On the identification of colour photographic processes

Ambra Cattaneo[1], Beatrice Sarti[1], Alice Plutino[1] and Alessandro Rizzi[1]
[1]Computer Science Department, University of Milan
ambra.cattaneo@studenti.unimi.it

Abstract

For a preliminary screening of colour photographic processes, a visual inspection can be conducted to identify the used printing process and establish the subsequent investigations more consciously.
The visual inspection protocols derived from the literature do not offer a completely easy reproducible practice as some require the use of specific instruments with excessive costs. The following study aims to define a more inclusive procedure that exploits portable and inexpensive instrumentation. The methodology proposed is composed of four steps for the study of prints, from the macroscopic to the microscopic scale. The procedure's applicability was proven by analyzing a set of photographs: the result is a diversification of the collection both in terms of materials and formats. Furthermore, since the prints come from uncontrolled conservation contexts, it was possible to observe the forms of degradation typical of this condition.
To present the project, an open-access website called "Color photographic processes – Preliminary identification by visual exam" (https://mips.di.unimi.it/wp/) has been created.
Keywords: Colour photography, Identification, Conservation.

Introduction

Photographic prints combine subtractive dyes to create all colours using different subtractive processes. These processes share a dependence on the light sensitivity of silver halides, while their primary difference lies in how the dyes are formed and deposited (Weaver, 2014; Messier, 1999). Some features differ from one process to another, allowing us to identify the printing procedure, such as the order of the CMY layers, the type of support, the border, the structure of the image and the forms of decay that afflict the prints (Lavedrine, 2003; Wilhelm, 2003; National Film Preservation Foundation, 2004). The four processes considered in this study are: the dye coupler process, the dye destruction process, the dye transfer process and the internal dye transfer process.

Materials and Methods

Instruments

Optical instruments used in this project differ from the others used in literature for their portability and affordability. The apparatus has been chosen considering magnification capacity and consists of 10x magnifying glasses and two portable microscopes (PocketMicro 20x-60x LED Lighted Zoom Microscope, CARSON; MicroBrite Plus 60x-120x LED Lighted Pocket Microscope, CARSON).

The identification protocol

The proposed methodology derives from the state of the arts; the sources used are Graphic Atlas (Image Permanence Institute, 2017) and the information given by conservators Gawain Weaver (Weaver, 2014 and 2020; Weaver & Long, 2009) and Paul Messier (Messier, 1999). The novelty of this protocol lies in the fact that it considers the forms of degradation as fundamental in the identification of unique characteristics of the single process.
A four-step methodology is used: I. Print observation: preliminary visual examination of the print; it considers the type of support, colours and tones of the image, the formats, the border and the backprint; II. Surface observation: visual examination of the surface using the proper light angle of incidence on the image surface to define the surface sheen and texture; III.

Magnifications observation: visual exam through portable optical instruments to define image structure and layers; IV. Decay and damage: description of the forms of alteration and degradation and evaluation of the state of conservation.

Protocol's application

The applicability of procedure was proven analyzing a set of seventy photographs, dating back to the period between the mid-60s and 00s. The prints come from uncontrolled conservative conditions, which is the reason why almost all photographs are affected by typical forms of deterioration of incorrect handling, exposure and storage.

Conclusion

The primary objective of this work is defining a more inclusive procedure for the preliminary identification of colour photographs that exploits a portable and inexpensive instrumentation. The procedure has been developed considering the state of the arts. In this way, the established protocol was modified in order to obtain an accessible and easily reproducible methodology, whose strengths are simplicity, practicality in the use of the instruments and the affordability and attainability of tools. The need for portable instrumentation, however, has resulted in the impossibility of obtaining digital images of the enlargements, preventing the collection of exhaustive photographic documentation in support of the descriptions given during the Magnifications observation.
It is created an open access website, "Color photographic processes – Preliminary identification by visual exam", to show the processes, their history, the protocol, the characteristic forms of alteration and degradation and the application to a real collection.

References:

Image Permanence Institute (2017) *A Methodology for Process Identification, Part 1 and Part 2*, *Webinars | Image Permanence Institute*. Available at: https://imagepermanenceinstitute.org/education/webinars.html (Accessed: 2021).

Image Permanence Institute (2017) *Graphics atlas: Welcome*, *Graphics Atlas: Welcome*. Image Permanence Institute. Available at: http://www.graphicsatlas.org/ (Accessed: 2021).

Bertrand, L., Gandolfo, J.-P. and Monod, S. (2003) *A guide to the preventive conservation of photograph collections*. Los Angeles, California: Getty Conservation Institute.

Messier, P. (1999) *An Introduction to Color Photographs: Technology, Terminology and Identification*, *Paul Messier Conservation of Photographs & works on paper*. Paul Messier. Available at: https://www.paulmessier.com/resources (Accessed: 2021).

National Film Preservation Foundation (2004) *The Film Preservation Guide: The basics for archives, libraries, and Museums*, *National Film Preservation Foundation*. San Francisco, California. Available at: https://www.filmpreservation.org/preservation-basics/the-film-preservation-guide-download (Accessed: 2021).

Weaver, G. (2014) *Photo conservation - Photographic Process Controlled Vocabulary*, *Gawain Weaver Art Conservation*. Available at: https://gawainweaver.com/library/ (Accessed: 2021).

Weaver, G. (2020) *Photo conservation - Photographic Processes*, *Gawain Weaver Art Conservation*. Available at: https://gawainweaver.com/processID (Accessed: 2021).

Weaver, G. and Long, Z. (2009) "Chromogenic Characterization: a study of Kodak color prints, 1942-2008." Tucson: Topics in Photographic Preservation, Volume Thirteen.

Wilhelm, H. and Brower, C. (2003) *The permanence and care of color photographs: Traditional and digital color prints, color negatives, slides, and Motion Pictures*. Grinnell, Iowa: Preservation publishing company.