Understanding the Historical Possibilities of Photos and Problems with their Conservation

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1. Introduction: Objects and Process

Well over 20,000 dry photographic glass plates, taken from 1898 through 1945, exist at Historiographical Institute the University of Tokyo. Many of them depict images of lost or destroyed objects. These dry photographic glass plates represent an important historical source for these no longer extant items. Nevertheless, some of these dry glass plates, already a hundred years old, are starting to degrade. Thus, how to use these dry photographic glass plates as sources, and preserve them is quite a germane topic for the present.

In addition, if one is to use the content of these dry photographic glass plate negative images as a source, it is necessary to know when the photo was taken, by whom, and where. For many years, this basic information about these dry photographic glass plates has not been known. In order to solve this problem, one approach is to focus on the particularities of the dry photographic glass plate development process, or to pay attention to the photographers and developers, and the process of dissemination and preservation of these images. In other words, focusing on the photographs themselves as objects can prove illuminating. In addition, by exploring when the photographs were taken, recorded, borrowed, and the like, one can ascertain the process of their use, and by comparing photographs as objects that have survived through an ongoing process of use, it is possible to learn much about, and from, these photographs.

1. Understanding Dry Photographic Glass Plates as Objects: Repairs and Additions

First, let us look at the dry photographic glass plates at Historiographical Institute the University of Tokyo. We have discovered that over 90% of them have been retouched or altered after their original development. The changes to the images can be categorized as follows.

A. Retouching. Places where the photographs were damaged were retouched with ink, brush, or lead pencils. At times the objects in the photograph are retouched to look better.
B. Opaque. Adjusting the dark gradient. Often a way of repairing the image. One type of retouching.
C. Masking. Covering unneeded parts of the print with paper or other substances.
D. Varnish coating. Using varnish to retouch the image layer or coating the under layer in order to preserve the image.
E. Removing the image layer. In order to reuse the glass, or for issues of storage space, removing the image layer from the glass, and storing it as film.

F. Restoring the image layer to glass. In order to allow for collotype printing, the image layer from a glass will be removed, turned over, and transferred to another piece of glass.

The above changes serve two functions. The first is to make it possible to print photos in a visually appealing way. The other option is to preserve the photographs. Thus, we need to pay attention of authenticity to photographs which have been altered or restored. For example, Inoue Toshizō, took a photograph of Sakamoto Ryōma during what has been surmised to be the sixth month of 1867. Detailed analysis of the wet collodion glass plate negative reveals that the negative was retouched in the area of Ryōma's face. Thus, a comparison between this retouched image and other images is not a reliable way of ascertaining the identity of Sakamoto Ryōma in other prints. In other words, it is essential to recognize that certain prints which have been thought to be reliable primary sources, have in fact been altered over time and thus, before being used, require further analysis and study. In the future, digital images that are drawn from these photographic glass plate negatives must be analyzed so as to ascertain how the images were altered before uncritically using them.

2. Peeling and Transferring Dry Photographic Glass Plate Image Layers

Of the dry photographic glass plates owned by the Historiographical Institute, some have been created by peeling the image layer off of glass plates and transferring it to another glass plate. This decisive development in photography at the Historiographical Institute came about in 1900, when Shōsōin documents were photographed and collotype prints were produced, published the next year, and entitled *The Documents of Japan* (*Dainihon komonjo*). This was the first time that a detailed photograph of an original document was published. It did not merely convey the written characters of the document, but also its detailed appearance. Because of collotype prints, images that would have been accessible to only a handful of individuals could now be viewed by many.

Collotype printing requires printing from a reverse of the image. This meant that a prism was placed in front of a large camera, in order to make a reverse image of the object for the glass plate negative. Nevertheless, in many cases, instead of adopting this approach, the image layer was removed from the glass so as to allow for a photograph to be correctly printed. Likewise, in cases where many photographs were published, this process of peeling and transferring images proved to be more convenient. Thus, many images could be printed from a single glass plate image. In recent years, as many now rely on digital photographs, few understand this process. But in order to properly use collotype images as historical research sources, I would like to introduce this process of peeling and transferring dry photographic glass plate images.

3. The Process of Peeling

As I stated before, the process of peeling involves removing an image from a glass plate, turning it over, and attaching it to another piece of glass. Peeling and transferring dry photographic glass plate images occurs when the image layer is peeled off the glass, transferred, and attached to another piece of glass. This work was done as part of the process of making plates of collotype print.

In modern day digital photography, these methods are no longer used. Indeed, to further complicate our understanding of this process, little has been written about this actual method in

detail. The process of peeling image layer and transferring, which originated in France, and spread to Germany where collotype printing was mastered, and from there transferred to Japan, represents a forgotten technology.

Nevertheless, the process of peeling images from glass plates continues to be performed by one company in Kyoto, Japan, Shinyōsha, and thanks to their cooperation, and in particular the help of a Mr. Hayashi Yukichi, I was able to reconstruct the process of peeling images from glass plates. Practices that had previously only been orally transmitted were filmed in 2014.

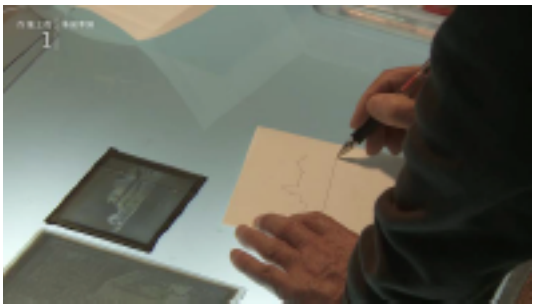
What I would like to do next is explain the process through which image layers were peeled from glass. I will explain it in five stages. 1. Preparation; 2. Hardening the image layer; 3. Removing the image layer; 4. Reattaching the image layer to new plate of glass; and 5. Adjusting (retouching) the final image.

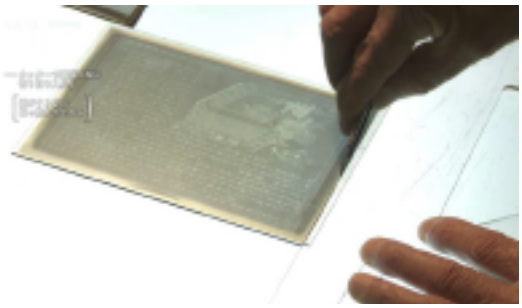
＊This work requires the use of a draft chamber to mitigate the ill-effects of harmful gases that are dispersed during this process.

4. The Process of Peeling and Transferring: A Video Introduction

1. Preparation

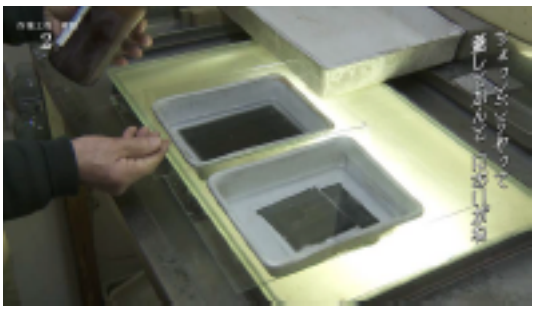
First, the image to be removed from the dry photographic glass plate is sketched so as to be a reference for when it is reattached to a different plate of glass. Using a cutter knife, the excessive white areas around the edge of the photo are removed. We have discovered that it is much easier to remove the image after removing the edges like this.

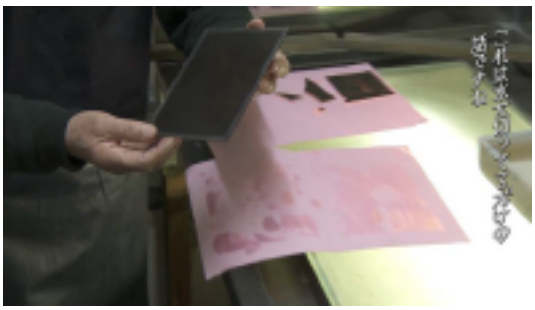




2. Hardening the Image Layer

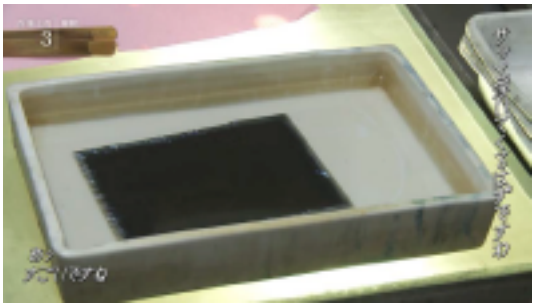
The dry photographic glass plate is soaked in formalin overnight so as to harden the image layer on the glass. It is then allowed to dry naturally.
According to Mr. Hayashi, older dry photographic glass plates need to be soaked for a longer periods of time. The amount of formalin required, and the length of time needed to soak the image depends on the age of the dry photographic glass plate, and experienced craftsmen can determine the amount and time needed for images of different ages.

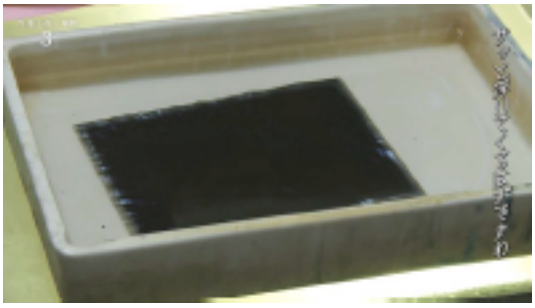


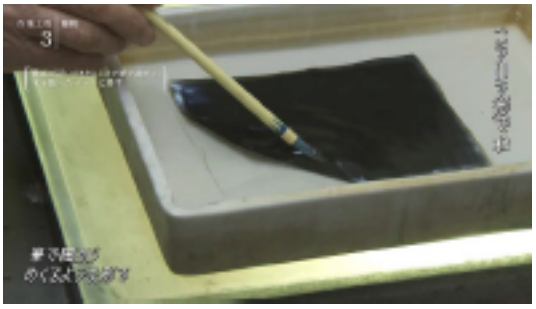


3. Removing (Peeling Off) the Image Layer

The dry photographic glass plate is washed with water. To do this, dip the glass plate in water, and let it dry. Dilute 50 cc of a hydrofluoric acid solution with one liter of water, and immerse the glass plate in this solution. Very quickly the image will rise off the glass. If the developing process is good the image will float off quite easily. Using a paint brush, completely remove the photographic image layer from the glass plate. Move the image layer into a vat containing water.

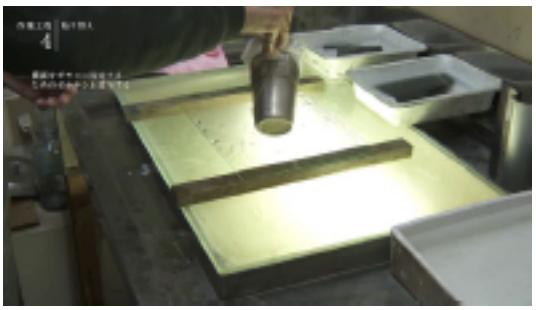
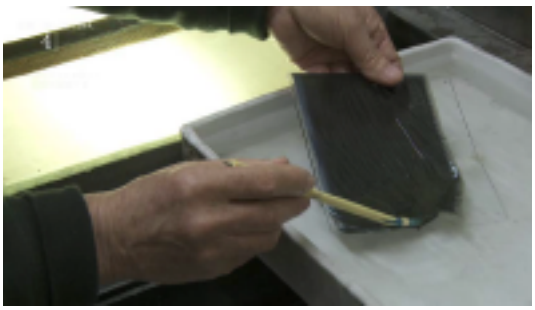


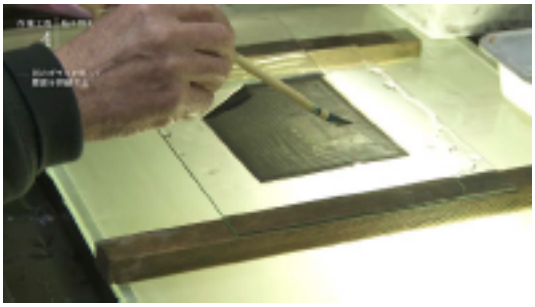




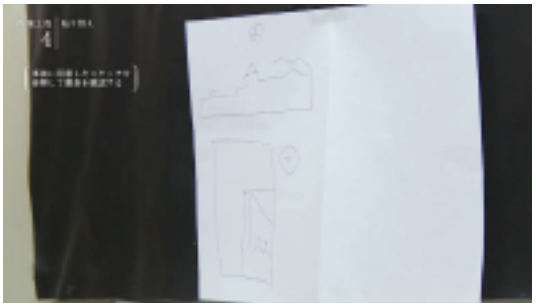
4. Reattaching the Image Layer to New Glass

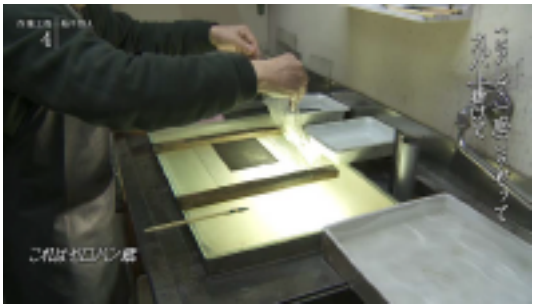
Next, place the image layer on a new piece of glass. Boil and dissolve 10 grams of gelatin in 100 cc of water. Pour this gelatin mix on the glass (it will be used to attach the image layer to the new glass plate). Spread out the image layer in the water with a brush, place it on the piece of glass to transfer, and then from that piece of glass move it by brush to the glass coated in gelatin. Cover with cellophane paper that has been placed in water. Flatten the image layer on the glass as depicted here. Dry the glass plate, and the transfer is complete.



Images from broken glass plates can be reattached as well and reversed as needed for collotype printing. The image layer is scooped out and the image flipped based on the initial sketch. Layers with multiple pieces can be difficult to bond because each piece expands and contracts at different rates. The layers are pasted and flipped horizontally, so as to allow for collotype printing. Then the excessive glass is then cut.






5. Retouching the Image

After cutting the excess glass, varnish for retouching the image layer side (on cellophane) that has been attached to the glass. Use a pencil to retouch areas where there are gaps, which are missing pieces of film, and retouch other imperfections with ink.
Analysis reveals that many of the old photos are coated with varnish, but none were coated in cellophane. According to Mr. Hayashi, depending on the state of the image, it is decided whether or not to use cellophane.


Conclusion

In this talk, I have demonstrated the process of peeling the image layer from a dry photographic glass plate. As a result of this process, the size of the original image may change in some cases. This means that the current photo can differ in terms of size from the time when the image was originally developed. I have shown too that formalin is vital for removing the image layer from glass plate. If you use the same amount of formalin for two identical sheets of glass but soak the images for either one (Right photo) or two hours (Left photo), you can see a great difference in the replaced image. The shorter period expands the image.


Thus, inadequacies in the original image layer cause the transferred image to become elongated. In cases where old images, reattached to glass, are used as historical sources, special care needs to be taken when considering the dimensions of the image, which may now be distorted.

In terms of preservation, it should be obvious that a variety of chemical compounds were used in order to remove the image layer from the glass. In addition to the chemical composition of the glass, the use of these compounds presents a danger in the preservation of these images. In reality, at the Historiographical Institute there are cases where images removed from glass and

restored solely with gelatin have already degraded. Over a long period of time, changes in these images need to be analyzed and taken into consideration. This observation is significant.

Recently, photographs have been thought to be able to be a superior method of reproducing primary documentary sources, and are valued equally with original documents. In addition, through their replication, they have been valued as enabling many people to gain a clearer sense of the past. These sentiments are unlikely to be overturned. There is no way to know definitively whether the image layer on glass plate was adequate or not, when analyzing dry photographic glass plates that are over a hundred years old. This method of removing the image layers from glass plates asks us to reconsider of the reliability of these images as historical sources. In the future we need to more carefully read photographs as objects.

New Trends in the Study of Medieval Japanese Documents

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