



Article: Acetate Base Stripping: a Preliminary Investigation into the Feasibility of Bulk Treatment

Author(s): Caroline Garratt

Topics in Photographic Preservation, Volume 15.

Pages: 371-375

Compiler: Jessica Keister

© 2013, The American Institute for Conservation of Historic & Artistic Works. 1156 15th St. NW, Suite 320, Washington, DC 20005. (202) 452-9545, www.conservation-us.org.

Under a licensing agreement, individual authors retain copyright to their work and extend publication rights to the American Institute for Conservation.

Topics in Photographic Preservation is published biannually by the Photographic Materials Group (PMG) of the American Institute for Conservation of Historic & Artistic Works (AIC). A membership benefit of the Photographic Materials Group, *Topics in Photographic Preservation* is primarily comprised of papers presented at PMG meetings and is intended to inform and educate conservation-related disciplines.

Papers presented in *Topics in Photographic Preservation, Vol. 15*, have not undergone a formal process of peer review. Responsibility for the methods and materials described herein rests solely with the authors, whose articles should not be considered official statements of the PMG or the AIC. The PMG is an approved division of the AIC but does not necessarily represent the AIC policy or opinions.

Acetate Base Stripping: A Preliminary Investigation into the Feasibility of Bulk Treatment

Caroline Garratt

Poster presented at the 2013 AIC & ICOM-CC Photographs Conservation Joint Meeting in Wellington, New Zealand.

Objective

This remedial treatment was performed to remove the base layer of 25 severely deteriorated acetate negatives. In doing so the emulsion pellicle was returned to a flat plane allowing the image content to become accessible once more. An additional purpose was to investigate the feasibility of bulk base stripping, following the treatment methodology published by Munson (1997: pp. 55 – 65, 2010: pp. 96 – 109). The work was executed by Caroline Garratt at the Archives New Zealand conservation laboratory under the supervision of Mark Strange, Senior Conservator of Photographs, National Library of New Zealand.

Background

Archives New Zealand has significant holdings of photographic items transferred from government agencies, including major collections from the National Publicity Studios, Forestry and New Zealand Railways. These holdings include thousands of negatives on cellulose acetate supports.

The majority of Archives' known photographic negatives are stored in a controlled atmosphere vault at 2deg C, 35% RH without air purification. However, there are large quantities of negatives currently held in general repository climate conditions, awaiting processing and separation to cool storage.

In 2010 - 2011 Collection Care staff undertook initial indicative condition surveying of Archives' photographic acetate holdings, held in open stack areas, using IPI A-D strips. The survey indicated that 29% of the photographic negatives had reached level 3 deterioration (Jackson 2011, pp. 6 - 7). Whilst further comprehensive surveying is needed an immediate plan of action was required, addressing storage concerns, digitization and the remedial treatment of negatives already exhibiting acute acetate shrinkage. It was recognized that in order to slow down further deterioration, and effectively 'buy time', Archives would need to increase its controlled atmosphere storage capacity and make improvements to its existing still and moving image vaults. At the time of writing construction of a new climate controlled store, that will house the acetate holdings currently held in general stack conditions, is almost complete. A proposal to begin digitizing the acetate holdings has been initiated, following the success of a business case to purchase a Phase One iQ180 digital back to capture the negatives to preservation specifications.

The initial acetate digitization pilot project focussed on part of a collection of film stills and publicity shots taken by the National Film Unit, a government agency that operated from 1941 to 1990. From this pilot, 56 negatives (the majority of which are 4" x 5" format) were found to have

severe base channelling from a total of 560 items. The negatives also exhibited varying degrees of plasticizer exudation, edge curl, warpage and localized de-lamination of the emulsion where channel furrows or plasticizer exudate were present. Small areas of antihalation dye had become visible on several of the negatives. It was decided to set aside the deteriorated negatives for treatment, to separate the image emulsion from the acetate base support. It was felt important to demonstrate that these severely deteriorated negatives could be returned to a legible state and negate any necessity to deaccession material that was considered to no longer be accessible. Digital retouching was not pursued as a viable solution as it was perceived it would involve a degree of reinterpretation and compromise the integrity of the original image.

Treatment Methodology and Observations

The treatment methodology was based on Munson's articles on acetate recovery. The only deviation from this method was the use of 97% Absolute Ethanol and 3% water in the final two baths, instead of 95% grain alcohol and 5% water. The negatives were interleaved with 34gsm Hollytex, which kept the items separated and allowed the negatives to be easily transited between baths.

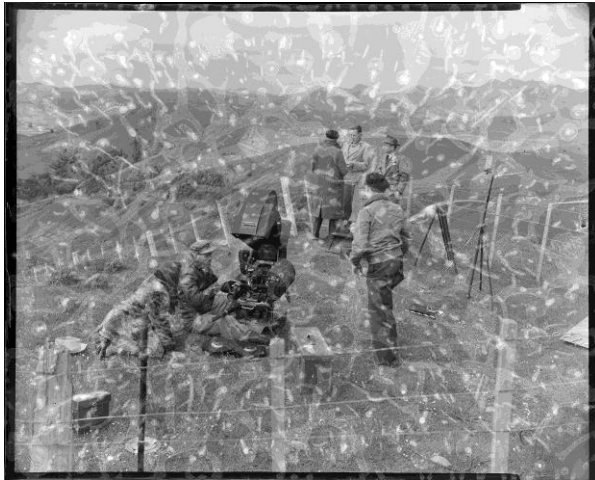


Fig. 1. Before treatment image of 'Land From The Sky' production still, 1959, National Film Unit collection, Archives New Zealand/Te Rua Mahara o te Kāwanatanga [AAPG 24449 W3939 [1], R23583806].

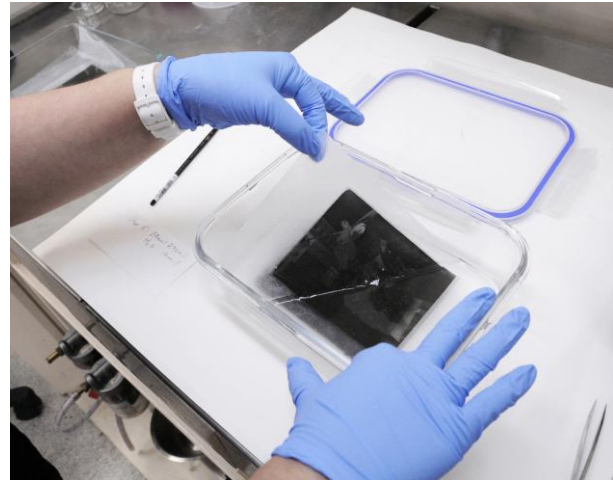


Fig. 2. Transferring a pellicle between solvent baths.

Prior to the commencement of treatment a condition report was produced for each negative and photography, both reflective and transmissive, was performed to record each image. These images would also aid identification post treatment. The treatment was carried out over a period of 8 days with an initial batch of 5, followed by a larger batch of 20 negatives. The smaller batch served to build confidence and experience and establish procedures before embarking on a batch of a size more representative of the trial objective to test bulk feasibility.

Following the first bath, the base layers from the initial batch remained in one sheet and were removed with relative ease, assisted by tweezers. The anti-curl layer in both batches of negatives removed easily and on occasion both the anti-curl layer and base could be removed as one piece.

However, the removal of the base supports on the second batch of 20 items proved more problematic and indicated a higher degree of base brittleness, with a number of the supports ‘shattering’ into shards that needed to be removed individually. Using a combination of the tweezers, a retouching brush and a spatula the base material was carefully separated from these image pellicles. It was hypothesized that the different formations of channelling observed prior to treatment, (e.g. longer chains versus shorter; circular patterns), could provide a visual indication to this physical response.

In the latter stages of treatment to the second batch a further small quantity of water (2ml) was added to the final ethanol:water bath as the pellicles retained a faint memory of channelling, indicating the need for further relaxation. In this second batch of negatives small crystals - possibly from the nitrate subbing layer or perhaps plasticizer residue - were observed on the image pellicles in the final bath. These were gently removed with cotton wool whilst in solution before placement of the pellicle into a blotter stack for drying and flattening.

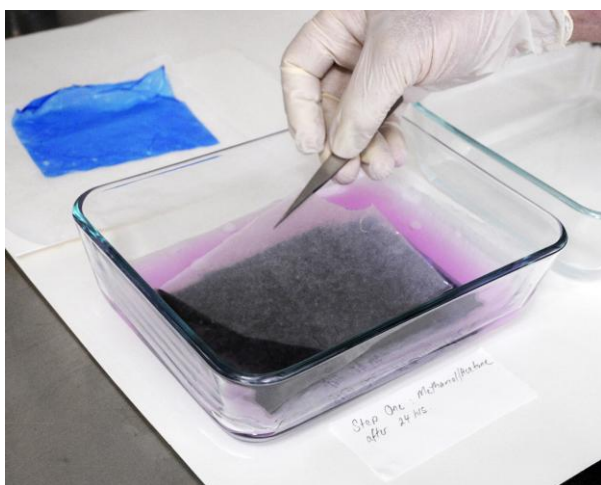


Fig. 3. Removing a base layer.

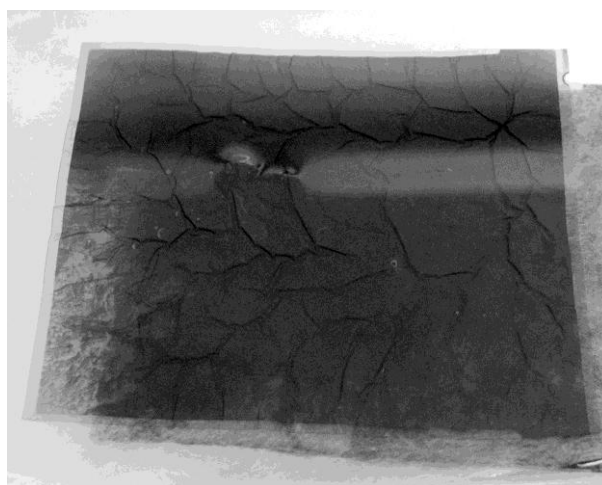


Fig. 4. Channel impressions visible on a pellicle in solvent bath.

It was decided not to re-adhere the pellicles onto a polyester support due to the extra costs, the labor intensiveness of this step and the physical risks imposed in the delicate manipulation of the pellicle. Once dried and flattened each pellicle was placed in a 4-flap enclosure, supported with a 2 ply, PAT tested board.

Findings

This trial treatment is considered a success with the bases of the negatives removed, resulting in 25 flat pellicles, which are ready for imaging and storage. In analyzing the treatment steps it is evident there could be future gains in efficiency and a reduction in costs by maintaining consecutive batches through the tray process. However, a gradual approach was adhered to in this trial in order for skills to be developed and confidence acquired. This initial treatment provided a firm basis for further trials of bulk base stripping and a deeper awareness of the materials’ properties was realized. For example, an ability to judge the evaporation of solvents and the pellicle’s reactions to moisture in the air was attained in the drying and flattening stages of the process. Future testing of increased batch sides would be of benefit to establish maximum parameters.

There are risks involved in this treatment and physical damage to the pellicle could occur, including tears and stretching causing distortion. Exposure to a higher concentration of water in the final stages can lead to the loss of the pellicle's dimensional stability (Munson, 1997, p. 56). Strict adherence to health and safety practice should be followed and the work must be performed under a fume hood. The treatment raises an ethical question in the removal of part of the item's original material. However, in regaining image clarity access to the original is restored. In addition the treatment removes the negative's inherent vice and ensures its longevity.

In future the Collections Care team will undertake more rigorous condition surveying of Archives' acetate holdings, which will enable accessions to be prioritized for digitization according to the severity of acetate deterioration. This survey will also serve to identify negatives requiring remedial treatment. The large scale of Archive's acetate holdings and the autocatalytic nature of acetate base deterioration mean a cost-effective and time-efficient bulk treatment process will likely become increasingly necessary.



Fig. 5. After treatment image of 'Land From The Sky' production still, 1959, National Film Unit collection, Archives New Zealand/Te Rua Mahara o te Kāwanatanga [AAPG 24449 W3939 [1], R23583806].

Acknowledgements

The author wishes to thank Mark Strange for his invaluable guidance and support.

References

Adelstein, P.Z. 1987, 'From Metal to Polyester: History of Picture Taking Supports' in *Pioneers of Photography: Their Achievements in Science and Technology*, ed. E. Ostroff, The Society for Imaging Science and Technology, Springfield, VA, pp. 30 - 36.

Herrera, R., Casella, L. & Bigourdan, J.L, 2007, *Hispanic Society of America: Survey Report*. Available from: http://notesonphotographs.org/images/6/6b/HSA_survey_report_final_for_web.pdf

Horvath, D.G. 1987, *The Acetate Negative Survey: Final Report*, University of Louisville, Louisville.

Jackson, S. 2011, *Photographic Acetate Survey September 2010 - July 2011 Summary Report*, unpublished internal document, Archives New Zealand.

Munson, D. 2010, 'History, Conservation and Duplication of Negatives', in *Seminar on Preservation & Management of Photographic Collections, Benaki Museum Postprints*, October 3rd – 7th 2005, ed. M. Matta, Benaki Museum, Athens, pp. 77 – 109.

Munson, D. 1997, 'The Pellicular Burlesque' in *Topics in Photographic Preservation*, vol. 7, Photographic Materials Group of the American Institute for Conservation, Washington, DC, pp. 55 – 65.

Pavelka, K.L. & Naipavel-Heidushke, V. 2005, 'A Step in the Evolution of the Treatment of Acetate Negatives', in *Topics in Photographic Preservation*, vol. 11, Photographic Materials Group of the American Institute for Conservation, Washington, DC, pp.17 – 24.

Reed, V.L. 1980/2010, 'How to Work Restoration Magic on Wrinkled Negatives (1980)' republished in *Issues in the Conservation of Photographs*, eds D. Hess Norris & J. Jae Gutierrez, Getty Conservation Institute, Los Angeles, pp. 375 – 379

Reilly, J.M. 1993, *IPI Storage Guide for Acetate Film*, Image Permanence Institute, Rochester.

Wood, C. S. 1992, 'Negatives: Positive Action' in *The Imperfect Image; Photographs their Past, Present and Future*, conference proceedings, The Centre for Photographic Conservation, London, pp. 323 – 327.

Caroline Garratt

Preservation Technician

Archives New Zealand Te Rua Mahara o te Kāwanatanga

Wellington, New Zealand

Papers presented in *Topics in Photographic Preservation, Volume Fifteen* have not undergone a formal process of peer review.