

Colour Photography and Film:

Sharing knowledge of analysis, preservation, and
conservation of analogue and digital materials
2024



Edited by: Alice Plutino, Barbara Cattaneo and Marcello Picollo

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3rd Edition of the Conference “Colour Photography and Film:
Sharing knowledge of analysis, preservation, and conservation of
analogue and digital materials”

Edited by: Alice Plutino, Barbara Cattaneo and Marcello Picollo



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Amsterdam, September 12 and 13, 2024

Organized by The Gruppo del Colore – Associazione Italiana del Colore (Color Group – Italian Color Association), in collaboration with the University of Amsterdam (UvA), Eye Filmmuseum (Eye), the Istituto di Fisica Applicata “Nello Carrara” of the Consiglio Nazionale delle Ricerche (IFAC-CNR), and the Opificio delle Pietre Dure (OPD)

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Conference Program

Wednesday 11 September 2024	
UvA conservation program and studiobuilding tour Introduction and presentation AG + SBMK photoproject and tour by Katrin Pietsch, coordinator photograph conservation, Maartje Stols-Witlox, program director - Kayleigh Kunst-van der Gulik, Ariënné Boelens (SBMK photoproject Speakers)	
Thursday 12 September 2024	
SESSION 1	
Esther Ng, Yen Lin Kong	Tan Lip Seng’s montaged colour transparency slides: A case study in unpacking intentionality and ‘the decisive moment’ in image-making, preservation and conservation
Lénia Oliveira Fernandes, Élia Roldão, Emília Tavares	Fading memories: Assessing colour slide film’s cultural impact in Portugal and abroad
Melissa Gianferrari, Chiara Zironi, Paolo Barbaro, Davide Bussolari	“Infinito” by Luigi Ghirri - Restoration work and diagnostic imaging: an opportunity for further reasoning
SESSION 2	
Tessa Maillette de Buy Wenniger, Katrin Pietsch, Maarten van Bommel	Investigating solvent treatment methods on a matte pigment inkjet print
Joana Silva, Sille Petersen, Morten Ryhl-Svendsen, Jesper Stub Johnsen, Karen Brynjolf Pedersen	Evaluating the stability of colour slides: 30 years of natural ageing at the National Museums of Denmark
KEYNOTE	
Elif Rongen-Kaynakçi	Rediscovering the colours of early cinema: a journey through Eye Filmmuseum’s silent film restorations
SESSION 3	
Giovanni Vanoglio, Laura Genovese, Angela Quattrocchi, Moreno Pilloni, Alessandro Rizzi	Your memory is our history: recovery, digitalisation and dissemination of vernacular video production
Nadezhda Stanulevich	Prokudin-Gorskii’s technique of colour photography and contemporary exhibitions
SESSION 4	
Irina Ciortan, Giorgio Trumpy, Irina Sandu	The Scream (ca. 1910) through the Years: from Photographic Documentation to Digital Rejuvenation
Sille Juline Høgly Petersen, Morten Ryhl-Svendsen	Polaroids around the 80s. An investigation of the stability of instant film according to storage, handling, and exhibition.
Paulina Miasik, Sylvie Penichon	An investigation into the structure and color stability of different generations of Polaroid 20×24 materials
Rita Hofmann-Sievert, Manfred Hofmann	Light sensitivity of contemporary photographic print materials

Friday 13 September 2024	
KEYNOTE	
Monica Marchesi	Reprinting as a game-changer
SESSION 5	
Iryna Marholina	Reception of film colour in the Soviet postwar cinematic community: between aesthetics and technology
Enea Ahmedhodzic, Ema Muftarevic	Preserving Bosnia's Cinematic Heritage: Challenges and Achievements of the Film Centre Sarajevo in the Post-War Era and Beyond
SESSION 6	
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Alice Plutino, Lorenzo Stefani, Costanza Cucci, Andrea Casini, Marcello Picollo	Limitations and Potentials of Hyperspectral Imaging Technique Applied to Cinematographic and Photographic Film Materials
SESSION 7	
Lisa Vergelli, Francesca Frasca	Colour change tools to assess the preservation state of motion picture films
Alessandro Russo, Sergio Canazza	Color and original soundtrack restoration of experimental films by Italian artist Roberto Lucca Taroni
Lucia Becatti, Enea Ahmedhodzic, Beatrice Sarti, Alessandro Rizzi	The Role of Subjectivity in Color Film Restoration
David LeHoty, Giorgio Trumpy, Barbara Flueckiger, David Pfluger	Style Transfer in Advanced Film Digitization and Rendering Workflows
SESSION 8	
Paula Ogayar Oroz, Katrin Pietsch	Training the eye, an exploration of hand-coloured daguerreotypes and their examination
Clara Tomasini	Insensitive to red. The hand-colored daguerreotype and its sociopolitical value in the Río de la Plata.

Foreword

It is with gratitude and satisfaction that we introduce the proceedings that resulted from the third edition of the conference on *Colour Photography and Film: Sharing Knowledge of Analysis, Preservation, and Conservation of Analogue and Digital Materials*. It was organized in September 2024 by the *Gruppo del Colore – Associazione Italiana del Colore* (Color Group – Italian Color Association), in collaboration with the University of Amsterdam (UvA), Eye Filmmuseum (Eye), the *Institute of Applied Physics “Nello Carrara”* of the Italian Nation Research Council (IFAC-CNR), and the Doctoral School in History of Art at Sapienza University in Rome. The conference, held at the University Library in Amsterdam, welcomed more than one hundred participants representing 16 countries across five continents; over 50 of them attended the convening in person.

The papers presented over the two-day conference in eight thematic sessions covered a wide range of topics, from the history of photographic and film materials to conservation critique and ethics, from deterioration issues to new restoration treatment approaches. From a historical perspective, the objects studied ranged from colored daguerreotypes to color slides, with a particular focus on specific processes such as Dufaycolor and Polaroid. The history of early color films and the stratification of vernacular materials were also explored. The cultural impact of color in both film and photography was discussed in several papers, as were the importance of a clear strategy and unambiguous policies to ensure proper archival preservation.

Digitization as a conservation and restoration strategy was proposed for both film and photographic materials. While digitization practices have emerged as an ineluctable solution for dissemination, digital restoration and rejuvenation remain evolving fields where research is growing exponentially.

The ethical considerations underlying restoration practices in early cinema were expertly introduced on the first day by the keynote speaker, Elif Rongen-Kaynakçi, Curator of Silent Film at Eye Filmmuseum, in her talk titled *Rediscovering the Colours of Early Cinema: A Journey Through Eye Filmmuseum’s Silent Film Restorations*. Although her contribution does not appear in these proceedings, we would like to express our gratitude for her generosity in participating in the conference.

We are also truly grateful to Monica Marchesi, art historian and conservator at the Stedelijk Museum, for serving as the keynote speaker on the second day of the conference. In her talk *Reprinting Photography as a Game-Changer*, Dr. Marchesi shared new considerations from her seminal long-term project on reproduction and reprinting as a conservation and exhibition strategy. This project underscores the importance of dialogue among artists, conservators, and curators when addressing the deterioration and obsolescence of photographic and film technology.

Finally, we wish to thank all the participants and speakers who submitted their contributions to be published in this volume. It was our great pleasure to include them in the proceedings.

Barbara Cattaneo, Alice Plutino, Marcello Picollo

3rd international conference on “Colour Photography and Film: sharing knowledge of analysis, preservation, and conservation of analogue and digital materials”, Amsterdam 2024

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“Your memory is our history: recovery, digitization and distribution of vernacular video production”

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Abstract

In the process of empowerment of society, the search for innovative solutions to update and strengthen the relationship between communities and their cultural heritage - material and immaterial - and the territory is fundamental. From this perspective, the inclusive and participatory enhancement of cultural heritage and the experimentation of new models of communication and use can contribute both to strengthening the sense of place and to defining a heritage community. Since 2015, in Carbonia, in the Southern Sardinia region (Italy), the “Centro Servizi Culturali della Società Umanitaria - CSC” (i.e. Centre for Cultural Services of the Humanitarian Society) has started the project “Ex Di Memorie in Movimento - La Fabbrica del Cinema” (i.e. Ex Di Moving Memories - The Cinema Factory) aimed at preserving, collecting, promoting and post-producing the historical audiovisual memory of the territory. The working hypothesis is that small private stories can transform into public testimonies of the daily life of both the community and the nation. The recent collaboration between the CSC and the project “Reinventing Industrial Museums for a New Image of Italy - 2023-2025” (ReMusIt - Home, 2024), constitutes a further experimental activity.

This study traces some of the most significant activities undertaken by the Sardinian Center and illustrates the hypotheses of collaborative work within the ReMusIt project. In the final part, new possible joint research scenarios will be outlined.

Keywords: vernacular film, cultural heritage preservation, documentary film, mining culture, color family film.

Introduction

History is a complex tapestry of interwoven memories, a set of narratives that define us and connect us to the past, reinforcing the sense of belonging to a society and a territory. Carbonia, in Southern Sardinia region (Italy) is a founding city, created to ensure the supply of coal in the Italy of Fascist autarchy to reduce dependence on foreign imports. Inaugurated on 18 December 1938, in the presence of Mussolini, it saw an intense economic migratory phenomenon converge on it that delineated a peculiar social characterisation and experienced changing fortunes, until the definitive end of mining era (Graph. 1). The preservation of memory is a topic of significant interest that can be used both for the pure documentation of events and for the suturing of a sense of belonging to a legacy that is difficult to accept (Peghin and Sanna, 2009; Peghin, 2010; Sanna and Sanjust, 2020).

Carbonia is home to the “Centro Servizi Culturali della Società Umanitaria - CSC”, this is the Sardinian headquarters of the “Società Umanitaria” at Milan, a non-profit organization, founded in 1893. The organization has made itself known with over one hundred years of social battles, combining assistance and work, social commitment and education, progress and training, emancipation and culture (La Nostra Storia, no date). The CSC was inaugurated in Iglesias in 1967, before moving to Carbonia in 1982, first in the Velio Spano Hall and then, in 2015, in the offices of the former Mining Directorate in the Grande Miniera di Serbariu complex. The same year the La



Graph. 1 - Population of Carbonia as of census date.

Fabbrica del Cinema (i.e. The Cinema Factory) project was launched, aiming at preserving, collecting, promoting and post-producing the historical audiovisual memory of the territory.

Since 2017, the Region of Sardinia has granted the Center funding for the activation of a “Cineport hub”, an attempt to develop the local cinema industry. Of considerable interest is the “Your memory is our history” project promoted by the three Sardinian CSC of the “Società Umanitaria” (Cagliari, Carbonia and Alghero). It is based on family (or vernacular) cinema, which aims to recover the audiovisual historical memory that private citizens have produced through home movies from the 1960s-70s onwards and eventually forgotten in attics and cellars, and then transform these small private stories into public testimonies of daily life and local culture. Thus, these vernacular film materials are not only valuable documentation, free from the political propaganda that characterizes the enormous archive of Istituto Luce productions during Fascism, but are also fundamental pieces for scholars, historians and film enthusiasts who want to build a stronger social framework, based on sharing and mutual understanding thanks to new productions that seek to fill cultural gaps or address neglected aspects of the island’s culture and history. The Carbonia’s La Fabbrica del Cinema stands out as an example of excellence in the integration of art, science and society. Through its commitment to memory preservation and scientific dissemination, it demonstrates the transformative power of art and culture in building a shared and conscious future.

Carbonia and the Italian Center for Coal Culture, the Great Mine of Serbariu and the Coal Museum are subject of studies into the project “ReMusIt - Reinventing industrial Museums for a new image of Italy 2013-2025” (PRIN 2022 – Funded by EU - NextGenerationEU - M4.C2.1.1., project n. 2022X5KWKT, CUP Master_B53D23034050006). Promoted by the National Research Council of Italy in collaboration with the University of Milan and the University “Mediterranea” of Reggio Calabria, the ReMusIT proposes an interesting model of collaboration between stakeholders intended, on the one hand, to strengthen the socio-cultural and economic role of the Great Mine of Serbariu, also with a view to tourism development of the territory, and, on the other, to strengthen the attachment of the community to this place and, in a broader sense, to its past. Between the supporter and collaborators of the multidisciplinary Remusit research team there’s also the CSC – “La Fabbrica del Cinema”.

The “La Fabbrica del Cinema” and the “Your Memory is Our History” project

In the context of the “Società Umanitaria” and its mission, “La Fabbrica del Cinema” has launched the project “Your memory is our history”, a regional campaign aimed at creating an archive of private and family memories of Sardinians (Cinema and Family - the project, no date). The campaign is dedicated to the collection and enhancement of vernacular or family films, shot until 1985, in various formats, documenting moments of private and public everyday life, places, traditions, faces and celebrations, which portray life far beyond the rhetoric of the Istituto Luce

propaganda films. In addition to family films, the collection also includes amateur material, documentaries and fiction films made by associations from various backgrounds. This project has made it possible to create a valuable, unpublished audiovisual corpus that is important for the study of local history and culture, as well as for the analysis of the social, economic, anthropological and landscape development of the territory.

The “Your memory is our history” project is being developed in four stages: collection, digitization, cataloguing and dissemination.

The collection can be carried out by accidental discovery (for example, when emptying cellars or garret) or by direct delivery; the “Società Umanitaria” can take charge of the original films in the form of temporary storage (coinciding with the time required for digitization), long-term storage or donation. The latter will then be conserved in their original format at the “Cineteca Sarda” (i.e. Sardinian Cinematheque) della “Società Umanitaria” in Cagliari and made available to the community according to the procedures established in agreement with the owner. Once the films have been collected, the “Società Umanitaria” carries out an initial evaluation and classification by creating a file card uniquely linked to the reel through a relational database. The films then undergo a light conservative restoration (removal of dust, dirt and grease) and minor repairs to damaged parts. Only after this preparatory phase is the film ready for conversion to digital video and storage for archival preservation.

To date, thanks to 799 contributions 11,754 videos have been collected, mostly in 8mm and Super 8 format, of which 11,680 have been digitized (Fig. 2). Digitization takes place using the Scanner Film technology for 9.5 mm Pathé Baby, 8 mm and Super8 formats, and with the telecine film transfer process for 16 mm and 35 mm formats.

The D-ARCHIVER 2 2K scanner (Fig. 1) used for digitization is equipped with a drag system that guarantees the highest film security. A high-definition sensor allows the entire frame to be digitized thanks to an LED light source that generates a short flash for each frame, so that the three primary colours can be controlled independently; in addition, the system can read films with single- or double-track magnetic audio. The choice of this film scanner was mainly dictated by the high quality of its output (2K, Pro-Res file format) but also by the possibility of capturing different formats and its general ease of use. The two digitization operators have the possibility to do colour correction and image stabilization during the acquisition process. Each operation is recorded on the film review sheet.

Contribution	799
8 mm	5232
Super 8	6200
16 mm	186
9,5 mm	118
35 mm	18
TOTAL	11754
Digitalized	11680
Other materials included in the contributions other than film footage	881

Graph. 2 - Number of videos by format. Elaboration on data from “La Fabbrica del Cinema”, 2024.

In the final phase of the project, the collected audiovisual material will be carefully catalogued in order to allow quick and organized access through the creation of a database. This database will indicate the contents by keywords, allowing for targeted and immediate consultation. The “Società Umanitaria” will develop a computerized cataloguing system that will be made available online through the official website of the “Cineteca Sarda” (Home Page società Umanitaria CSC Cagliari, no date), thus facilitating public access to the content.

The work of cataloguing and documenting the films is carried out, whenever possible, in direct dialogue with the creators of the material and their families, who are an indispensable resource for accurate historical and social reconstruction. This dialogue will make it possible to restore the films

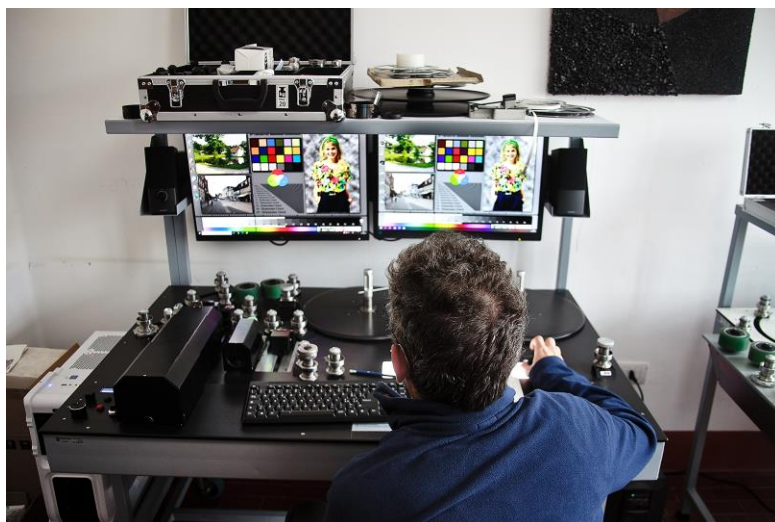


Fig. 1: La Fabbrica del Cinema's Scanning Station

to their full testimonial status, placing them in the cultural and personal context in which they were produced.

In order to further enrich the archive, the owners of the material are encouraged to provide, along with the reels, other supporting elements such as photographs, written documents, prints or any other resource that can contribute to the reconstruction of the original context of the footage. In this way, the project not only preserves the historical value of the films, but also promotes and realizes a more complete audiovisual memory, returning a consultation tool that enhances the complexity and authenticity of Sardinian history and culture (Cinema and Family - Project, no dates). The films collected are stored in acid-free boxes. Improvements are underway that will soon allow the boxes to be stored in a room with constantly controlled ventilation, humidity (<50%) and temperature (<15°C), and with adequate fire protection.

The “Società Umanitaria” develops the archive thus created by promoting research and study activities, by disseminating the films and the project through meetings and events, but also by directly producing or participating in the production of audiovisual or multimedia materials that deal with or use the family films.

It is also useful to mention here another project of the “La Fabbrica del Cinema” Cineport hub, this time in the role of a training centre. The archive and materials produced by the “Your memory is our history” project are linked to the activities of the “Carbonia Cinema Giovani Film Lab”, a project aimed at bringing new generations closer to the world of audiovisual production and film culture: addressed to young high school and university students, the Lab offers a comprehensive training experience, ranging from an introduction to filming and editing techniques to the realization of real film projects, through meetings with directors, scriptwriters and industry professionals who enrich the participants’ education and inspire them with direct experiences in the world of cinema.

The students who participated in the 2023 edition of the “Cinema Giovani Film Lab” have produced a film entitled “Seemingly Never Ending”. In this film, they have successfully employed a technique whereby archive material is juxtaposed with new footage. This film will have its premiere at the Carbonia Film Festival 2024, which is scheduled to take place between 13 and 17 November 2024.

ReMusIt and the audio video research

The ReMusIT aims to advance knowledge to support the development of industrial museums through a multidisciplinary approach with several complementary objectives. The project aims to support museums in developing new interpretation frameworks for the tangible and intangible values associated with their collections and their local contexts, in order to broaden and improve their cultural offer in terms of communication and audience engagement. ReMusIT also provides strategic advice on management, community engagement and resilience to strengthen museums against various challenges, while promoting a broader understanding of the value and potential of Italian industrial museums through selected case studies. The project also supports museums in developing innovative communication strategies by digitizing and promoting their photographic and audiovisual archives through new technologies.

To achieve the second goal, the University of Milan's MIPS Lab leads research focusing on multimedia processing, assessment, and visualisation, particularly for cultural heritage applications such as colour management and film restoration. This work includes advanced research in audiovisual heritage acquisition, restoration, and museum visualisation, analyzing communication methods and multimedia tools in case studies, and supporting local stakeholders in developing new strategies for photo and video restoration and the enhancement of industrial museum values. The research is based on some main activities, as follows: a) assessment of photographic and audiovisual archives of each case study, in terms of film types, numerosity, conservation state, as well as implemented scanning techniques and available devices and softwares for film digitization, restoration and visualization in museal context. In particular, the assessment methodology will focus on the accuracy of the digitization protocols, to extract accurate digital information to be used in the following steps of the project. In this context, the digitization phase will be followed by the development and implementation of automatic and unsupervised methods of frames restoration and color/tones enhancement, which could improve the current state-of-the-art in this field and strongly reduce the costs in money and time to retrieve and restore images and video of historical relevance; b) identification of criticalities and evaluation of suggested improvements regarding the content, digitization, photo and video restoration, and state of archives and their communication, access and enhancement. The assessment of partners archives will regard film types, numerosity, conservation state, etc. and will result in a series of suggested improvements regarding the content, digitization and state of archives and their communication and access. Partner's archives will also be the base of research and tests on digitization techniques, mainly focused on the accuracy of the digitization protocols, the test of automatic unsupervised methods for video and images restoration, and processing, image quality tests and measures (Plutino *et al.*, 2020; Plutino and Rizzi, 2021).

The collaboration with “La Fabbrica del Cinema” will regard to provide technical consultancy and software solutions that align with the specific needs. For example, The MIPS Lab at the University of Milan will provide “La Fabbrica del Cinema” with the necessary support to navigate the initial compulsory step in the process of film digitization, namely the decision to proceed with film restoration. Should this decision be taken, the MIPS Lab will also offer guidance on the selection of the most appropriate tools for the restoration process. The decision to undertake a film restoration project is, in essence, confronted with two principal types of problem.

The first is the dependence on commercial software which has limited offer on the market, is less maintained and which requires operator training more on the software package than on the restoration

process. This creates the problem that the restoration process adapts to the capabilities of the software and not vice versa. Furthermore, another problem is that an operator who is expert in a software often finds it problematic to switch to an alternative software, underlining as well that all the skills had adapted to the software and not to the restoration process. The second problem is the time it takes to restore a movie. Restoration is essentially a process that takes place frame by frame and therefore requires similar operations that are very repeated over time. This translates into a very high cost of restoration in terms of man-months. The main proposal is the use of algorithms called Spatial Color Algorithms (SCA). These algorithms are based on computational models of the human visual system and have the characteristic of processing each frame automatically and unsupervisedly. With the simple press of a button the algorithm is able to autonomously equalize the color and contrast of the degraded frame and restore colors closer to the original ones. In many cases the simple application of these algorithms guarantees a good recovery of color and contrast, but where these are not sufficient, their modifications can be considered as a useful starting point for a final color correction, still saving a lot of time to the restorer (Rizzi *et al.*, 2006; Rizzi and Chambah, 2010; Rizzi *et al.*, 2014; Plutino *et al.*, 2021;). These algorithms have been widely tested and are available to any film library that requests them.

Conclusions

Initiatives to promote audiovisual memory in Carbonia, such as the “Your memory is our history” project, highlight the importance of preserving and making accessible cultural heritage through innovative processes of collecting, digitizing, cataloguing and disseminating vernacular films. Projects such as these make a fundamental contribution to the historical and social understanding of the community, filling in the gaps left by the official narratives, which are often limited or partial, and are capable of restoring the sense of belonging to a territory rich in discordant legacies. This reinterpretation not only allows the city’s historical identity to be addressed, but also creates a space of re-appropriation for the community and new generations. Educational projects such as the “Carbonia Cinema Giovani Film Lab” reinforce this mission. By integrating tradition and innovation, the Lab provides young people with practical experience and a strong connection with the local cultural heritage, stimulating a new sensitivity towards the past and opening up future perspectives for the community.

In the context of the ReMusIt project, the Carbonia experience highlights the dynamic role of industrial museums as spaces for critical and inclusive reflection on the cultural heritage of the territory. Through dialogue with the local community and the direct involvement of material owners, these museums promote access to cultural heritage and strengthen the sense of belonging to collective memory. In conclusion, Carbonia stands out as a model for the promotion of industrial memory and film culture, demonstrating how the use of audiovisual media, combined with dialogue between institutions and communities, can contribute to the construction of a shared memory and a deeper social awareness.

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