

Editor's Note: *Readers of the following paper concerning case photographs should appreciate the experimental nature of the processes described. Applications of the processes should be undertaken with caution and the usual concern for the special requirements of individual items. Comments concerning the processes described may be relayed to the author through R. Lynn Ogden, Canadian Conservation Institute, 1030 Innes Road, Ottawa, Ontario, K1A 0M8.*

The Conservation of Case Photographs

Case photographs include early photographic forms, in particular the daguerreotype (1839-1865), the ambrotype (melainotype) (1851-1885), and the tintype (ferrotype) (1852-1920). These were unique photographic positives matted with metal and glass, and displayed in decorative cases. The plates themselves had supports made of copper, glass or iron. The cases housing the plates were of decorative leather-cloth, plastic or wood, and were lined with velvet or silk.

Historical Development

The daguerreotype was introduced in 1839 and most were simple head and shoulder portraits. The image was formed on a silver coated copper plate sensitized with iodine vapour and developed over heated mercury after exposure. Fixing took place with "hypo". By 1840 a gold toner was used as a part of the fixing bath, resulting in a stronger visual image as well as providing a protective coating for the silver.

The daguerreotype image is simultaneously positive and negative, depending upon the observer's viewing angle. This duality is very strong and provides the major point of identification. By 1842, plates were being hand-coloured with dry pigment and gum. Within eight years, the daguerreotype process was being displaced by the newer wet collodion process, which was faster and cheaper but could not match the daguerreotype in the delicacy or range of tones. Nevertheless, it was used from 1852-1885 with numerous modifications and revisions to the process being made by photographers. The collodion process could have had any of three products: a negative or one of two positives. The ambrotype was an underexposed negative on a glass base which, when backed with a black lacquer, produced a positive image. The second positive, the tintype, was a black-lacquered iron plate. Identification of these two often requires the removal of the plates (photographs) from their cases.

The ambrotype was developed with a diluted developer which had nitric acid added, though mercuric chloride was often substituted for the acid. Either compound decreased the blackness of the reduced silver. The plate was fixed in a solution of potassium cyanide rather than "hypo", since the latter resulted in a darker negative image and thus a poorer positive. Once dry, the back of the glass plate was coated with a black Japan lacquer, thereby changing the image from a negative to a positive. The emulsion was usually coated with a colourless varnish. Hand-tinting was done with water colour, oil, wax crayon or dry pigment and completed before the plates were varnished. Flaws in the manipulation of the process include reticulation and emulsion flaking because of rapid drying, as well as abrasive marks and scratches. Some photographers coated their plates with albumen before coating the emulsion thereby reducing the possibility of flaking. Fading in ambrotypes resulting from residuals is rare since potassium cyanide, the fixing agent, could be effectively removed even with a minimal wash. Faded images could indicate the use in the developer of a corrosive sublimate, such as mercuric chloride.

The tintype consisted of a wet collodion emulsion placed on a blackened metal plate and developed in an iron developer. Problems with the tintype included scratching which leads to emulsion losses and the deformation of the plates themselves.

The case for these photographs frequently were a form of moulded material composed of gum shellac and dyed wood fibre, plastic, wood or paper. They were usually dark brown or black with relief patterns that included floral and geometric designs. The case interiors were lined with velvet or silk, with metal mats and frames to protect and decorate the photographic plates. Generally, the cases contained a single photographic plate with a metal matt buffer, a protective glass plate and an ornate metal binding frame to hold the entire assembly together. The edge of the frame often was taped to seal the contents from the environment, and this entire unit was fitted into the case.

Case Repair

The first component available for conservation treatment is the case. The plate is removed from the case by gently prying it out with the flat end of a scalpel. Once removed, the plate is placed to one side and the case examined. The paper backing on the plate side of the case is removed (it usually shows acid discolouration) and the case is dusted with a stiff bristle brush. The case is now wiped with a cotton swab saturated in a 10% formalin solution. Swabbing is done with a circular motion over the entire case using a progressive number of swabs, both inside and out, until a clean swab remains. Dab dry all damp areas after swabbing because the solution must not be allowed to remain on the surface long enough to soak through the material. The velvet or silk is brushed again and a quick pass with the formalin swab is made over the material and along its seams. Acid-free matt board is then cut to fit the area of the original paper in the plate side of the case to isolate the plate from the case wood.

Very often, the leather hinges on these cases have been broken and a paper hinge must be installed. The procedure is as follows:

1. Cut to size a length of strong Japanese handmade paper (Kurotani) and brush with a thick starch paste.
2. Dampen the leather with water and remove mechanically (Fig. 1).
3. Once the leather is removed, paste the hinge area lightly, taking care to remove any excess paste.
4. Place the paper on the case and adjust to fit (Fig. 2). Place the leather strips upon the paper, matching the tear seam and pressing to remove excess paste.
5. Allow overnight drying with weights to insure alignment (Fig. 3).
6. Just before opening the case, bruise the new hinge seam with a thumbnail (Fig. 4).

Breaks occurring within the wooden frame of the case are repaired with a PVA adhesive, the excess being removed and the case being weighted down during drying. The case is now ready to receive the conserved photographic plate. Spotting and other superficial improvements are undertaken at the discretion of the worker and would require a preparation of the case surface.

Non-Photographic Components

The framed photograph is now separated into its component parts. The plate is laid upside down and the outer protective frame is gently bent out of its normal position and the contents removed. This brass frame is very pliable, but is liable to break at the corners because of its thickness and the embossed pattern. The glass, matt and plate are now separated by removing first the plate, then the matt, and finally the glass. The plate is again placed aside, the metal matt and frame are put in a fume hood and the glass prepared for cleaning.

The glass is washed in a 2% solution of FL-70, a biodegradable detergent, and once dirt and tape are removed, it is dried over an air blower. The metal parts may show tarnish, discolouration and soil. These parts are first swabbed with acetone to remove grease and dirt, then immersed in methyl-ethyl-ketone to loosen the discoloured varnish, and again, upon removal, mechanically cleaned with a ketone swab. Once the varnish layer removal becomes apparent, immerse in a 5% solution of sulphuric acid. While in this acid bath, the

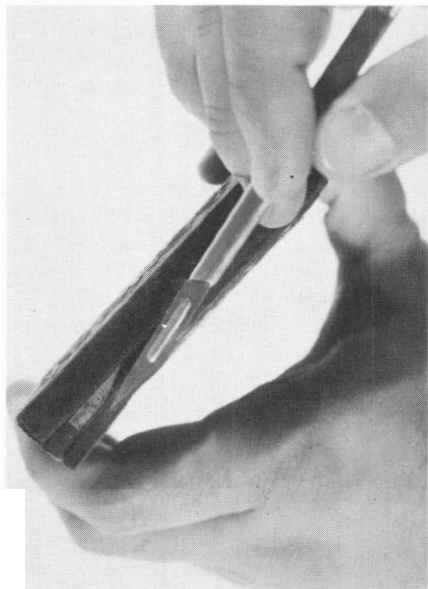


Fig. 1

Figure 1 shows the leather hinge being lifted with a scalpel blade, and Figure 2 illustrates the pasted Kurotani being placed in position.

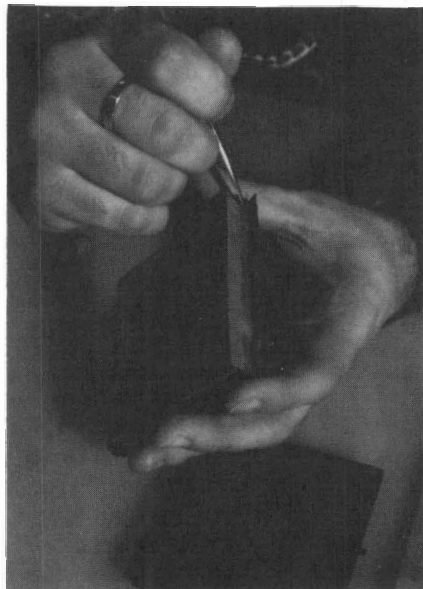


Fig. 2

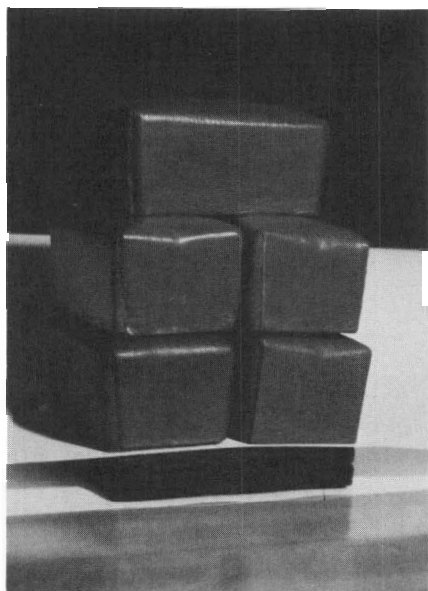


Fig. 3

The case is dried overnight under pressure of weights (Figure 3), after which the repaired hinge is bruised to permit opening (Figure 4).

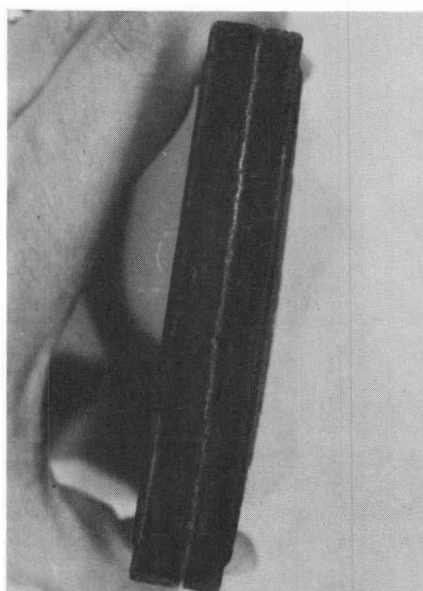


Fig. 4

metal is removed regularly and brushed with a bristle brush to ensure an even cleaning action. Care must be exercised to avoid scratching the metal's surface. Should this first cycle prove insufficient, the ketone-acid treatment is repeated until the desired level is achieved. Finally, the metal parts are immersion-coated with Incralac, a toluene soluble tarnish inhibitor.

The Daguerreotype

A daguerreotype suffering only surface soilage may be brushed by skilled personnel with a soft sable hair brush and if necessary, washed by immersion in a 2% solution of FL-70. A water rinse followed by an alcohol bath will aid in the even drying of the plate over an air blower. The plate's surface is very delicate and direct contact should be avoided. Should the plate be tarnished — the result of a reaction of silver with hydrogen sulfide, producing silver oxide and silver sulphide — employ the acid-thiourea treatment¹ to remove tarnish.

The sequence of steps is as follows:

1. Wash in a 2% solution of FL-70 to remove dirt and tape.
2. Immerse in the thiourea bath and use slight tray agitation (lift plate from bath when tarnish removed).
3. Rinse with distilled water and immerse in alcohol.
4. Dry the plate with air blower using cool air.

The daguerreotype is now ready to be reassembled and the component pieces are laid out in the order as required. A water soluble glued linen tape is used to tape the unit together and once sealed, it is reinserted into the case. The daguerreotype must have a matt between the plate and the coverglass, otherwise sulphides will attack and tarnish the plate leaving behind a stencil outline of the metal matt.

The Ambrotype

The two major problems with ambrotypes are soilage and the flaking of the black backing (Fig. 5). Early ambrotypes tend to have only a partial backing left, especially those on which an asphaltum coating was utilized. The emulsions for ambrotypes were generally gun cotton in ether and alcohol (collodion) but some photographers also used albumen. Many solvents will damage the thin emulsion of the ambrotype, therefore any treatment requires spot testing. Varnished emulsions can be washed with a detergent swab but liquid immersions should be avoided because the emulsion will separate from the glass plate support.

For a backing that is flaking, the remnants are removed mechanically and a dead black cloth backing is applied. Relacquering with asphaltum is not recommended because it will shrink with age and because the lacquer contains compounds which will damage the emulsion. To remove the residual areas, the backing is softened with an alcohol immersed swab and stubborn units are mechanically removed with a scalpel. The plate is then cleaned on both sides with Kodak Film Cleaner² and backed with a dead black polyester fabric. The material is pasted (wheat starch) to the acid-free card before reassembling. *Should the backing not show signs of flaking, it should not be removed.*

Some later ambrotypes were photographed on a rose coloured glass thereby eliminating the need for a black backing. These look very much like tintypes, especially the highlight tones, and they must be removed from their cases for a positive identification. These same plates often had their protective glass plates cemented to the emulsion affording greater image protection, except where the adhesive had dissolved the emulsion. The glue seam is usually covered by the metal matt and so is not readily visible to the observer.

1 Following is a variation of Eugene Ostroff's (Curator-Photographer, Smithsonian Institute) formulation: 500 ml. distilled water; 6.5 g. thiourea; 0.7 ml. 85% phosphoric acid; 1 drop non-ionic wetting agent; distilled water to 900 ml.

2 A formalin swab treatment was used initially, but it might prove to be harmful in the long-term life of the artifact. Therefore, it was replaced by the film cleaner.



Fig. 5



Fig. 6

Before and after pictures of a conserved case, ambrotype and contents. Note dirt and discoloured metal parts as well as the flaking of the black backing in Figure 5.

Solvent tests made on the ambrotype emulsion revealed deformation of the emulsion with water, methanol and acetone. The Kodak Film Cleaner solution did not cause a change in the emulsion and so was used both to clean the plate and to act as a fungicide.

The Tintype

Tintypes are collodion emulsions on a black or brown varnished iron plate. The emulsion is just as fragile as the ambrotype, but better adhesion exists between the support and the emulsion permitting short liquid immersions. The soap solution is used and applied by swabbing the plate. Scratches, a major problem with tintypes, are covered with a commercially-prepared gum arabic solution totally varnishing the image and providing a retouching base for watercolour compensations.

Slightly bent plates are treated by burnishing the rear surface with a piece of plexiglass, the edge of which has been rounded. Care must be exercised not to abrade the emulsion while burnishing the back of the plate. Rust spots are removed from the back either mechanically with sandpaper or with deoxidizing agents such as naval jelly.³ Once the treatment is completed, the back of the plate is coated with toluene soluble Inralac to inhibit rusting.

Storage

The storage of case photographs is similar to the general recommendations for photographic collections. Avoid extremes of temperature and relative humidity. Too dry an environment will generate flaking on ambrotypes, while a moist environment will result in mold or rust on tintypes. A relative humidity of 40-50% and a temperature of 20°C can be considered optimum. Sulfide environments are to be avoided and a well-ventilated area is

³ Available as a commercial preparation. A substitute for this product for rust removal has been suggested by Robert Organ, Head, Conservation-Analytical Laboratory, Smithsonian Institute: 35% phosphoric acid; 20% ethanol; 5% butanol; 1% hydroquinone; 39% water. Apply with a brush, let stand, then wash off.

required. Although tintypes and ambrotypes have a very thin nitrocellulose emulsion, the magnitude of the decomposition products of the nitrocellulose is such that isolation from existing collections may be needed but unique storage rooms are not required. Excessive light levels may cause damage to varnish and tinting. Each case should be wrapped and stored independently of others to reduce wear and, if possible, should be stored vertically in slipcases. To minimize handling of the originals because of their brittle support, ambrotypes and case photographs should be photographed with a fine-grained, large format film to facilitate research.

Points of Interest

Various factors discussed in this paper require further investigation. For example, Robert Organ of the Conservation-Analytical Laboratory, Smithsonian Institute, recommended in a private communication the use of a sulfide-absorbing matt between the daguerreotype's metal matt and the plate. This would neutralize sulfide gasses entering the case. Another point emphasized the possibility of emulsion damage during the process of image consolidation for ambrotypes.

In the course of treating the daguerreotype plates, it was noted that those with a yellow-gold tint were less tarnished, suggesting that gold toning may be a possible tarnish inhibiting treatment for conserved plates. It was also observed that the modified thiourea formulation (see footnote 1) lost its action very quickly with each plate treated, and in the case of heavy tarnishes it could not complete the cleaning cycle. A fresh bath was therefore prepared for each plate, and a second bath used for the most heavily tarnished plates. The second bath had double the weight of thiourea, and once the cleaning action had slowed in the first bath, the plate was transferred to the second until cleaned.

The treatments mentioned in this paper are now being prepared for accelerated aging tests in order to establish their utility as conservation processes.

Bibliographic Note

In addition to observations deriving from the experimental process, and the generous assistance of David Dudley and Robert Senior, both of the Canadian Conservation Institute, the following works were consulted for the preparation of this paper: Carl Dame Clark, *Pictures: Their Preservation and Restoration* (Maryland: The Standard Arts Press, 1959); *The Focal Encyclopedia of Photography* (Norwich, England: Fletcher and Sons Ltd., 1969); Peggy Ann Kusnerz, "Preservation of Case Photographs," a reprint from *Michigan Museums Review* in *Canadian Museum Association Gazette*, vol. 7, no. 2, 1973; Eugene Ostroff, "Conserving and Restoring Photographic Collections," *Museum News*, issues for May, September, November, 1974; Eugene Ostroff in *Caring for Photographs*, by the Editors of Time-Life Books (New York: Time Inc., 1972) pp. 34-38. Two lecture hand-outs were also used: D. B. Thomas, Keeper, The Science Museum (United Kingdom) "The Wet Collodian Process" and A.T. Gill, Curator, Royal Photographic Society (United Kingdom) "The Daguerreotype."

Siegfried Remple
Canadian Conservation Institute

FOCUS: Simcoe County Archives

Whatever else the uncharacteristic, not to say chauvinistic, Canadian Centennial celebrations did, they left, along with a plethora of centennial parks, a very valuable addition to the cause of historical preservation in Simcoe County. The Simcoe County Archives springs largely from the same nationalistic urges which brought us Expo '67.