147; 1048; 979; 903; 838; 751; 685; 658; 618; 593; 563; 545; 511; 482

Bands (cm^{-1})	Assignment
3454; 1631	~3400 νO-H; ~1640 δO-H
3091	ν C-H aromatic
1568; 1538	1600-1500 ν -N=N-
1493↑	1620-1505 ν C=C aromatic
1424	1465-1380 ν Aromatic azo
1367	1380-1350 ν_s S=O (SO_3-H)
1288; 1221↑; 1193↑; 1147; 1048↑	1304-1043 ν_{as} S=O (SO_3-H)
979; 903; 838; 751; 685↑; 658↑; 618; 593; 563; 545; 511; 482	Various ring deformation vibrations

Crocein

Kodak Crocein scarlet



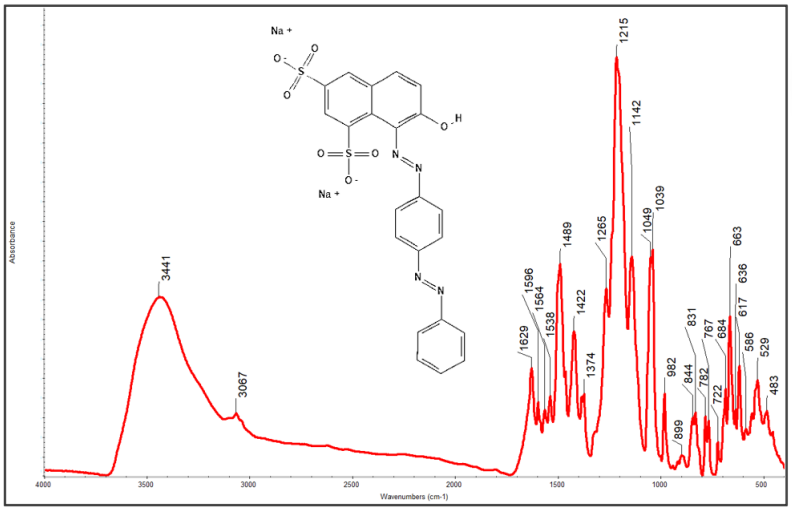


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Crocein scarlet Kodak (KBr Pellet)	3442; 3068	1628; 1597; 1561; 1536; 1492; 1465; 1420; 1373	1264; 1216; 1139; 1052; 1038; 982; 892; 831; 783; 768; 723; 686; 663; 636; 617; 556; 539; 483

Bands (cm^{-1})	Assignment
3442	3500-3300 ν O-H
3068	ν C-H aromatic
1628; 1597; 1561; 1536	1600-1500 ν -N=N-
1492↑	1620-1505 ν C=C aromatic
1465; 1420	1465-1380 ν Aromatic azo
1373	1380-1350 ν_s S=O (SO_3-H)
1264; 1216↑; 1139↑; 1052	1304-1043 ν_{as} S=O (SO_3-H)
1038↑	ν_s S-O (SO_3-H)
663↑; 617↑; 556; 539; 483	Various ring deformation vibrations

RedETZ

Foto-Carvalho red dye



Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Red Foto-Carvalho (ETZ) (KBr Pellet)	3441; 3067	1629; 1596; 1564; 1538; 1489; 1422; 1374	1265; 1215; 1142; 1049; 1039; 982; 899; 844; 831; 782; 767; 722; 684; 663; 636; 617; 586; 529; 483



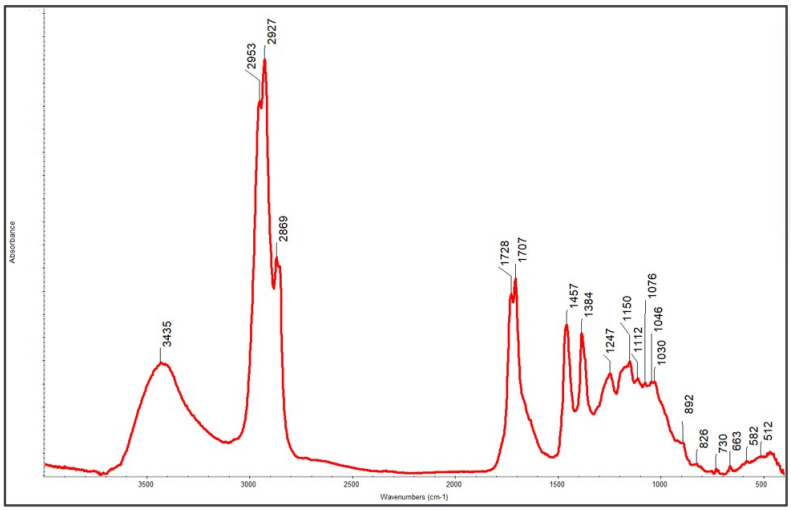
Bands (cm^{-1})	Assignment
3441	3500-3300 ν O-H
3067	ν C-H aromatic
1629; 1596; 1564; 1538	1600-1500 ν -N=N-
1489↑	1620-1505 ν C=C aromatic
1422↑	1465-1380 ν Aromatic azo
1374	1380-1350 ν_s S=O (SO_3-H)
1265; 1215↑; 1142; 1049↑	1304-1043 ν_{as} S=O (SO_3-H)
1039↑	ν_s S-O (SO_3-H)
663↑; 617; 586↑; 529; 483	Various ring deformation vibrations

Summary comparison of FT-IR bands found in new coccine and crocein scarlet samples

	Agfa Neu-Coccin	*Globo E 124*	*Manuel Riesgo E124*	*ETZ Rojo*	*Kodak Crocein scarlet*
3500–2650 cm^{-1}	3463	3434	3454	3419	3442
	3099	3079	3091	3067	3068
1750–1300 cm^{-1}	1630	1628	1631	1629	1628
		1582		1596	1597
	1567		1568	1564	1561
	1542	1538	1538	1538	1536
	1493	1496	1493	1489	1492
					1465
	1425	1421	1424	1422	1420
	1367	1367	1367	1374	1373
1300–580 cm^{-1} Fingerprint region	1288	1278	1288		
				1266	1264
	1233				
	1221		1221	1215	1216
	1195	1194	1193		
			1147	1142	1139
	1051	1046	1048	1049	1052
		1021		1039	1038
	980	980	979	982	982
	902	902	903	899	892
				844	
	838	837	838	831	831
				782	783
				767	768
	753	754	751		
				722	723
	687	687	685	684	686
	656	655	658	663	663
	617	621	618	617	617
	594	595	593	586	
	564	561	563		556
	546	544	545		539
	511		511	529	
	482	482	482	483	483

Varnish 1

Dammar resin + Lavender + Turpentine + Petroleum ether



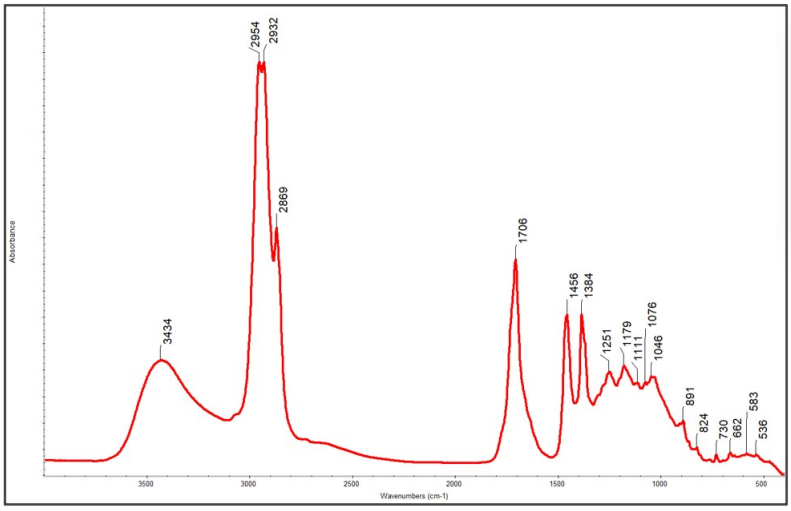


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Varnish 1	3435; 2953; 2927↑; 2869	1728; 1707↑; 1457↑; 1384↑	1247; 1150; 1112; 1076; 1046; 1030; 892; 826; 730; 663; 582; 512

Bands (cm^{-1})	Assignment
3435	ν(O-H)
2953; 2927	$\nu_{as}(CH_3)$ $\nu_{as}(CH_2)$
2869	$\nu_s(CH_3)$
1728; 1707	ν(C=O)
1457	$\delta_{as}(CH_2)$, $\delta_{as}(CH_3)$
1384	$\delta_s(CH_3)$
1247	ν(C-C), ω,τ (C-H), ν(C-O-O)
1150	ω,τ (C-H), ν(C-O-O)
1112	δ(C-H)
1076; 1046; 1030	ν(C-O), ν(C-C)

Varnish 2

Dammar resin + Turpentine



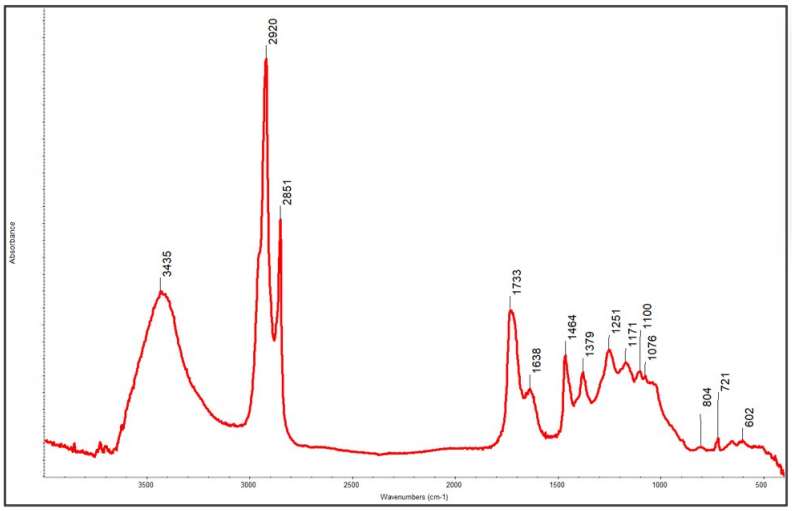


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Varnish 2	3434, 2954, 2932↑, 2869	1706↑, 1456↑, 1384↑	1251, 1179, 1111, 1076, 1046, 891, 730, 662, 583, 536

Bands (cm^{-1})	Assignment
3434	ν(O-H)
2954; 2932	$\nu_{as}(CH_3)$ $\nu_{as}(CH_2)$
2869	$\nu_s(CH_3)$
1706	ν(C=O)
1456	$\delta_a(CH_2)$, $\delta_{as}(CH_3)$
1384	$\delta_s(CH_3)$
1251	ν(C-C), ω,τ (C-H), ν(C-O-O)
1179	ω,τ (C-H), ν(C-O-O)
1111	δ(C-H)
1076; 1046	ν(C-O), ν(C-C)

Varnish 3

Shellac + Ethanol



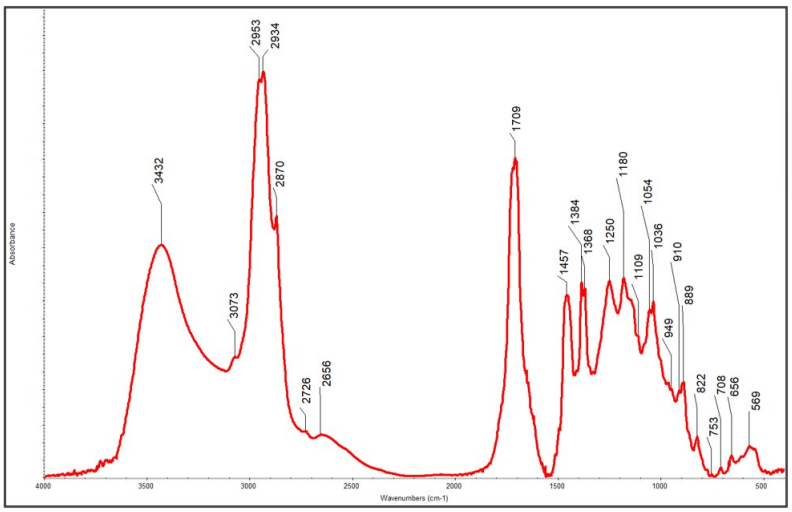


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Varnish 3	3435sp_{water}; 2920↑; 2851	1733↑; 1638sp_{water}; 1464↑; 1379↑	1251; 1171; 1100; 1076; 804; 721*; 602

Bands (cm^{-1})	Assignment
3435	ν(O-H)
2920	$\nu_{as}(CH_2)$
2851	$\nu_{s}(CH_3)$
1733	ν(C=O)
1638	ν(C=C)
1464	$\delta_{as}(CH_2)$
1379	$\delta_{s}(CH_3)$
1251	ν(C-C), ω,τ (C-H), ν(C-O-O)
1171	ω,τ (C-H), ν(C-O-O)
1076	ν(C-O), ν(C-C)
721	$\gamma(CH_2)$ alkanes-shellac wax

Kodak (Varnish 4)

Kodak Retouching Medium



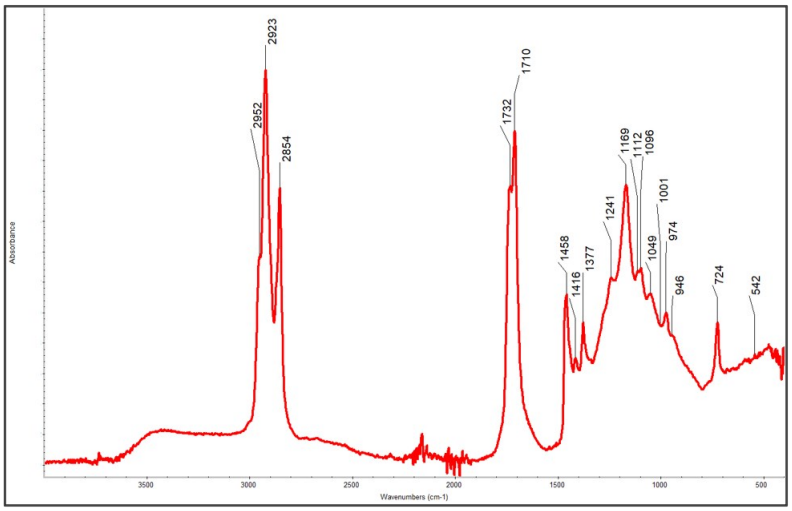


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Retouching medium Kodak (KBr pellet, after drying)	3432; 3073; 2953; 2934; 2870; 2726; 2656	1709; 1457; 1384; 1368	1250; 1180; 1109; 1054; 1036; 949; 910; 822; 753; 708; 658; 569

Bands (cm^{-1})	Assignment
3423	ν(O-H)
3073	ν(C=CH) olefinic
2953↑; 2934↑	$\nu_{as}(CH_3)$ $\nu_{as}(CH_2)$
2870	$\nu_{s}(CH_3)$
1709↑	ν(C=O)
1457↑	$\delta_{a}(CH_2)$, $\delta_{as}(CH_3)$
1384↑; 1368	$\delta_{s}(CH_3)$
1250↑	ν(C-C), ω,τ (C-H), ν(C-O-O)
1180↑	ω,τ (C-H), ν(C-O-O)
1109	δ(C-H)
1054; 1036↑	ν(C-O), ν(C-C)

Varnish 5

Linseed oil + Turpentine (expected)



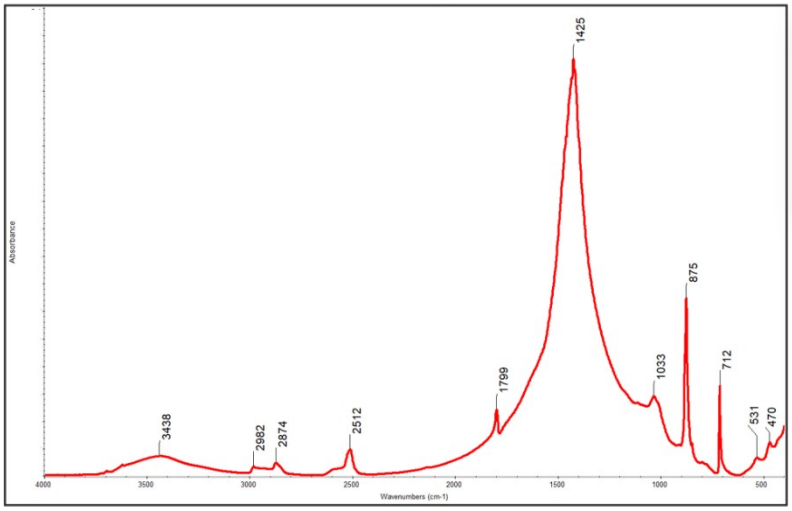


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Varnish 5	2952; 2923↑; 2854↑	1732; 1710↑; 1458; 1416; 1377↑	1241; 1169↑; 1112; 1096; 1049; 101; 974; 946; 724↑; 542

Bands (cm^{-1})	Assignment
2952 sh	ν_{as} (C-H)CH_3
2923	ν_{as} (C-H)CH_3
2854	ν_s (C-H)CH_2
1732	ν (C=O) ester
1458	δ_{as} (CH_3), δ(CH_2)
1416	δ_s (CH_2)-CH_2-CO-O-
1377	δ_s (CH_3)
1241	ν_{as} (C-O) in ester
1169	ν_{as} (C-O) in ester
1112	ν_{as} (O-CH_2-C)
724	γ -(CH_2)- + ω (C-H)= CH

WhiteETZ

Foto-Carvalho white colorant – Identified as $CaCO_3$





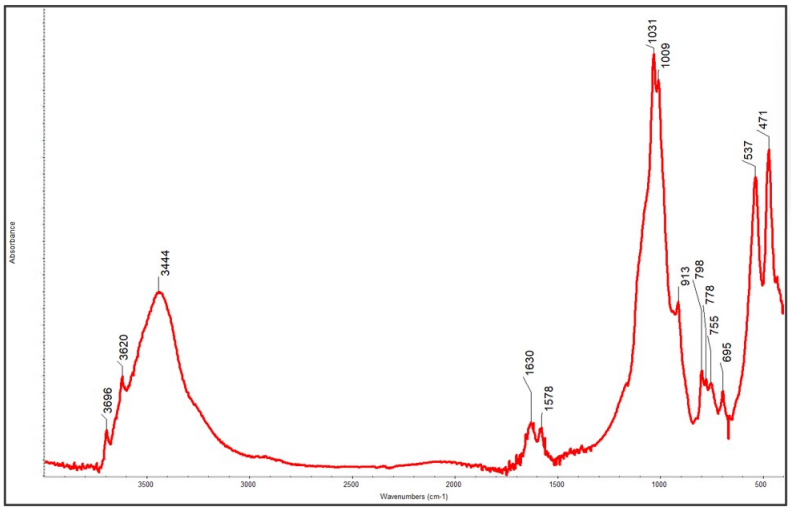
source: Wikimedia Commons

Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
White Foto-Carvalho (ETZ) (KBr Pellet)	3438; 2982; 2874; 2512	1799; 1425↑	1033; 875↑; 712; 531; 470

Bands (cm^{-1})	Assignment
1425↑	ν_{as} (C-O)
1033	ν_s CO_3
875↑	δ out-of-plane (C-O)
712	δ in-plane (C-O)

BlackETZ

Foto-Carvalho black colorant – Identified as mineral pigment



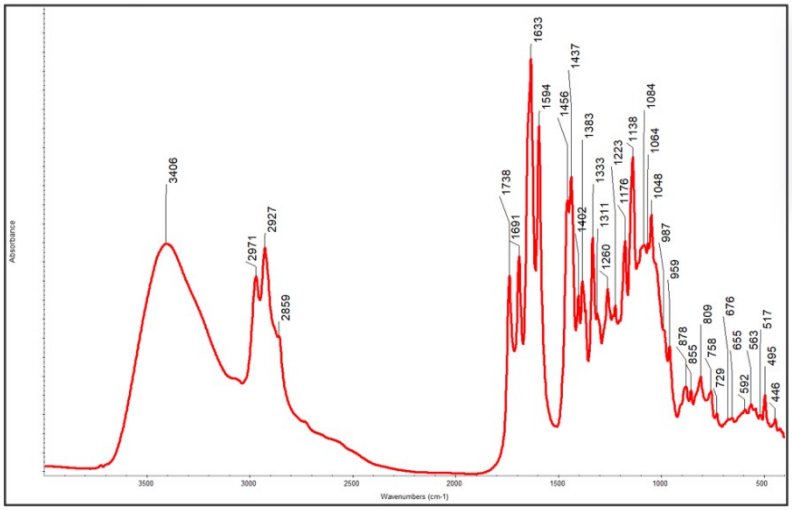


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Black Foto-Carvalho (ETZ) (KBr Pellet)	3696; 3620; 3444sp_{water}	1630sp_{water}; 1578	1031↑; 1009↑; 913; 798; 778; 755; 695; 537↑; 471↑

Bands (cm^{-1})	Tentative assignment as mica
3696	contributions of ν (Mg_3OH)
3620	may be related ν (MgAlOH) inner hydroxyl groups between the tetrahedral and octahedral sheets
3444	ν(OH) overtone
1578	Mg-O-H
1031; 1009	ν_a (Si-O)
913; 798	ν (Si-O) 798-537 δ OH overlap with vibrations of the tetrahedral sheets
537; 471	(O-Si-O)

Gamboge

Manuel Riesgo

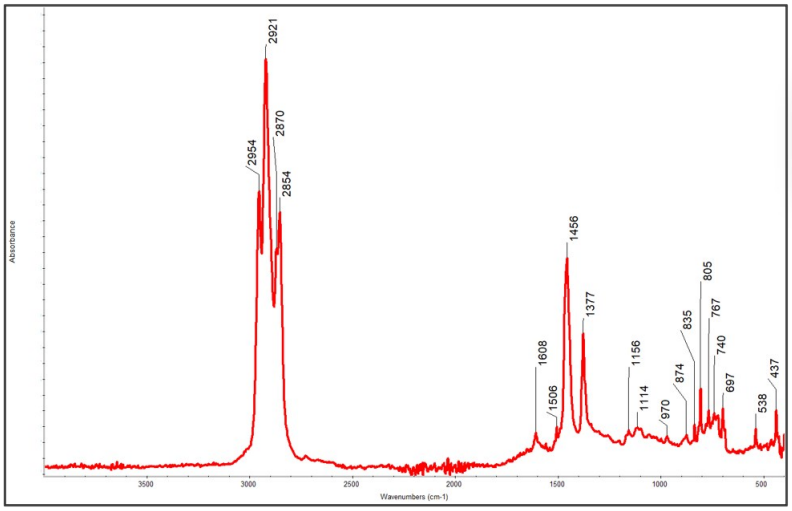




Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Gamboge Manuel Riesgo (KBr pellet)	3406; 2971; 2927; 2859	1738; 1691; 1633↑; 1594↑; 1456; 1437↑; 1402; 1383; 1333↑; 1311	1260; 1223; 1175; 1138↑; 1084; 1064; 1048↑; 987; 959; 878; 855; 809; 758; 729; 676; 655; 592; 563; 517; 495; 446

Bitumen

Titan



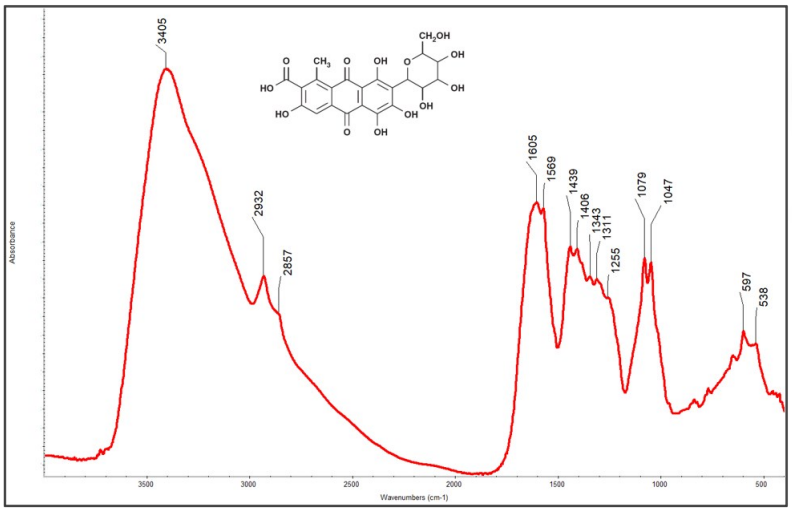


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Bitumen (ATR)	2954↑; 2921↑; 2870; 2854↑	1608; 1506; 1456↑; 1377↑	1156; 1114; 970; 874; 835; 805; 767; 740; 697; 538; 437

Bands (cm^{-1})	Assignment
2954↑; 2921↑; 2870; 2854↑	νCH_2 νCH_3
1608	νC=C Aromatics
1456↑	δ_a C-CH_2, CH_3 Aliphatics
1377↑	δ_s C-CH_3 Aliphatics
1156; 1114	ν S=O Sulfoxides
970; 874; 835; 805	γ CH aromatic
767; 740	Poliaromatics

Carmine

Productos de Conservación Cochineal



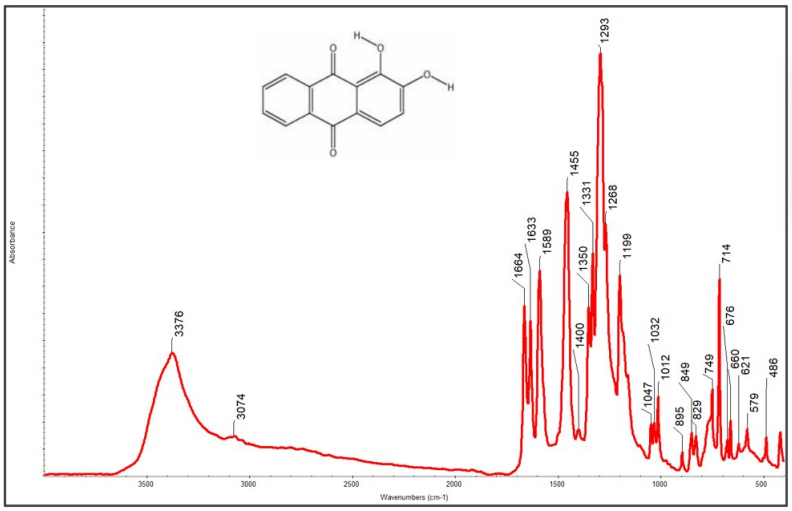


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Cochineal (KBr pellet, after drying)	3405; 2932; 2857	1605; 1569; 1439; 1406; 1343; 1311	1255; 1079; 1047; 597; 538

Bands (cm^{-1})	Assignment
3405	ν (O-H)
2932; 2857	ν (C-H)
1605; 1569	νC=C aromatic
1439; 1406; 1343; 1311	δ (C-H)
1255; 1079; 1047	ν (C-O)

Alizarin

Panreac



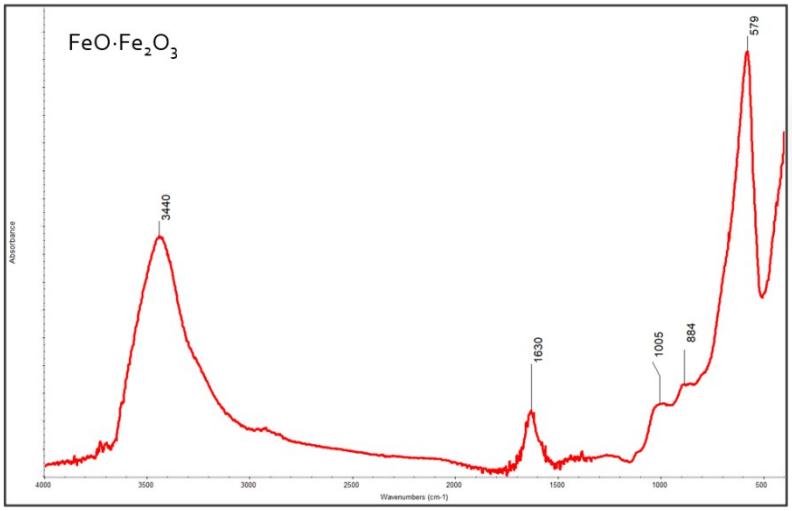


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Alizarin (KBr pellet)	3376; 3074	1664; 1633; 1589; 1455↑; 1400; 1350; 1331	1293↑; 1268; 1199; 1047; 1032; 1012; 895; 849; 829; 749; 714↑; 676; 660; 621; 579; 486; 418

Bands (cm^{-1})	Assignment
3376	ν (O-H)
1664	ν (10-C=O)
1633	ν (9-C=O)
1589	νC=C aromatic
1455	ν (C=C); δ (COH); δ (C-H)
1350	ν (C-C); δ (COH)
1331	ν (C=C)
1293; 1268	ν (C-O)
1199	ν (C = O); δ (CCC)
714	γ (C = O); γ (C-O)

Mars black

Maimeri



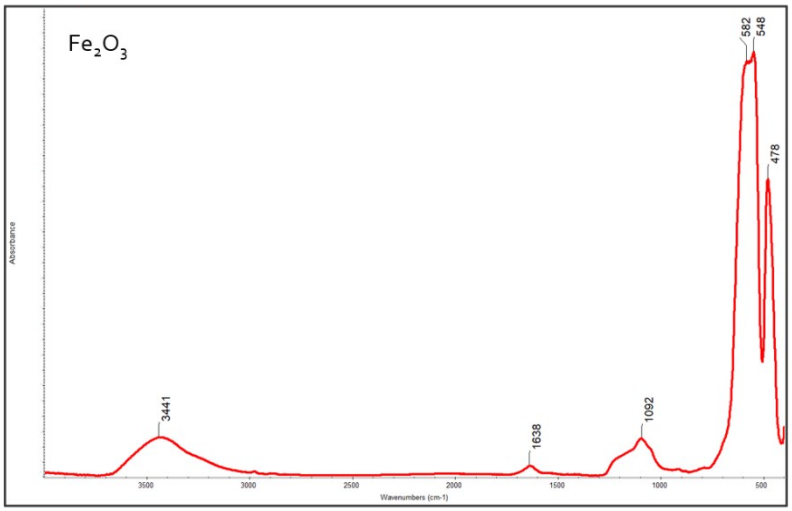


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Mars Black (KBr pellet)	3440sp$_{water}$	1630sp$_{water}$	1005; 884; 579↑

Bands (cm^{-1})	Assignment
3416; 1618	Water ~3400 νO-H; ~1640 δO-H
579	ν (Fe-O)

Red oxide

Agroquímica dell Valles



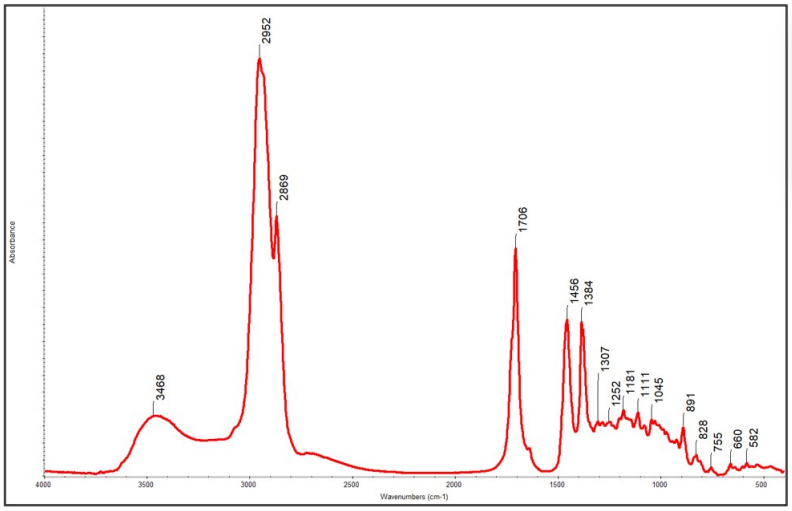


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Iron oxide red pigment (KBr pellet)	$3441sp_{water}$	$1638sp_{water}$	1092; 582↑; 548↑; 478↑

Bands (cm^{-1})	Assignment
3416; 1618	Water ~3400 ν(O-H); ~1640 δ(O-H
1092	ν (Si-O)
582; 548; 478	ν (Fe-O)

Dammar

Productos de Conservación



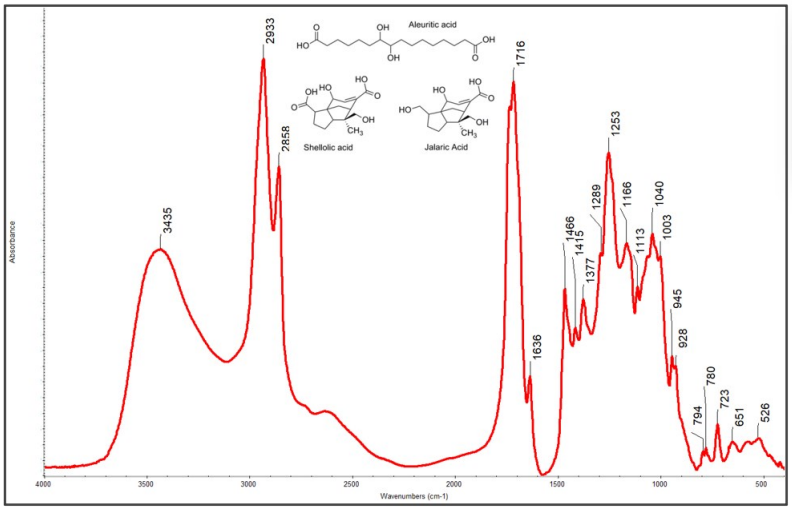


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Dammar resin pearls (KBr pellet)	3468; 2952; 2869	1706; 1456; 1384; 1307	1252; 1181; 1111; 1045; 891; 828; 755; 660; 582

Bands (cm^{-1})	Assignment
3468	ν(O-H)
2952↑	$\nu_{as}(CH_3)$ $\nu_{as}(CH_2)$
2869	$\nu_s(CH_3)$
1706↑	ν(C=O)
1456↑	$\delta_a(CH_2)$, $\delta_{as}(CH_3)$
1384↑	$\delta_s(CH_3)$
1307	ν(C-O)
1252	ν(C=C), ω,τ (C-H), ν(C-O-O)
1181	ω,τ (C-H), ν(C-O-O)
1111	δ(C-H)
1045	ν(C-O), ν(C-C)

Shellac

Productos de Conservación



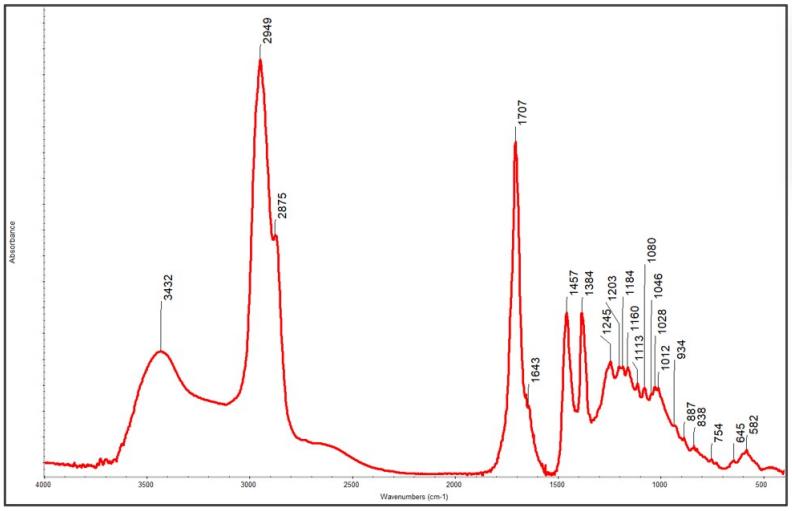


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Shellac resin flakes (KBr pellet)	3435; 2933; 2858	1716; 1636; 1466; 1415; 1377	1289; 1253; 1166; 1113; 1040; 1003; 945; 928; 794; 780; 723; 651; 526

Bands (cm^{-1})	Assignment
3435	ν(O-H)
2933↑	$\nu_{as}(CH_2)$
2858↑	$\nu_s(CH_3)$
1716↑	ν(C=O)
1636	ν(C=C)
1466	$\delta_{as}(CH_2)$
1415	δ(O-H)
1377	$\delta_s(CH_3)$
1289	ν(C1O)
1253↑	ν(C-C), ω,τ (C-H), ν(C-O-O)
1166	ω,τ (C-H), ν(C-O-O)
1040↑	ν(C-O), ν(C-C)
723	$\gamma(CH_2)$ alkanes-shellac wax

Mastic

Productos de Conservación



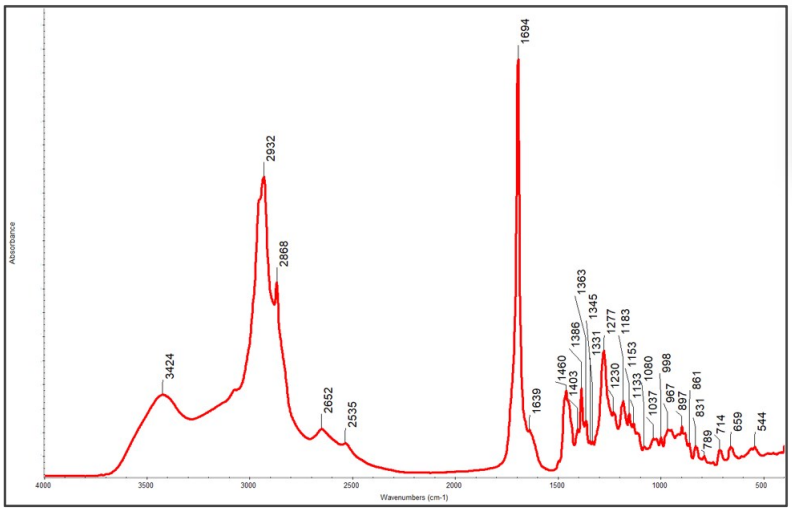


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Mastic resin pearls (KBr pellet)	3432; 2949; 2875	1707; 1643; 1457; 1384	1245; 1203; 1184; 1160; 1113; 1080; 1046; 1028; 1012; 934; 887; 838; 754; 645; 582

Bands (cm^{-1})	Assignment
3432	ν(O-H)
2949↑	$\nu_{as}(CH_2)$
2875	$\nu_s(CH_3)$
1707↑	ν(C=O)
1643sh	ν(C=C)
1456↑	$\delta_s(CH_2)$, $\delta_{as}(CH_3)$
1384↑	$\delta_s(CH_3)$
1245	ν(C-C), ω,τ (C-H), ν(C-O-O)
1184	ω,τ (C-H), ν(C-O-O)
1113	δ(C-H)
1080	δ(C-H), ν(C-C)
1028	δ(C-H), ν(C-O)

Rosin

Productos de Conservación



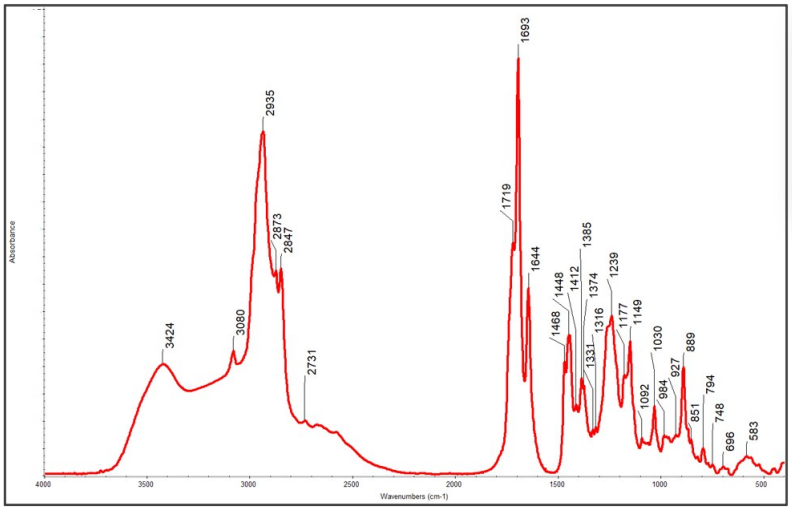


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Rosin / Colophony pearls (KBr pellet)	3424; 2932; 2868; 2652; 2535	1694; 1639; 1460; 1403; 1386; 1363; 1345; 1331	1277; 1230; 1183; 1153; 1133; 1080; 1037; 998; 967; 897; 861; 831; 789; 714; 659; 544

Bands (cm^{-1})	Assignment
3424	ν(O-H)
2932↑	$\nu_{as}(CH_2)$
2868	$\nu_s(CH_3)$
1694↑	ν(C=O)
1639sh	ν(C=C)
1460	$\delta_{as}(CH_3)$
1386	$\delta(CH_3)$
1363	$\delta_s(CH_3)$
1277↑	
1245	ν(C-C), ω,τ (C-H), ν(C-O-O)
1184	ω,τ (C-H), ν(C-O-O)
1080	δ(C-H), ν(C-C)
1037	δ(C-H), ν(C-O)

Copal

Productos de Conservación



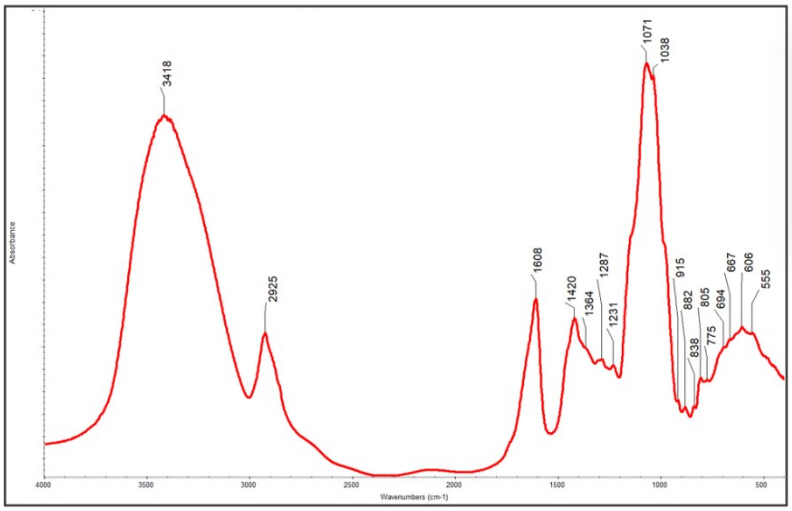


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Copal resin pearls (KBr pellet)	3424; 3080; 2935; 2873; 2847; 2731	1719; 1693; 1644; 1468; 1448↑; 1412; 1385; 1374; 1331; 1316	1239↑; 1177; 1149↑; 1092; 1030; 984; 927; 889↑; 851; 794; 748; 696; 583

Bands (cm^{-1})	Assignment
3424	ν(O-H)
3080	ν (C=C)
2935↑	$\nu_{as}(CH_2)$
2873	$\nu_s(CH_3)$
2847	ν(C=H)
1693↑	ν(C=O)
1644↑	ν (C=C) vinyl
1468, 1448	$\delta(CH_2)$, $\delta(CH_3)$
1385	$\delta(CH_3)$
1239	ν(C-O)
1177, 1092, 1030	δ(C-H), ν(C-O)
889	ω,τ (CH_2) in vinylidene structure

Gum

Productos de Conservación Arabic gum



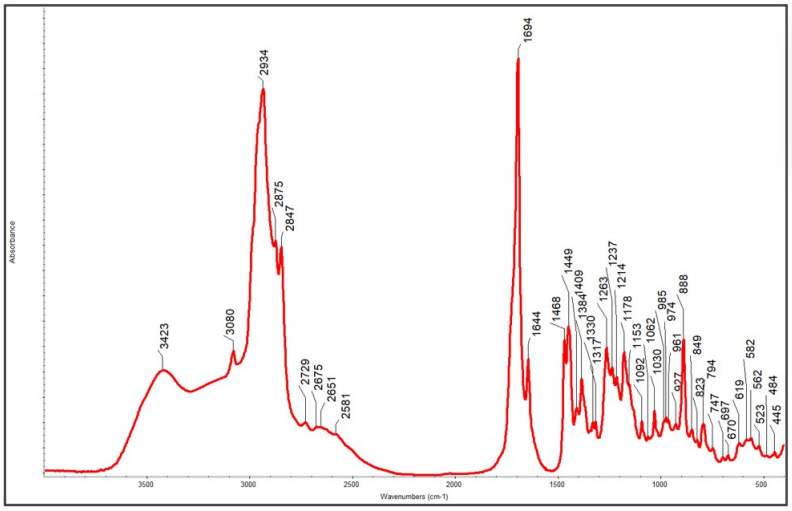


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Arabic gum pearls (KBr pellet)	3418; 2925	1608↑; 1420↑; 1364	1287; 1231; 1071↑; 1038↑; 915; 882; 838; 805; 775; 694; 667; 606; 555

Bands (cm^{-1})	Assignment
3418	ν O-H
2925	ν C-H
1608	ν C=O
1420	δ C-H and –OH
1071; 1038	ν C-O

Sandarac

Productos de Conservación





Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Sandarac resin pearls (KBr pellet)	3423; 3080; 2934; 2875; 2847; 2729; 2675; 2651; 2581	1694; 1644; 1468↑; 1449↑; 1409; 1384; 1330; 1317	1263; 1237↑; 1214; 1178↑; 1153; 1092; 1062; 1030; 985; 974; 961; 927; 888↑; 849; 823; 794; 747; 697; 670; 619; 582; 562; 523; 484; 445

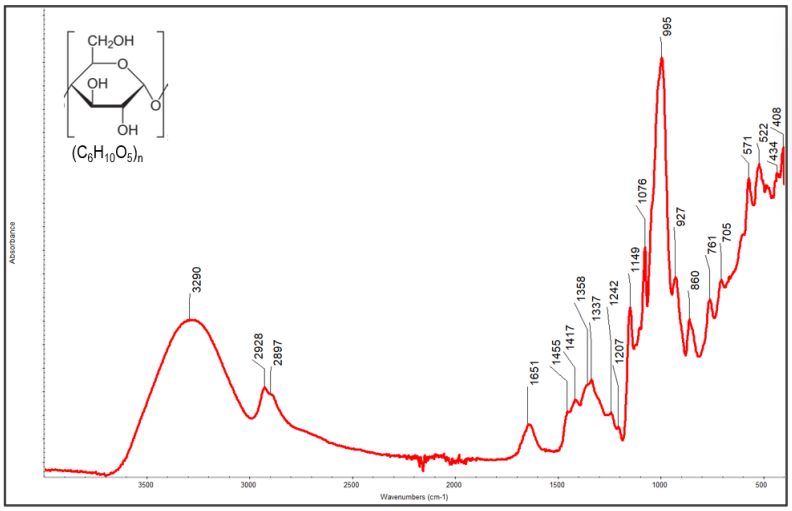
Bands (cm^{-1})	Assignment
3423	ν(O-H)
3080	ν (C=C)
2934↑	$\nu_{as}(CH_2)$
2875	$\nu_{s}(CH_3)$
2847	ν(C=H)
1694↑	ν(C=O)
1644↑	ν (C=C)
1468, 1449	$\delta(CH_2)$, $\delta(CH_3)$
1384	$\delta(CH_3)$
1263	ν C-O
1237	ν(C-O)
1178, 1092, 1030	δ(C-H), ν(C-O)
888	ω,τ (CH_2) in vinylidene structure

Summary of FT-IR bands for resins according to literature

		3500–2650 cm^{-1}	*1750–1600 cm^{-1}*	*1500–580 cm^{-1} and fingerprint region*	*References*
diterpenoid	General	3050–2990 ν(–C=C–); 3070–3088 ν(=C–H); 2937 ν_{xx}(C–H), CH_3, CH_2; 2844 ν_x(C–H), CH_3, CH_2	1718–1690 ν(C=O), 1644 ν(C=C)	1384 δ(–CH_3),1448–1445 δ_{xx}(CH_3); 1386 δ_x(CH_3); 888 (CH_2) out of plane (exomethylene func)	[v, 7, 34, 35, 36]
	Rosin	2936 ν(C–H), 2870 ν(C–H)	1697 ν(C=O); 1610–1615	1496, 1365,1275, 1239, 1151, 1130, 1107, 980, 910, 823, 707, 652	[v, 4, 5, 6, 9]
	Sandarac	2933 ν(C–H); 2873 ν(C–H); 2849 ν(C–H); 2646–2654 ν(C–H)	1694 ν(C=O); 1643 vinyl	1497, 1466, 1449, 1329, 1315, 1259, 1259–1263, 1236, 1213, 1153, 972, 909, 885–890, 856, 823, 789–792	[v,6]
	Copal	2933 ν(C–H); 2873 ν(C–H); 2849 ν(C–H); 2646–2654 ν(C–H)	1694 ν(C=O); 1643 vinyl	1466, 1449, 1329, 1315, 1259–1263, 1228, 1149, 889, 850, 795	[v, 5, 6, 9]
	General	3446–3425 ν(O–H), 3079–2650 ν(=C–H) augmentation with ageing, 3050–2990 ν(–C=C–), 2948 ν_{xx}(C–H), CH_3, CH_2; 2868 ν_x(C–H), CH_3	1713–1706 ν(C=O); 1658–1639 vinyl	1456–1455 δ(CH_3), δ(CH_2) 1378–1384 δ_x(CH_3) 1037–1035 ν(C–O–C) ether and ν(C–O) alcohol	[v, 7, 8, 34, 35, 36]
triterpenoid	Mastic	2949 ν(C–H), 2874 ν(C–H)	1717 ν(C=O); 1650 vinyl	1458–1460, 1245, 1161, 1115, 1046, 1008, 837, 580	[v, 4, 5, 6, 7, 8, 10]
	Dammar	2950 ν(C–H)	1713 ν(C=O); 1647 vinyl	1459, 1379 δ_x(CH_3), 1307 ν (C–H), 1251 ν(C–C), 1180 and 1154 ν(C–C) sat or (C–H) aromatic ring, 1083 and 1032 ν(C–O)	[v, 4, 5, 6, 7, 8, 10, 37]

Starch

Quimicen

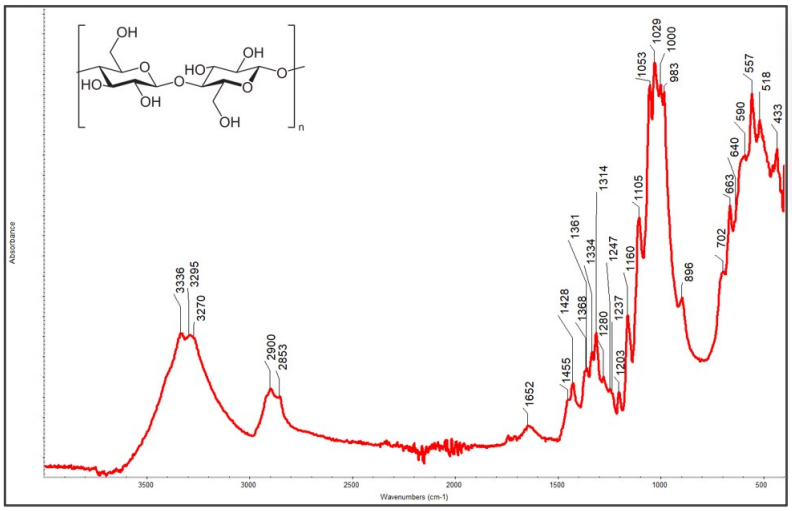




Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Starch (ATR)	3290; 2928; 2897	1651; 1455; 1417; 1358; 1337	1242; 1207; 1149; 1076; 995↑; 927; 860; 761; 705; 571; 522; 434; 408

Bands (cm^{-1})	Assignment
3290	ν O-H
2928; 2897	ν C-H
1651	δ O-H water molecules absorbed in the amorphous region
1455; 1358; 1337	δ C-H
1417	δ CH_2; ν –COO
1242; 1207; 1149; 1076; 995; 927	ν C-O

Cotton



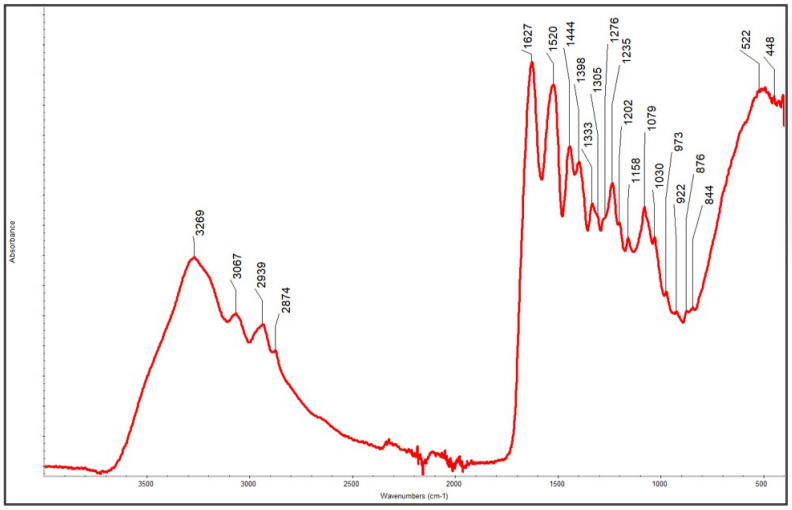


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Cotton (ATR)	3336; 3295; 3270; 2900; 2853	1652; 1455; 1428; 1368; 1361; 1334; 1314↑	1280; 1247; 1237; 1203; 1160; 1105; 1053↑; 1029↑; 1000; 983; 896; 702; 663; 640; 590; 557; 518; 433

Bands (cm^{-1})	Assignment
3336; 3295; 3270	ν (O-H)
2900	ν_a (CH_2)
2853	ν_s (CH_2)
1652	δ(O-H) absorbed water
1428; 1316	ω (C-H)
1368	δ (C-H)
1281	ν (C-H)
1247; 1203	δ(O-H)
1160; 1105	C-O-C
1053↑	ν in-plane ring
1029↑; 1000; 983	ν (C-O)

Gelatin

Difco



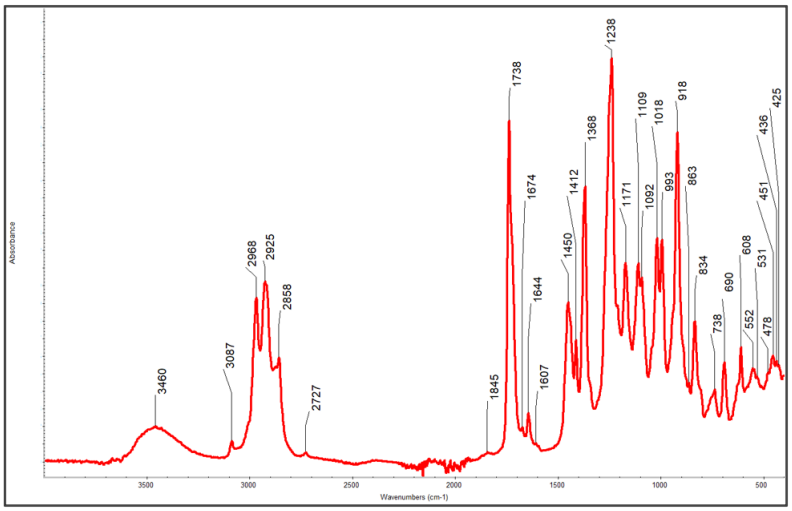


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Gelatin (ATR)	3269; 3067; 2939; 2874	1627↑; 1520↑; 1444↑; 1398↑; 1333; 1305	1276; 1235; 1202; 1158; 1079; 1030; 973; 922; 876; 844; 522; 448

Bands (cm^{-1})	Assignment
3269	ν N-H overlaps with -OH
3067; 2939; 2874	ν C-H
1627	ν C=O
1520	δ N-H; ν $-NH_3$
1444; 1398	δ C-H

Lavender

Manuel Riesgo Lavender essence



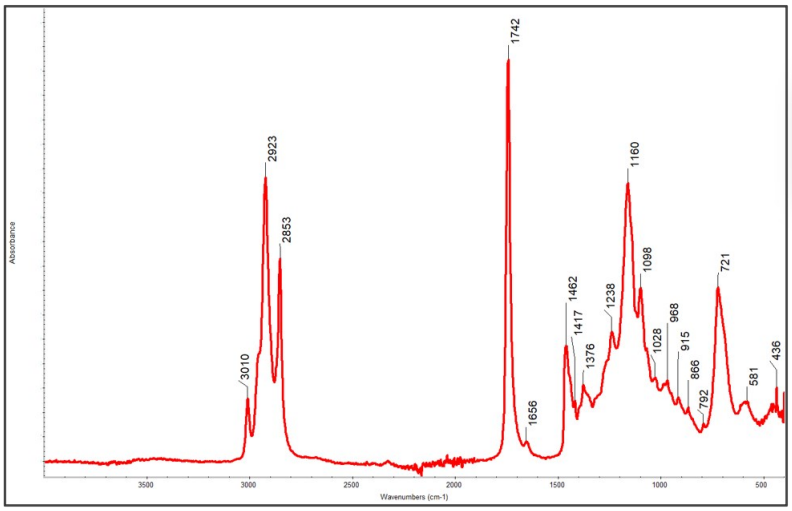


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Lavender essence (ATR)	3460; 3087; 2968; 2925; 2858; 2727	1845; 1738↑; 1674; 1644; 1607; 1450; 1412; 1368↑	1238↑; 1171; 1109; 1092; 1018; 993; 918↑; 863; 834; 738; 690; 608; 552; 531; 478; 451; 436; 425

Bands (cm^{-1})	Assignment
3460	ν (O-H)
2923↑	ν_{as} (C-H)CH_3
2853	ν_s (C-H)CH_2
1738	ν (C=O) ester
1674	ν (C=O) hydrogen bond with -OH
1450	δ_{as} (CH_3), δ(CH_2)
1368	δ_s (CH_3); (CH_2)
1238; 1171	ν_{as} (C-O) in ester
1109	ν_{as} (O-CH_2-C)

Oil

Talens Linseed Oil



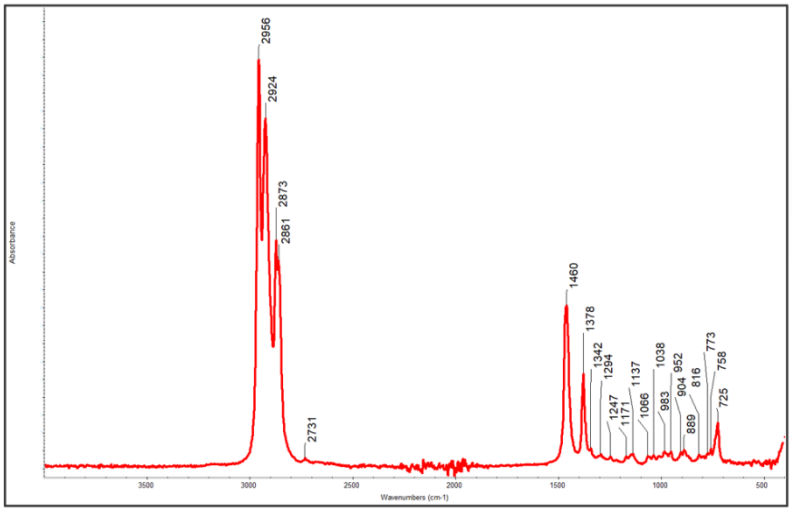


Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Linseed oil (ATR)	3010; 2923↑; 2853	1742↑; 1656; 1462; 1417; 1376	1238; 1160↑; 1098; 1028; 968; 915; 866; 792; 721↑; 581; 436

Bands (cm^{-1})	Assignment
3010	ν (C-H)=CH
2923↑	ν_{as} (C-H)CH_3
2853	ν_s (C-H)CH_2
1742↑	ν (C=O) ester
1656	ν (C=C) of cis -CH=CH-
1462	δ_{as} (CH_3), δ(CH_2)
1417	δ_s (CH_2)-CH_2-CO-O-
1376	δ_s (CH_3)
1238; 1160	ν_{as} (C-O) in ester
1160↑	ν_{as} (C-O) in ester
1098	ν_{as} (O-CH_2-C)
721↑	γ -(CH_2)- + ω (C-H)= CH

PetEth

Panreac Petroleum ether

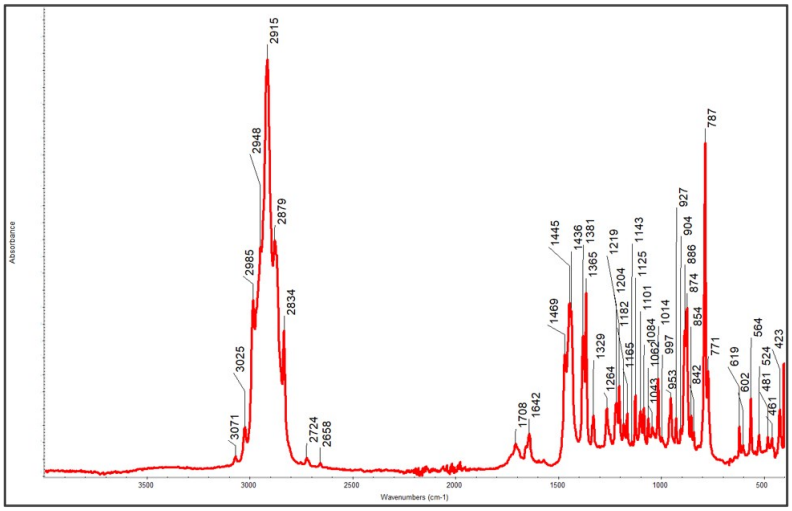




Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Petroleum ether (ATR)	2956↑; 2924↑; 2873; 2861; 2731	1460↑; 1378↑; 1342	1294; 1247; 1171; 1137; 1066; 1038; 983; 952; 904; 889; 816; 773; 758; 725

Turpentine

Lefranc Bourgeois Rectified turpentine

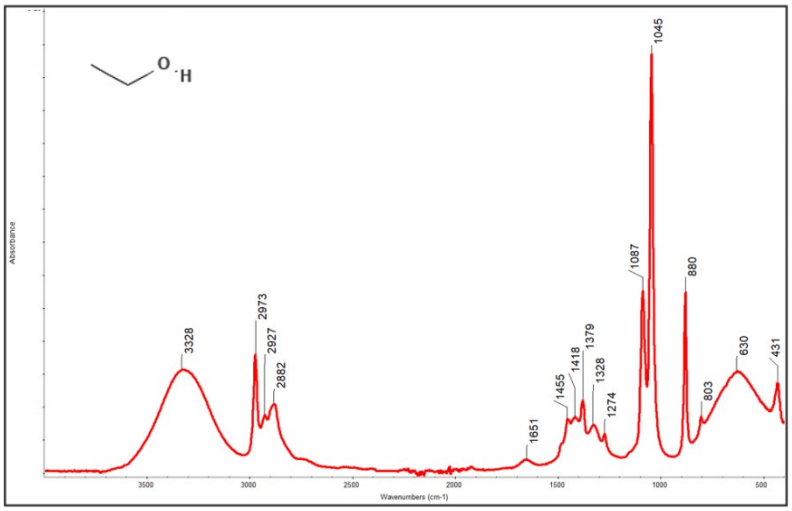




Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Turpentine (ATR)	3071; 3025; 2985; 2948; 2915↑; 2879; 2834; 2724; 2658	1708; 1642; 1469; 1445; 1436↑; 1381; 1365↑; 1329	1264; 1219; 1204; 1182; 1165; 1143; 1125; 1101; 1084; 1062; 1043; 1014; 997; 953; 927; 904; 886↑; 874; 854; 842; 787↑; 771; 619; 602; 564; 524; 481; 461; 423; 401

Ethanol

Panreac Ethanol 96%



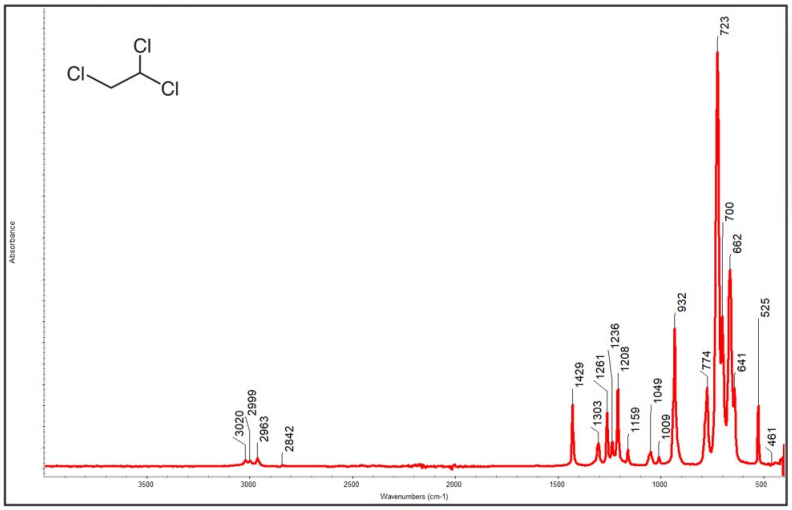


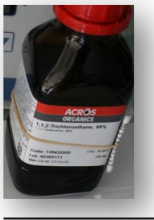
Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
Ethanol (ATR)	3328; 2973; 2927; 2882	1651; 1455; 1418; 1379; 1328	1274; 1087↑; 1045↑; 880↑; 803; 630; 431

Bands (cm^{-1})	Assignment
3328	ν (O-H)
2973	ν (CH_2)
1087; 1045	ν (C-O)
880	ν (C-C)

TriChl

Acrös Organics 1,1,2, Trichloroethane





Sample	4000–2500 cm^{-1}	1750–1300 cm^{-1}	1300–400 cm^{-1} Fingerprint region
1,1,2, Trichloroethane (ATR)	3020; 2999; 2963; 2842	1429; 1303	1261; 1236; 1208; 1159; 1049; 1009; 932↑; 774; 723↑; 700; 662↑; 641; 525↑; 461

Bands (cm^{-1})	Assignment
3020	ν (CH_2)
2999	ν (CH)
2963	ν (CH_2)
1429	δ (CH_2)
1303	δ in-plane (CH)
1261	δ out-of-plane (CH)
1236	ω (CH_2)wag
1208; 1159	τ (CH_2) twist
1009	ν (C-C)
932	γ (CH_2) rock
774; 700; 662	ν (C-Cl)
525	skeletal deformation

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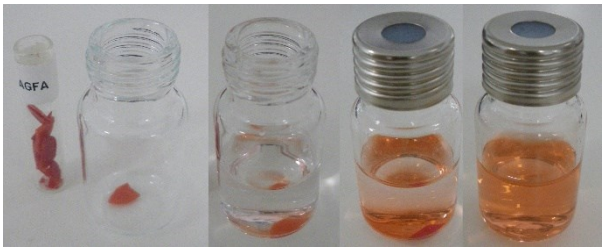
UV-Vis spectroscopy of two red dyes

Analysis by UV-Vis spectroscopy of samples *Agfa* (new coccine) and *RedETZ* (crocein scarlet) was done to ascertain if the technique is suitable to differentiate both colorants as a complement to the FT-IR analysis.

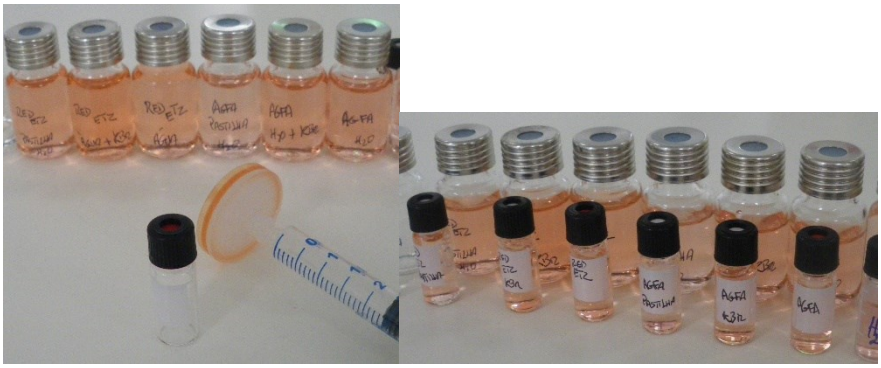
Sample preparation

Five samples were prepared by dissolving the sample in ultra-purified water: two samples using the KBr pellets prepared for FT-IR analysis of Agfa and RedETZ. Two samples of Agfa and RedETZ and a control sample of KBr.

A small portion of concentrated color samples prepared as KBr pellets were dissolved in UP water and filtered (1 and 1). Then samples with just the colorant were dissolved in an amount that would be visibly similar in color concentration to those prepared with KBr pellets.



1 – UV-Vis spectroscopy, sample preparation.



1 – UV-Vis spectroscopy, sample preparation.

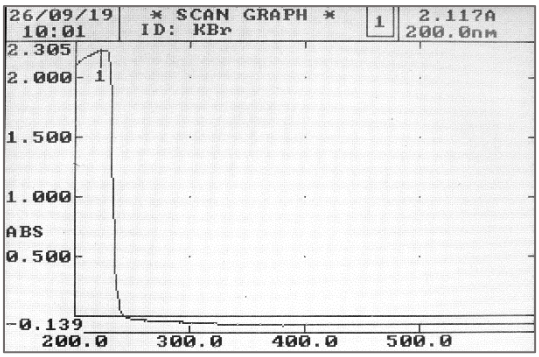
Instrumentation and Measurements

The UV measurements were conducted with a Spectronic Hελos α UV-Visible Spectrophotometer from Thermo Electron Corporation using semi-micro cell cuvettes. All samples were scanned at wavelengths between 200 and 600 nm, and three replicates were made of each.

Results

UV-Vis spectra for:

KBr

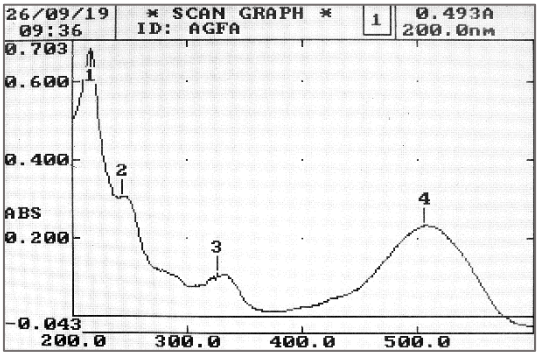


Mark	*ABS*	*Wavelength (nm)*
1 Peak	2.236	223

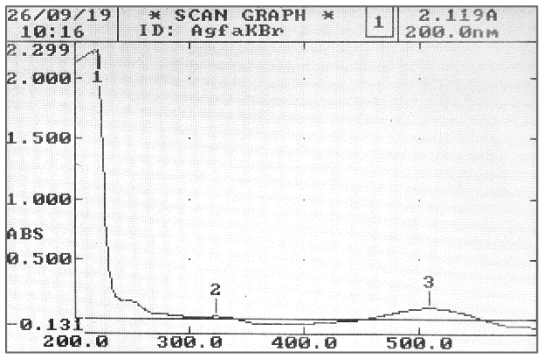
Agfa, Agfa+KBr in water

(historical sample with >50 years)

Max absorption c. 506 nm



Mark	*ABS*	*Wavelength (nm)*
1 Peak	0.682	216
2 Peak	0.308	244
3 Peak	0.112	326
4 Peak	0.233	506

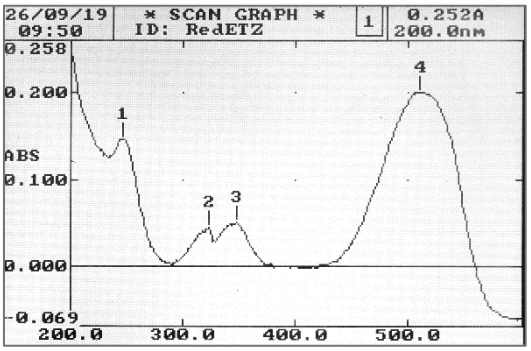


Mark	*ABS*	*Wavelength (nm)*
1 Peak	2.230	221
2 Peak	0.026	323
3 Peak	0.093	508

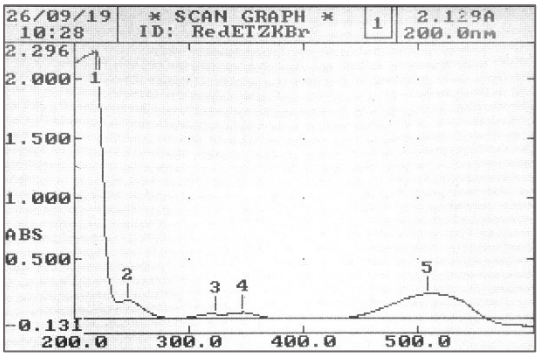
RedETZ, RedETZ+KBr in water

(historical sample with >50 years)

Max absorption c. 510 nm



Mark	*ABS*	*Wavelength (nm)*
1 Peak	0.146	247
2 Peak	0.045	324
3 Peak	0.051	348
4 Peak	0.200	510



Mark	*ABS*	*Wavelength (nm)*
1 Peak	2.228	220
2 Peak	0.150	247
3 Peak	0.044	324
4 Peak	0.049	348
5 Peak	0.203	509

Discussion

The spectra show that the most relevant bands to differentiate both dyes are the ones in the middle. While both present a band at ~324 nm, only the crocein scarlet has a second band at ~348 nm.

Also, the KBr does not mask the most relevant bands, and samples can still be differentiated even in a mixture with KBr