



Article: The Great Exhibition of 1851: AN Introduction to A Research Project and Preliminary Findings

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THE GREAT EXHIBITION OF 1851: AN INTRODUCTION TO A RESEARCH PROJECT AND PRELIMINARY FINDINGS

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Abstract

The Great Exhibition of the Works of Industry of All Nations was held in the Crystal Palace in Hyde Park, London from 1 May to 15 October 1851. During the five months that the exhibition was open over 6 million people paid at least a shilling to visit.

As a thank you to the nations and various persons that had participated in the exhibition or had aided with the organisation, the Royal Commission, which was established to organize the event, decided to present each, a luxury presentation set of the official catalogue. This catalogue was made up of 8 volumes of which four, Reports by the Juries, were to be illustrated by means of photography.

This paper will focus on preliminary research performed on albumen glass plate negatives which were used to print some of the photographs in the Presentation Catalogue. Glass plate negatives in 3 collections were studied and analysis of glass plate negatives was performed by the Getty Conservation Institute and by The Netherlands Institute of Cultural Heritage. The preliminary results of this research are presented.

Introduction

History of the Great Exhibition

The Great Exhibition of the Works of Industry of All Nations was the first in a series of World's fair exhibitions of culture and industry. It was organized by the Royal Commission under the patronage of Prince Albert (Queen Victoria's consort), modelled after the earlier French national exhibition and held in the Crystal Palace in Hyde Park, London from 1 May to 15 October 1851.

The architect of the Crystal Palace, Joseph Paxton, was the former head gardener of the Duke of Devonshire and his design was chosen by the Royal Commission largely due to the lucrative material choice of glass in a cast-iron frame, and because the design was widely accepted by the general public. The identical and interchangeable parts of glass and metal were composed to form a huge glass building resembling a giant greenhouse. The building was comprised of 990,000 square feet of exhibition space and measured 408 feet high to accommodate a row of elm trees that were located at the site where the Crystal Palace was to be erected. The building was built in nine months and comprised 7000 British and 6000 foreign entries.

During the five months that the exhibition was open over 6 million people paid at least a shilling to visit and view the newest developments in industry and art. The visitors viewed items such as silks, kitchen appliances, clocks, furniture, farm machinery and 145 photographs including: daguerreotypes, cyanotypes, crysotype, chromatype and Talbotypes on paper, silk, ivory, wood, etc.

The exhibition had great influence on industry and culture and for people that were not able to visit, there was a plethora of information made available. Books, pamphlets, official and unofficial guides and catalogues, sermons, songs and music, poetry, travel guides, trade literature, children's books and games, satirical stories and cartoons. Illustrated works including prints on paper and photographs were produced for sale as souvenirs and advertisement.

History of the Presentation Catalogue

To commemorate the event and to serve as thank you to heads of states of participating countries, the organizers and various other persons, the Royal Commission decided to commission the making of a luxury presentation set of the official catalogue. The presentation catalogue was composed of 8 volumes of which four, Reports by the Juries on the Subjects in the Thirty Classes into which the Exhibition was divided, were illustrated with salted paper prints.

The Hundred-and-fifteen presentation editions of the catalogue and fifteen additional copies of the illustrated volumes, produced for Henry Fox Talbot in exchange for using his patented process, were published by William Clows and Sons, London. The paper was of the finest quality and produced by Spicer Brothers and each of the 8 volume catalogues was hand-bound in red Moroccan leather by Robert Rivière. The end papers were of Kings Blue Moiré paper and the letters "VA" were stamped in gold on the inside and outside covers and on the spine.

The 154 salted paper prints are believed to have been taken by Hugh Owen (1804-1881) and Claude Marie Ferrier (1811-1889) using the paper negative and the albumen glass plate negative process. The printing of the salted paper prints is credited to Robert Jefferson Bingham (1825–1870). Ferrier used the albumen negative process, a technique which was first published by M. Niepce de Saint-Victor, in the *Technologiste*, in 1848.

The Albumen Glass Plate Negative Process

In a publication by T. A. Malone, in *Art Journal*, in 1850, the following recipe is given, "To the white of an egg its own bulk of water is to be added; this mixture, beaten into a froth, is then strained through a piece of linen cloth, and preserved for use in a glass-stoppered bottle." Malone goes to say that the glass support should be cleaned using a solution of caustic potash or any other alkali and then rinsed in water and dried using a cloth. Prior to application of the albumen it was recommended to breath on the glass and rub its surface with clean, new, blotting paper and to remove paper fibers using cotton, wool or a piece of new linen. The albumen was to be applied by pouring the mixture onto clean glass and inclining the plate from side to side. The excess was poured off the end of the corners. Malone further recommended breathing on or warming the lower half of the plate as soon as the albumen "ceased to drop rapidly". This heating action caused the albumen to become more fluid and spread easily. After application, the plate was dried with a lamp or "by a common fire".

The albumen plate was iodized using vapor and when the film was yellow, the plate was removed from the iodine and plunged vertically into a solution of aceto-nitrate of silver. When a milky color changed was perceived (seconds) the plate was washed in distilled water and ready for use. Development, according to the Art Journal article, was done by pouring gallic acid over the exposed plate.

Research Project

Introduction

As part of an extended research project surrounding the photographs in the Reports by the Juries on the Subjects in the Thirty Classes into which the Exhibition was Divided, thirty-one glass plate negatives made by Ferrier and used to print some of the salted paper prints, were located in the collections of the Rijksmuseum, Amsterdam, the Netherlands; the Getty Research Institute, Los Angeles, USA and the Victoria and Albert Museum, London, England. Preliminary investigation of the plates using visual analysis, X-ray fluorescence (XRF) and Fourier Transform Infrared spectroscopy (FTIR) were performed to establish glass, binder and finishing characteristics and to identify the image forming substance.

Glass Support

The glass support of the thirty-one albumen glass plate negatives varied from 1 millimetres to 2.5 millimetres in thickness. More research is needed to understand the reasons for the variations in thickness. Some of the glass plates have a clear tone when viewing the edges and others have a greenish tone reminiscent of window glass. Historian Marc Osterman, of the George Eastman House mentioned during a workshop on the ambrotype process in Berlin, Germany (31 July, 2007) that various types of glass and thicknesses were used in photography during the nineteenth century.

Binder

The binder is matte and thin. It is applied by pouring the binder onto the glass plate and pouring marks are visible along edges and in corners of many of the studied negatives.

A sample of the binder from a badly deteriorated and flaking plate, in the collection of the Getty Research Institute (GRI), was analysed by FTIR expert Thea van Oosten at the Institute Collectie Nederland (ICN, -Netherlands Institute for Cultural Heritage, Amsterdam, the Netherlands). The FTIR spectra from the sample, matched reference samples for historic and modern albumen confirming that indeed the glass plate negatives were made via the albumen process.

Image tone

Variations in tonal range were visually detected amongst the different plates. The visual appearance of the D-min or highlight regions are clear to pale yellow and some plates have clear to pale green highlight tones. The D-med or medium density areas show a pale yellow to orange/yellow and others exhibit pale green to olive green image tones. Some D-max (dark or shadow) areas of the thirty-one glass plate negatives showed orange to chocolate brown and others appear olive green to almost black in image tone. By visually investigating the thirty-one plates, it can be concluded that either a yellowish or greenish tone of the binder can be observed. Further research is needed (and will be performed) to establish the reasons for the variations in tone.

Image forming substance

Investigation of the image forming substance on all 26 glass plates in the GRI collection was performed at the Getty Conservation Institute (GCI) with Dusan Stulik and Art Kaplan using XRF analysis. Analysis revealed high silver peaks indicating the image forming substance to be silver. Light silver mirroring in D-max areas of unvarnished plates support this analysis.

Finishing Techniques

Three types of finishing techniques were visually encountered during preliminary investigation of the the thirty-one glass plate negatives. These techniques included: masking and retouching, varnishing and local mechanical reduction of the albumen binder.

Masking and Retouching

Although the terms masking and retouching are often used interchangeably, this author makes the following distinction. The term masking is used when large areas of the negative are manually covered with a light-masking substance, removing the image to produce a D-min area during printing. The term retouching is used when small areas are manually worked to produce cosmetic improvements: remove blemishes or to fill lacunae in the negative.

Not all plates have signs of retouching or masking but both types of finishing techniques were visually identified on the thirty-one glass plate negatives. Masking was performed much more frequently than retouching. The lack of retouching may indicate that the albumen binder was stable and not easily damaged during processing or printing.

Both masking and retouching were performed using a black medium. Retouching appears to be applied using a small brush and small brush strokes are commonly visible in retouched areas. Due to the lack of retouching and lack of FTIR analysis in retouched areas, very little can be said about the type of medium and its characteristics.

The masking medium used on the various negatives is matte or has a satin-gloss. The difference in appearance may indicate that various recipes may have been used and may indicate that masking was performed by various persons involved in the processing or printing of the plates. The matte masking appears to be applied in a thin, even layer. The application of the satin-gloss masking is in comparison much thicker and brush strokes are clearly visible. Preliminary FTIR analysis on a sample of the thicker satin-gloss masking was performed at the ICN in February 2007, with Thea van Oosten and indicates that an asphalt-like substance was used.

Varnishing

Of the thirty-one plates that were visually examined, it appears that six plates were varnished. There seems to be no correlation between masking, retouching or image tone and varnishing, and the reasons for varnishing these six plates are not self-evident. In the varnished plates, varnishing is applied to either the entire plate or to image areas only.

Varnishing appears in all cases to be flowed onto the image side of the negative. Masked areas are in all cases left unvarnished except for flow marks left by the varnish in local areas where the excess varnish was poured off the plate. The flow marks covering the masking appear to move in one direction, -towards the edge of the plate. From the flow marks it is evident that plates were masked prior to varnishing. The flow marks and residue varnish are also visible on the glass side of some plates indicating that varnishing may have been performed quickly.

Local Reduction of the Albumen Binder

For lack of a better term, local reduction of the albumen binder refers to a finishing technique that is visible on several plates where the albumen binder is mechanically reduced in local areas

of the plate. Due to binder remnants that are locally left behind on some of these negatives, it is possible to see that the removal of the albumen binder was performed mechanically. Scrape marks that correspond to scraping a sharp blade back and forth in order to physically remove the binder are visible in these areas.

In the negatives studied, local reduction of the binder was inconsistently used in images depicting sculptures; some images of sculptures show the binder present and others show that the binder surrounding the object has been removed. The visual result of reducing the binder is an even dark background area in the photographic print.

By locally reducing the albumen binder the exact opposite effect to that of masking (using a black medium to cover areas in the negative) is attained; instead of the lightest image tone, the deepest image tone is achieved in the resulting photograph. Masking is performed in D-min areas such as in sky areas and removal of the binder is performed in opposite areas, in areas that print out to be the dark tones in the print.

The reason that this technique may have been applied is to “mask-out” any objects visible in the background that would otherwise be visible in the print. By creating a dark image region surrounding the object, the object becomes the center of focus in the image and contrast in the image is created. A light (D-min) background, achieved by masking, would be less successful surrounding the object especially if your object is made from light-colored materials as for instance marble.

A variation in the local reduction of the albumen binder can inconsistently be seen in other images depicting sculptures. The binder depicting the background in these images is kept intact, but the albumen binder corresponding to the plaque on the pedestal (base) on which the sculpture is mounted, has been mechanically removed. In the resulting print, a dark square (D-max) in the area in which otherwise the information printed on the plaque would show, is visible. A conceivable reason for this type of mechanical reduction may be that the negative was printed in reverse and this would be visible by the printing on the plaque.

Conclusion

This research is a preliminary study in the albumen glass plate negative process. The glass support, binder and image tone of thirty-one albumen plates used for printing salted paper prints in four of the eight volumes of the presentation catalogue for the Great Exhibition of 1851, were visually analyzed. Analysis shows that the image can vary from yellow to greenish image tones in varying degrees. The albumen binder is matte and relatively stable, -negatives did not have to be varnished for protection against abrasion. Albumen flow marks are visible at corners and along edges and silver mirroring is visible in the D-max regions of unvarnished plates. Masking and retouching are visible in several of the negatives and six negatives are varnished with a clear varnish that was flowed onto the plate or a portion of it. Some negatives exhibit areas where the binder was mechanically reduced. This can be seen in the background of sculptures and in the plaque on the pedestal of the sculpture.

Research to study the characteristics and materials used to make albumen glass plate negatives is ongoing and an effort will be made to locate other glass plate negatives used in the printing of the presentation catalogue. Research surrounding the albumen glass plate negative process is a

small portion of a greater research project surrounding the photographs printed in the presentation catalogue of the Great Exhibition of 1851. This research will be supplemented by efforts to locate and study the paper negatives that were used for the printing of the Presentation Catalogue and supplemented by efforts to investigate the printing techniques that Robert Bingham used. Finally this author hopes to inventory the visual differences between images using the Talbot patent and images that were made via the albumen negative process.

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