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# Héliogravures : the unpublished photogravure process of Édouard Baldus

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**HÉLIOGRAVURES:**

**THE UNPUBLISHED PHOTOGRAVURE PROCESS OF ÉDOUARD BALDUS**

By

Jennifer I. Yeates

Honours B.A., Fine Arts, Studio Specialization, University of Waterloo, 2007

A Thesis Project

Presented to Ryerson University,

the Art Gallery of Ontario,

and the

George Eastman House International Museum of Photography and Film

In partial fulfillment of the requirements for the degree of

Masters of Art

In the program of

Photographic Preservation and Collections Management

Toronto, Ontario, Canada

2010

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Jennifer I. Yeates

Héliogravures: The Unpublished Process of Édouard Baldus.

Masters of Art, 2010

Jennifer I. Yeates

Photographic Preservation and Collections Management

Ryerson University

This thesis project uses an incomplete set of twenty six héliogravure prints by Édouard Baldus (1813-1889) from the publication *Les Principaux Monument de la France, reproduit en héliogravure par E. Baldus 1869-70*, which are held at the Art Gallery of Ontario. The prints are utilized as a primary means of analysis in an attempt to understand Baldus' working method, as he never published his photogravure process, and about which little is known.

The thesis is composed of five sections: 1) a discussion of Baldus' place in photographic history; 2) an examination of the complete set of forty five héliogravures in the publication based on the copy at the Canadian Centre for Architecture; 3) a case study looking at the relationship between Baldus' albumen prints and his héliogravures; 4) a second case study analyzing and comparing the physical nature of the photogravure works of William Henry Fox Talbot, Charles Nègre, Peter Henry Emerson and Alfred Stieglitz; with the intension of, 5) deciphering the method Baldus could have used in printing his héliogravures.

## ACKNOWLEDGEMENTS

I am grateful to the faculty and staff of Ryerson University and the Art Gallery of Ontario for their help and support. Specifically, I would like to thank my thesis adviser, Mike Robinson for his enthusiasm and his great efforts to explain things clearly and simply. Also, I would like to offer my gratitude to the Canadian Centre for Architecture. Without the generous support of their library staff, I would not have had the opportunity to view Baldus' albums at such length. I am indebted to many others who have helped me along the way. In particular, Katy Whitman, Chris Evans, David Harris and Malcolm Daniel deserve special mention.

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## INTRODUCTION/METHODOLOGY

This thesis project has a very tight focus. It will attempt to determine the likely process by which Baldus produced his héliogravures as well as shape, as conclusively as possible, the specifics of his aesthetic and technical method. In part this will be achieved by researching other photographer's known techniques. Baldus was one of the most successful proponents of photographic processes, producing a large body of work which provided a rich pictorial record of Nineteenth Century France. Because of this, it is important to stress the value brought to our appreciation of Baldus' works by having a better understanding of his working methods.

In order to discover Baldus' process, an examination of his works which reside in the collection of the Art Gallery of Ontario (AGO) will be carried out. The works consist of views of major, known monuments within France such as the Arc du Triomphe, Bibliothèque du Louvre and the Notre Dame Cathedral. His works have beautiful detail and prominent tonal ranges, both which were extremely difficult to achieve during his time, which is one of the many reasons why knowing how he achieved such great works is beneficial to the history of art. Also being studied is an edition of the complete album, *Les Principaux Monument de la France, reproduit en héliogravure par E. Baldus 1869-70*, which exists within the Canadian Centre for Architecture (CCA) in Montreal, Quebec. To clarify, the twenty six prints from the Art Gallery of Ontario have the same provenance and are loose duplicates of the original works found within the album at the CCA. (Appendix A)

This thesis will begin with a discussion of Baldus' involvement within photographic history over the span of his career, followed by an assessment of the works within the album, *Les Principaux Monument de la France*, as well as other albums and works which he disseminated during the mid to late nineteenth century in Europe. These discussions will build an understanding of Baldus' choices as a businessman and artist during his own time.

Before the final hypothesized process is discussed, two case studies will be carried out. Each will aid in determining the aesthetic, chemical and technical procedures Baldus may or may not have been using.

CASE STUDY 1: While looking at other albums of Baldus' works, it was noticed that he would occasionally print héliogravures using the same negatives he used for his albumen prints. With

this case study, it is hoped to determine some of the aesthetic choices which Baldus made while printing, by comparing his two printing processes, using identical imagery.

CASE STUDY 2: This case study will analyze the works of other photographers working toward perfecting the gravure process. Investigating strictly Baldus' prints proved limiting when looking for a process that is not recorded. Certain photographers were chosen in order to obtain a more diverse range of methods being used before Baldus' time, during the same time period and a decade afterwards. These photographers are; Nicéphore Niépce, William Henry Fox Talbot, Karl Klíč, Charles Nègre, Peter Henry Emerson and Alfred Stieglitz. This case study will look at the clues to Baldus' working method by comparing specific process artifacts such as; tonal quality, grain detail and paper support, within each of the other photographers works, as well as the twenty six prints found at the Art Gallery of Ontario.

Finally, this thesis will conclude with a discussion of Baldus' hypothesized method. It is important to be aware that because the process is not recorded, the conclusions drawn can never be entirely proven.

## LITERATURE SURVEY

Since Édouard Baldus began producing photogravures in the year 1854, only one writer has written substantial information on his life, techniques, and career as a pioneer of the early development of photography. Malcolm Daniel is the only real secondary authority on Baldus in the world. Daniel began his research in 1991 with his PhD Dissertation at Princeton University and has continued to be on the forefront regarding Baldus ever since. He has developed Baldus exhibitions at many museums as well as published several articles, and books. He therefore remains one of the most authoritative sources. Upon reviewing many sources, it was found that there are limited obtainable resources discussing the photogravure processes developed by Baldus, and only a few recorded of other photographers of that time, such as Charles Nègre.

The field of photogravures has received considerable analysis in recent years. Despite these renewed investigations, the analysis of the field remains rather inactive. Most writings on photogravure provide a standardized depiction of the seminal figures and their technical advancements. For example, most works mention early photographers such as Nègre, Niépce and Talbot in the 1850s and 1860s, Karl Klíč in the 1880s and then photographers who revised the process post Klíč such as Stieglitz and Emerson in the 1880s through to the 1910s. In this routine account Baldus' offerings are nearly always absent. The reason for this omission is due largely in part to source material. Nègre, Niépce, Talbot, and the like all have documented accounts of their attempts to create a process that was permanent. In addition to this there are also sufficient samples of their work for comparison. Baldus, conversely, never published his process and was actually quite secretive regarding it. As a result, his prints remain the only available source material, and there is little written documentation. This is most evident in the fact that one of Malcolm Daniel's key pieces of historical written information on Baldus' process comes not from Baldus himself, but from his assistant Louis Figuier who mentions briefly how Baldus was said to be working at the time.<sup>1</sup>

Malcolm Daniel's research aside, Baldus has not received adequate scholarly attention. Amongst his contemporaries Baldus was regarded as an influential figure in the photogravure process. The fact that Baldus' fellow photographers were interested in his work proves his

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<sup>1</sup> Daniel, Malcolm R. "The Photographic Railway Albums of Édouard-Denis Baldus." Ph.D. diss., Princeton University, 1991 p. 98

contributions in the field of photogravures. Additionally, his works have stood the test of time, and remain beautifully toned and in good condition. The subsequent lack of scholarly attention is unfortunate, but understandable given the lack of primary sources for analysis. There are a few French sources written by Blanquart-Évrard, Louis Figuier, Ernest Lacan and André Jammes which all focus mainly on Talbot and Nègres' achievements. These sources from time to time mention that Baldus' works are similar to other photographers in certain ways, but do not list any specifics of his process.<sup>2</sup> Louis Figuiers' text discusses in a matter of three sentences a few specifics of Baldus' process, as he was working as one of Baldus' apprentices at the time. It is difficult to hold this as fact as every other source looked at mentions the fact that Baldus' process was unknown, but it will be taken into consideration, and discussed during the analysis portion of this thesis.

There is a plethora of secondary process-based books outlining the step by step process of photogravures. Unfortunately, Baldus is largely overlooked in almost all this material. Most of these works instruct the reader on the actual creation of photogravures, and include very little on the historical background of the practice. Most process manuals have very small sections on the historical aspects of photogravures, and what is included focuses on the already established figures in the field.<sup>3</sup>

Sources which concentrate on the historical aspects of photography and photogravures have not been any more sympathetic to Baldus' contributions. The analysis of photogravures is dominated by the usual names of Nègre, Niépce, Talbot, Klíc, Stieglitz, Steichen and Emerson. These works chiefly examine the major breakthroughs and inventors of the process, but rarely

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<sup>2</sup> Blanquart-Évrard. *La Photographie, ses origin, ses progress, ses transformations*, Jammes, Andre. De Niépce a Stieglitz: *La Photographie en taille-douce*, Lacan, Ernest. *Le Moniteur de la Photographie*, Figuier, Louis, *Le Photographie* (for complete citations see bibliography)

<sup>3</sup> An examination of the following process-based sources was conducted; Coe, Brian et al. *Techniques of the World's Great Photographers*, Crawford, William. *The Keepers of Light: A History & Working Guide to Early Photographic Processes*, Kolb, Gary. *Photogravure: A Process Handbook*, Lavédrine, Bertrand. *Photographs of the Past: Processes and Preservation*, Morrish, David and Marlene MacCallum. *Copper Plate Photogravure: Demystifying the Process*, Mills Cartwright, Herbert. *Photogravure: A Textbook on the Machine and Hand Printed Processes*, Nadeau, Luis. *Modern Carbon Printing*, Sacilotto, Deli. *Photographic Printmaking Techniques*. (for complete citations see bibliography)

mention Baldus in relation to photogravures. When he is analyzed, the analysis is often directed towards his more popular accomplishments dealing with the *Mission Héliographique*.<sup>4</sup>

There have been three exhibitions spotlighting Baldus' works.<sup>5</sup> Of these, only one was specifically focused on Baldus' héliogravures. It was entitled *Héliogravures: Selections from Les Principaux Monuments de la France*, an exhibition at the Art Gallery of Ontario in 1994. The other which detailed his life was entitled, *The Photographs of Édouard Baldus: Landscapes and Monuments of France*, held at the Canadian Centre for Architecture and The Musée Nationale des Monuments Français, Paris in 1995 and 1996. The accompanying publications fail to mention Baldus' process, but do mention the fact that it was, and still remains unknown. Of the many other exhibitions which detail the history of photomechanical processes, there is no mention of Baldus, and surprisingly little of photogravures.

Perhaps the most telling example of Baldus' omission from the history of the photogravure process is his exclusion from the website, *The Art of the Photogravure: a Comprehensive Resource Dedicated to the Photogravure*. As the world presently relies on the internet for research, this site is currently the most visited website dedicated to the process. It highlights every other photographer stated in the history of the process, apart from Baldus.<sup>6</sup>

Lastly, Malcolm Daniel is the leading source on Baldus having written three substantial works; *The Photographs of Édouard Baldus*, a 1994 catalogue from the exhibition of the same title shown at the Metropolitan Museum of Art, the Canadian Centre for Architecture, and Musée National des Monuments, his dissertation *The Photographic Railway albums of Édouard Baldus* (1991), and a paper adapted from his dissertation entitled *The Beginnings of Photogravure in 19<sup>th</sup>*

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<sup>4</sup> The following history sources were studied; Frizot, Michel, ed. *A New History of Photography*, Ganz, James A. *Édouard Baldus at the Chateau de la Faloise*, Hannavy, John. "Baldus, Édouard Denis" in *Encyclopedia of Nineteenth-Century Photography; Volume I*, Jammes, André and Eugenia Parry-Janis: *The Art of French Calotype, with a Critical Dictionary of Photographers, 1845–1870*, Newhall, Beaumont. *History of Photography: from 1839 to the Present*, Pennell, Joseph. *Etchers and Etching*, Schaaf, Larry. *Out of the Shadows: Herschel, Talbot & the Invention of Photography*. (for complete citations see bibliography)

<sup>5</sup> The catalogues researched were; Benson, Richard. *The Printed Picture*, Delas, Arnaud. *Édouard Baldus (1813-1889): Important Ensemble de Photographie Provenant d'une Famille Lyonnaise*, Jammes, André. *De Niépce a Stieglitz: La Photographie en taille-douce*, Sun Pictures, *Catalogue 12: Talbot and Photogravure*, Sutnik, Maia Mari. *Héliogravures: Selections from Les Principaux Monuments de la France*. (for complete citations see bibliography)

<sup>6</sup> *The Art of the Photogravure: A Comprehensive Resource Dedicated to the Photogravure*. Accessed 13 November, 2009. <http://photogravure.com/history/chapter/html>.

*Century France*, published in 1995. While each of these sources does provide information on Baldus and his contributions to the art of photogravures, they focus more on Baldus' life and his other offerings to the field of photography. Each of Daniels' writings discuss Baldus' method at a minimum, with nothing more than a few sentences on the subject<sup>7</sup> Due to the limited information on Baldus within sources solely devoted to his career, it is apparent that there is a lack of accessible resources for those interested in the subject.

While little scholarly attention has been given to Édouard Baldus and his héliogravures, their inclusion in Malcolm Daniel's writings from 1991 to 1995 demonstrates that Baldus' works at some point have been considered in some way, even if only by one scholar. What has been written to date reveals limited knowledge in the field, but the lack of obtainable information should not decrease the importance of Baldus' work to the field of photogravure. The fact remains that Édouard Baldus was a seminal figure in the héliogravure process, and was one of the most successful early advocates of photographic processes.

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<sup>7</sup> Daniel, Malcolm R. *The Photographs of Édouard Baldus*, with an essay by Barry Bergdoll. New York: Metropolitan Museum of Art; Montreal: Canadian Centre for Architecture; New York: Harry N. Abrams, Inc., 1994. p. 96 & 117. Daniel, Malcolm, R. *The Beginnings of Photogravure in Nineteenth-Century France*. Institute for Research in Art/Graphicstudio, University of South Florida, Tampa, March, 1995. p. 10-11., Daniel, Malcolm R. "The Photographic Railway Albums of Édouard-Denis Baldus." Ph.D. diss., Princeton University, 1991. p. 96, 106.

## HISTORICAL INVESTIGATION OF EDOUARD BALDUS

Édouard Baldus (Fig. 1) had a hand in the progress of early photographic processes. In his time he developed a large amount of prints which documented France's architecture during the nineteenth century.

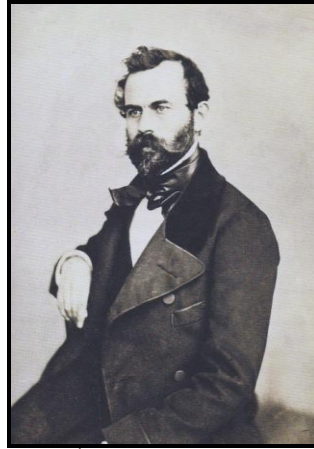


Fig 1. Édouard Baldus, *Self Portrait*, Salted paper

Baldus was German born in Westphalia in 1820 and later became a citizen of France. In his twenties he started his artistic career as a portrait painter in New York, and soon afterward moved back to France, giving up painting for photography. In 1851, he became a member of the Société Héliographique working alongside well known photographers such as Hippolyte Bayard, Gustave Le Gray, Henri Le Secq and O. Mestral.<sup>8</sup> On a commission by the government of France, known as *Missions Héliographique*, each of these photographers were assigned a different part of France to document. At this time, photography had become, undeniably, the medium of choice to record truthful images. It would continue to be used as the most fitting

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<sup>8</sup> Maia Mari Sutnik, *Héliogravures: Selections from Les Principaux Monuments de la France*. (Toronto: Art Gallery of Ontario, 1994): 4.

means of communicating information to the world.<sup>9</sup> Without photographs, the only visual record of the world would be through paintings and drawings.

One of the major concerns of photography at the time was that prints were likely to fade. Baldus, along with many other photographers began to experiment using photomechanical processes, believing that ink based techniques would be the answer to the issue of permanence, and provide a way to mass produce their images.<sup>10</sup> Baldus' response to the demand for greater permanence was to create a variation of the photogravure method which he coined *héliogravure*, thus Baldus was also an inventor.

Baldus was working on his method of *héliogravures*, a few years before Honoré d'Albert, duc de Luynes, a patron of the arts sponsored a competition in 1856 that would award the person who would come up with the best method of creating stable prints. Many artists and inventors submitted their ideas to the competition, including works by; Charles Nègre, Paul Pretsch, and Alphonse Poitevin. The smaller prize of two thousand francs was given to the person that made the most progress towards a process for permanent photographic positives. The larger prize of 8,000 Francs was awarded to the best process for producing photographs using printer's ink.<sup>11</sup> As none of the processes submitted were able to achieve results worth awarding, a further five years were allowed for contestants to refine their methods. Finally, at this time the larger prize was given to Alphonse Poitevin, regardless of the exceptional results achieved by Charles Nègre. Louis Désiré Blanquart-Évrard was frustrated by the results of the competition declaring that because this was a competition, there was no sharing of ideas which therefore delayed the discovery of a suitable process.<sup>12</sup>

It is interesting to note that Baldus had chosen not to enter his process in this competition as he was a businessman he emphasized the use of *héliogravures* to publish his own photographs in the late 1860s. This first portfolio of images led to the issuance of several other albums containing his works as he would continue to publicize his prints within them. Baldus seems to

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<sup>9</sup> Maia Mari Sutnik, *Héliogravures: Selections from Les Principaux Monuments de la France*. (Toronto: Art Gallery of Ontario, 1994): 6.

<sup>10</sup> Brian Coe et al, *Techniques of the World's Great Photographers*. (Secaucus, N.J: Chartwell Books, 1981):44.

<sup>11</sup> Malcolm Daniel, "The Beginnings of Photogravure in Nineteenth-Century France" (Colloquium on Photogravure held at the Institute for Research in Art / Graphicstudio, University of South Florida, Tampa, 22-24 March 1995):7.

<sup>12</sup> John Hannavy. "Baldus, Édouard Denis" in *Encyclopaedia of Nineteenth-Century Photography; Volume I*. (New York: Taylor & Francis, 2008): 108.

have made a choice to create and use this method as he was aware of the commercial future of his prints, realizing that other processes were bound to fade over time.<sup>13</sup> Baldus' gravures were part of a period in the development of photographic technology which led to reasonably priced, permanent and widespread distribution of images. At the time, he had perfected his technique to the point where he was able to sell works for as little as one franc per print. Today, with new technologies available, approximately one hundred prints can be made from a single plate, compared to about five to ten made using the post 1880 Klíč gravure method. Baldus must have been using a plate that was strengthened to some degree to be able to print a handful of prints at a time, saving him both time and money. His price was so low that Baldus would become one of the top sellers of gravure prints at the time.<sup>14</sup> It has been stated that Baldus kept his process a secret on "perhaps the well founded pretext that it was among the simplest methods being used." He could have been doing so as his method was fast, affordable and the results were a beautifully printed.<sup>15</sup>

Today, Baldus is mainly recognized for his five year period of work with the *Missions Héliographique* focusing on his photographs using processes such as albumen and salted paper. Malcolm Daniel acknowledged that,

"From the standpoint of original artistic creation, Baldus' gravure production is overshadowed by his photographic output of the 1850s and early 1860s. Historical records must begin to show that photogravure was his primary means of distributing his images during the latter half of his career, and a constant technical preoccupation within five years of his first photographic work"<sup>16</sup>

This notion warrants further research of his process as there is a regrettable lack of recognition for his works.

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<sup>13</sup> Malcolm Daniel, "The Beginnings of Photogravure in Nineteenth-Century France" (Colloquium on Photogravure held at the Institute for Research in Art / Graphicstudio, University of South Florida, Tampa, 22-24 March 1995):10.

<sup>14</sup> Malcolm R. Daniel, "The Photographic Railway Albums of Édouard-Denis Baldus." Ph.D. diss., (Princeton University, 1991):99.

<sup>15</sup> Malcolm R Daniel, "The Photographic Railway Albums of Édouard-Denis Baldus." Ph.D. diss., (Princeton University, 1991):96.

<sup>16</sup> Malcolm R Daniel, "The Photographic Railway Albums of Édouard-Denis Baldus." Ph.D. diss., (Princeton University, 1991):106-7.

*LES PRINCIPAUX MONUMENT DE LA FRANCE, REPRODUIT EN HELIOGRAVURE PAR E. BALDUS 1869-1870*

Beginning in the mid 1860's and lasting until the early 1880's, for more than half of Baldus' career as a photographer, his primary commercial activity was the production of gravures for use in countless publications. His first major publication was issued from 1866 to 1869 and was filled with reproduced ornamental engravings by past master printmakers such as; Hans Holbein, and Albrecht Durer who were both working during the early 1500's.<sup>17</sup> His first original publication of his own works was three-volumes showcasing the architectural detail of the Louvre and Tuileries palaces in France. Baldus was able to create publications filled with works that were unrivaled in their amount of detail and richness of tones.

Due to the success of his volumes on the Louvre, he continued to reproduce works that showed various interior and exterior views of architecture throughout France. This led to the publication of *Les Principaux Monument de la France, reproduits en héliogravure par E. Baldus 1869-1870*, first published in 1869 which consisted of a series of forty-five architectural *héliogravure* prints of monuments in France, much like those seen in his prior albumen works. This publication along with many of Baldus' other works, was created on a commission as France's government was concerned with preserving national monuments as they were forever changing under construction. These publications were to be used as reference for architects who would eventually be employed to restore these landmarks.<sup>18</sup>

The album, *Les Principaux Monument de la France* is housed within a canvas Hollander box within the collection of the Canadian Centre for Architecture. The album was originally created in three installments; two sets of twenty prints, and a set of five.<sup>19</sup> The Canadian Centre for Architecture in Montreal, as noted, holds one copy and the Victoria and Albert Museum in London holds another. There are plentiful duplicate prints from this album that have been placed in museums all over the world along including the grouping of twenty-six which are held at the

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<sup>17</sup> John Hannavy. "Baldus, Édouard Denis" in *Encyclopaedia of Nineteenth-Century Photography; Volume I*. (New York: Taylor & Francis, 2008): 110.

<sup>18</sup> Brian Coe et al, *Techniques of the World's Great Photographers*. (Secaucus, N.J: Chartwell Books, 1981):42.

<sup>19</sup> Malcolm R Daniel, "The Photographic Railway Albums of Édouard-Denis Baldus." Ph.D. diss., (Princeton University, 1991)

Art Gallery of Ontario, in Toronto. The complete set is held the CCA's collection within a elaborately decorated album. (Fig. 2 & 3) The album has a two inch red leather spine stretched over the decorated pattern. The outside cover details a spotted marble pattern in reds and browns, where the inside marble cover holds the addition of blues and greens to the patterning.



Fig 2. *Les Principaux Monument de la France* (Album Cover)



Fig 3. *Les Principaux Monument de la France* (Inside Cover)

The book measures 18.5 x 25 ¼ x 1 ¼ inches and weighs approximately ten pounds. The first page of the album is a title page, detailing the given name of the album in decorative block lettering made by letterpress, the address of Baldus' studio in France. Each print is titled and occupies a signature stamp of Édouard Baldus. (Fig. 4 & 5)

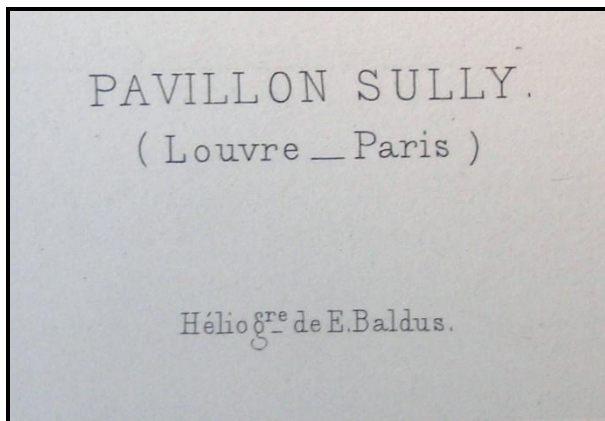


Fig 4. Édouard Baldus Letterpress Signature Stamp

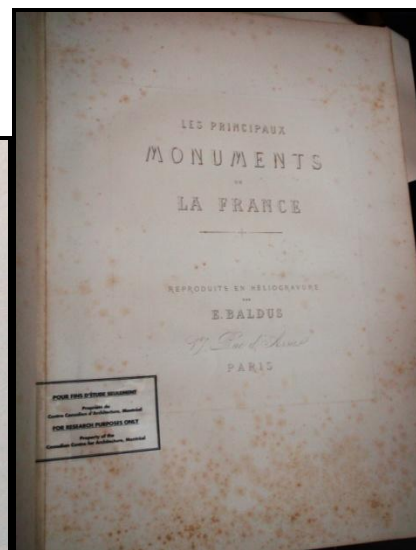


Fig 5. *Les Principaux Monument de la France*, (Title Page)

Images within the album are all the same size whether they were horizontally or vertically printed. This size is a standard printing plate spanning 12 ¾ x 16 ½ inches and the

paper size is 14 ½ x 18 ½ inches. Each print has the title of the location of the image centered in letterpress below the image, as well as Baldus' signature héliogravure stamp found on each of his gravures.

It has been noted that some nineteenth century albums were created in such a fashion that the buyer of the album would be able to pick and choose which prints they would want, and would buy them individually. When these prints were delivered, the buyer would have to bind them together themselves, or send them away to be bound. This could also be the reason for the unique album covers found on each album. This could possibly be the reasoning for the graphite numbering system located on the top right corner of each page (in this case numbering from 1 to 45) (Fig. 6) as well as for the different order in which they are found within other albums.<sup>20</sup>

(Appendix B) The CCA version of the album begins with a print of the Palais des Tuileries, followed by the Arc de Triomphe de l'Étoile and ends with a print of the Église de Saint-Trophime. The pages are all bound into this beautiful album using two L-shaped pieces of paper affixed along the spine of the album. (Fig. 7) They are each glued into place thereby holding the rest of the pages in place.

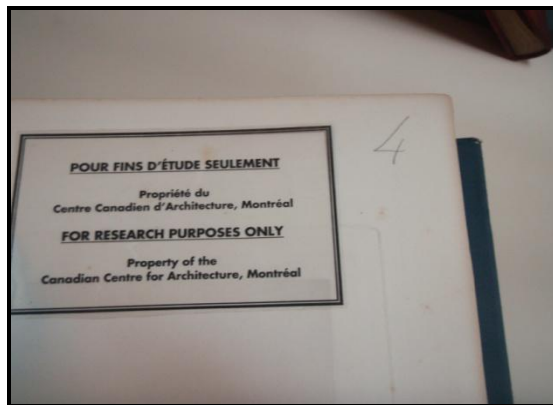


Fig 6. *Les Principaux Monument de la France*  
(Evidence of Numbering System)



Fig 7. *Les Principaux Monument de la France*.  
(Album Binding)

<sup>20</sup> David Harris, interview by author, Montreal, Canada. February 26, 2010.

The album suffers from a few areas of deterioration, which are important to note. Each of the forty five prints within is separated by a piece of acidic paper which has significant amounts of ink transfer from the prints transferring onto them. (Fig. 9) These separating pages would be the reason for the browning around the edges of these prints. The acidic paper would also be the reason for the brownish red spotting all over the surface of the prints, known as foxing.<sup>21</sup>(Fig. 8) The prints are all subject to a small amount of warping from the storage conditions. The pages toward the front of the album are in the worst condition as they are the pages viewed most often by viewers, thus frequently being taken out of their environment and exposed to light, as well as oils from viewer's hands.

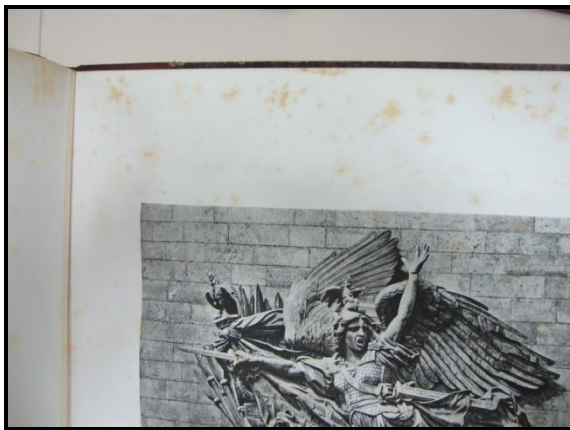


Fig 8. *Les Principaux Monument de la France*  
(Evidence of Foxing)



Fig 9. *Les Principaux Monument de la France*  
(Evidence of Ink Transfer)

Within the Art Gallery of Ontario's collection, the loose twenty six héliogravures are also found housed and stored within three large black cases with metal fasteners within the Prints and Drawings Vault. Two boxes house nine prints and the last holding eight of the gravures. These works are in undamaged as a result of being stored at the proper relative humidity and temperature, as well as being stored between non-acidic paper sleeves. This is possible as the prints are not fastened into an album and thus can be taken care of individually. The prints at the CCA must be kept in their original state to preserve the provenance of the album. Other than deterioration in the form of foxing and warping, the imagery of the CCA prints is still comparable to those at the AGO.

<sup>21</sup> James Reilly. *Care and Identification of 19<sup>th</sup> Century Photographic Prints*. (Eastman Kodak Company, 1986):35.

The provenance of the AGO *héliogravures* comes from a donation from Mr. and Mrs. Bernard Rasch. The Raschs' have played a large role in the archival world within Canada in the last twenty years and they acquired these works from the CCA as they were extra prints that were held with the original album. They then donated them to the AGO in 1990 and 1991. Each work within the AGO's collection measures 24  $\frac{3}{4}$  x 17  $\frac{1}{2}$  inches. (Appendix B)

## CASE STUDY 1: COMPARISON BETWEEN HÉLIOGRAVURES AND ALBUMEN PRINTS PRINTED WITH THE SAME NEGATIVE

Within the Canadian Centre for Architecture's collection are two albums which hold Baldus' albumen prints depicting the same monuments seen in *Les Principaux Monument de la France*. One is called, *Vues et Monument de France* which was made in 1861, and the other *Monuments de Paris*, 1862, both made almost a decade before his gravure albums. (Fig. 10 & 11)

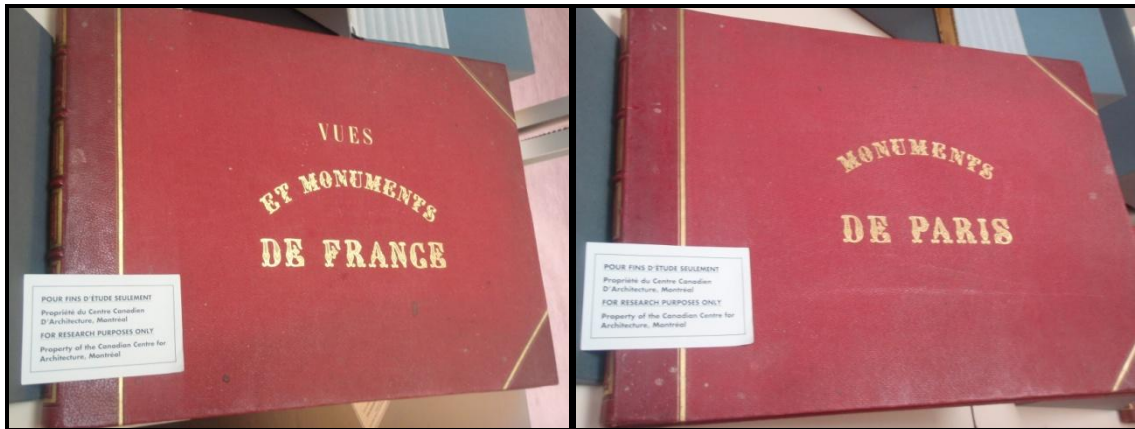


Fig 10. *Vues et Monument de France* (Albumen Album) Fig 11. *Monument de Paris* (Albumen Album)

Each of these albumen albums is comprised of approximately one hundred albumen photographs. Though each holds additional views of architectural detail, not depicted within *Les Principaux*, there are many similar if not identical prints found within. Works that have been printed from the same negative used for his albumens and gravures will serve as a reference in determining Baldus' specific choices made when printing these two processes. In looking at the differences seen between prints made from the same negative, Baldus' aesthetic decisions become evident and therefore can be discussed.

In order to determine that these gravure prints were in fact created from the same negatives used to print his albumen works, factors such as size and registration lines of each work were analyzed. Detailed measurements were taken on the surface of each print in order to determine if the registration lines matched correctly. For example, if an element such as a street lamp found within an albumen print measured the same height and distance from the building behind in the corresponding gravure and if various other markings lined up within both prints, then it is most likely a work printed from the same negative. The issue of cropping was also

taken into consideration as many of the images found within *Les Principaux Monument de la France* had been cropped. Luckily, in some prints, the subject matter differed slightly in each process so it was easy to note that these few works were not printed from the same negative.

After examining each of the works found within these two albums, it was noted that there were eleven identical prints to the héliogravures found within the album *Monuments de Paris*, and three identical prints found within the album *Vues et Monuments de France*. Therefore fourteen of the original forty-five within the album *Les Principaux Monument de la France* were made by using the negatives used for his other publications. Of the twenty six works from the Art Gallery of Ontario, looked at in detail, nine were made using the same negative. Baldus could have chosen to reuse previously made negatives for reasons such as time, money and convenience. As mentioned earlier, he was a businessman, and made his decisions with his career in mind. (Appendix C)

Certain factors detailed in these works determine that Baldus had manipulated his plates before printing his gravures, but also can reveal some of his aesthetic choices as well. The traits that reveal his choices to manipulate the plate are; the choice to reverse or not reverse the image, visible burnishing people from the prints, the decision to bevel the four corners of his plates, the addition of drawn lines to highlight certain areas within the prints. The visible traits within these images which hint at his aesthetic choices Baldus made would be; the choice of where to crop the image as well as the vantage point which the photograph was taken at, chosen as to minimize convergence when photographing architecture.<sup>22</sup> We can determine through the study of these works the specific choices that Baldus would have made when printing, and why he would have made these decisions.

It is important to mention and understand the artistic decisions Baldus made for his prints as in being aware of these unique decisions, and how he achieved them will aid in determining what his process could have been which will bring a new light to one of the proponents of photography in the nineteenth century.

The following is a detailed look at works that illustrate these factors.

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<sup>22</sup> Mike Robinson, interview by author, Toronto, Ontario, March 9, 2010.

## EXAMPLE 1: EVIDENCE OF REVERSAL AND BURNISHING

A print of the monument *Palace du Concorde* in France exists as both albumen and héliogravure within each individual album. (Fig. 12 & 13)



Fig 12. Édouard Baldus, *Palace du Concorde* (Héliogravure)



Fig 13. Édouard Baldus, *Palace du Concorde* (Albumen)

Both prints were from the same negative as they were both exactly the same size. The same negative was used in a contact print as opposed to Baldus using an enlarger. It is evident that the image has been reversed; reversing the image is an archetypal trait in printmaking. After a plate has been inked, it must be flipped upside-down in order for the inked side to come in contact with the printing paper and be run through a press. In doing so, typically the image will be reversed from left to right. What is interesting to see is that there are works found within these albums which have not been reversed, something that is unusual in the field and a specific decision made by Baldus while printing. How this is achieved will be discussed below.

Also visible within these prints is Baldus choice to edit from his works. Deletion of parts of a print is achieved by the process of burnishing. In printmaking, this simple procedure has remained the same throughout history, and has not been significantly modified. Because of this, it is safe to assume that Baldus would have used this method too. As we see in this example the albumen print has a man leaning against the light post, whereas in the héliogravure, the man has been burnished out of the image, leaving behind only a few small smudge marks.



Fig 14. Édouard Baldus, *Palace du Concorde*  
(Albumen detail – with figure)



Fig 15. Édouard Baldus, *Palace du Concorde*  
(Héliogravure detail – without figure)

The burnishing process is performed in order to smooth out the surface of the printing plate, originally etched with many deep lines. In doing this process the lines from the original etching that make up portions of the image will be removed and thus will not print in future passes through the press. (Fig. 14 & 15) This can be done on copper or metal plates (zinc). Specifically, a smooth metal tool is brought into contact with the printing plate. A small puddle of plate oil (usually linseed oil) is poured onto the area to be burnished. The metal tool rubs the etched lines in a circular motion to smooth the plate down, creating a flat surface once again. Once this is completed, the surface is cleaned with a fresh rag. The plate is then soaked in water for a minute and then dried quickly to prevent tarnishing of the plate. Now, when the plate is inked, the areas which used to have deeper lines now have shallower lines and will not print as darkly which reduces their visibility in the print.<sup>23</sup>

<sup>23</sup> Ross, John. *The Complete Printmaker: Techniques, Traditions, Innovations*. (Simon and Schuster, 1990):95.

The removal of people is common in Baldus' gravures found within *Les Principaux Monument de la France*. Why would Baldus want to remove people from his prints? As the album was created to be used as a reference for architects reconstructing buildings in France, as opposed to the function of his albumen prints which were merely taken as a record of the city, Baldus would most likely edit the people, as they are not necessary in a work being used by an architect. As he had used the same negative from his previous albumen prints to save time and expense he could spend time removing areas which were not relevant to the use of these works.

## EXAMPLE 2: NON-REVERSAL AND THE ADDITION OF DRAWN LINES

For this example the print, *Arc du Triomphe (façade)* will be considered. In this work, a sculpture, located on the side of the Arc du Triomphe is the focus of the print. As with the other works being looked at, the registration lines and size are identical to the albumen print, thus they have been printed with the use of the same negative. (Fig. 16 & 17)

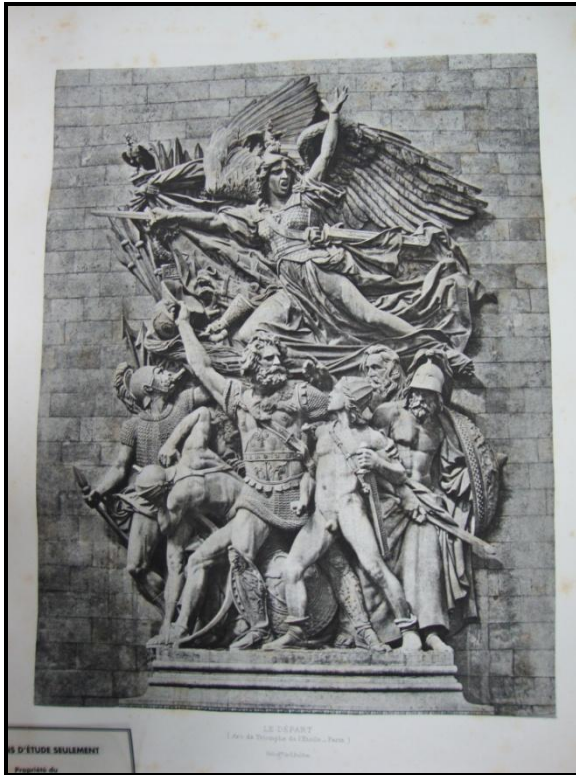


Fig 16. Édouard Baldus, *Arc de Triomphe (façade)* (Héliogravure)



Fig 17. Édouard Baldus, *Arc de Triomphe (façade)* (Albumen)

It is quite noticeable within these two works that the image had not been reversed when printed. This occurred a few times within the images found in each album. Mostly, this was the case with images that documented areas of sculptural detail. When there is a reference object in a photograph, such as lettering or a figure, Baldus would have made the decision to print these types of images using a method that would result in the final print being correctly registered.

Baldus used collodion glass plate negatives for his prints. If he made the choice to contact print, reversing the print from this negative would result in a blurry image as these pieces of glass are relatively thick (approximately two millimeters each). This would occur as there would be thick glass between the negative and the plate during exposure.<sup>24</sup> Baldus' images possess extreme detail, so this would most likely not have been his method of choice.

It is difficult to know which reversing process Baldus would have been using for his prints. There are two possible scenarios in the gravure printing process which both result in a correctly registered image. Firstly, a reversing prism could have been used. An image seen through the lens reflects off of the two sides that meet at the 90 degree angle, and is rotated 180 degrees, therefore flipping the image from left to right. Baldus could have also used a camera in which was fitted with a mirror, to produce the same effect.

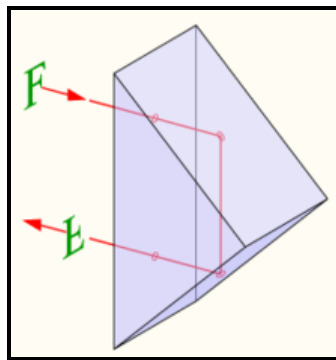
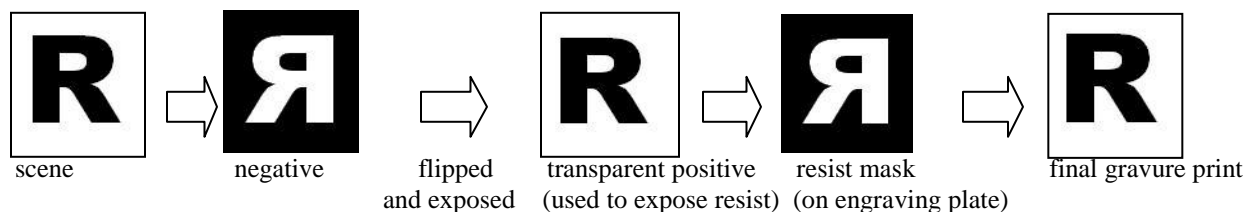


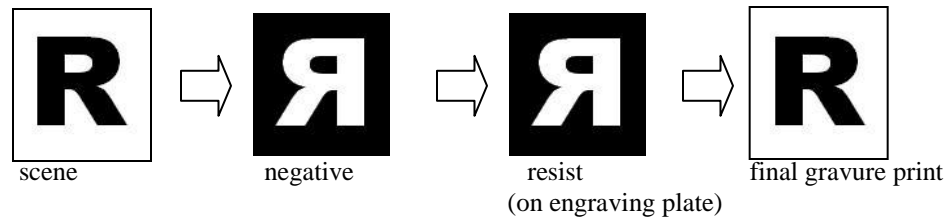
Fig.18 Reversing Prism (set up)

If a reversing prism were used by Baldus, the following diagram shows the step in which the reversal would have happened during the printing process.



<sup>24</sup> Mike Robinson, interview by author, Toronto, Ontario, March 9, 2010.

The other possible reversing method Baldus could have been using for his prints would be if he developed a resist directly on the copper engraving plate, comparable to the right reading found in albumen printing. If this was the method used, the step which the reversal would happen is shown in the below diagram.



Another choice Baldus made with his works was that he chose to highlight certain areas of these prints with the addition of drawn lines in certain parts of the sculpture. This technique is used in many other of his works found within *Les Principaux Monument de la France*.



Fig 19. Édouard Baldus, *Arc de Triomphe (façade)*  
(Evidence of Retouching – Héliogravure)

This was applied after the plate had been completely etched and was ready to print. With a fine scraping tool, the printer was able to redraw over specific lines which he/she wishes to highlight. In this example, it is evident that Baldus drew lines around the figures arm, in order to make it stand out when printed. (Fig. 19) In drawing over etched lines, before printing, these lines expand very little, but enough to allow more ink to pool within them. When printed, a

darker more prominent line will result. It is also a technique used by some printmakers to add lines after the printing process has occurred. In looking at Baldus' works under a microscope, some show signs of this approach while others use the method of re-etching lines.

### EXAMPLE 3: ANGLE OF PHOTOGRAPH

In looking at Baldus' prints in general, it is clear that he took these images from a higher vantage point than he would have achieved if they were taken while standing on the ground. The decision to use such a high vantage point shows just how dedicated Baldus was to create the best possible print that he could. It has been recorded that when Baldus took these photographs whether for albumen or héliogravure prints, he would do so while standing on scaffolding. This allowed him to shoot his images from an interesting angle.<sup>25</sup> This is visible in a comparison of the print of the *Tribunal de Commerce de Paris (façade sur la quai)* by Baldus, and the work of Michael Maslan who took the image from a distance, but standing at ground level. (Fig. 20 & 21)



Fig 20. Édouard Baldus, *Tribunal de Commerce de Paris (Façade sur la quai)* (Héliogravure)



Fig 21. Michael Maslan, *Notre Dame de Paris* (Albumen)

In making the decision to photograph these works from this new angle not seen or used before, Baldus' works have an added sense of authority as they seem more official, and less like an image taken by a common photographer.

<sup>25</sup> Maia Mari Sutnik, *Héliogravures: Selections from Les Principaux Monuments de la France*. (Toronto: Art Gallery of Ontario, 1994): 11.

## CASE STUDY 2: PROCESS ARTIFACTS

Recognizing the aesthetic choices made by Baldus while printing his héliogravures is just the starting point to an understanding of his technique. The following case study will delve into the more technical realm of printing. From it, specific materials and chemicals hypothesized to have been used by Baldus will be discussed as well as a comparison of the traits of other photographers working before, at the same time and after Baldus' career.

Currently, there are visual and textual records in the form of prints and manuals obtainable for the following photographers who all played a part in the development of photogravures; Nicéphore Niépce, William Henry Fox Talbot, Charles Nègre, Karl Klíč, Peter Henry Emerson as well as Alfred Stieglitz. In terms of Édouard Baldus, the visual records are the lone existing link to his process and are the only information to help shape an educated guess about his methods. Since there is no manual on the subject, we can never fully reconstruct or understand Baldus' method, and thus can never be entirely sure of what it might have been. But, we can propose a possible process by looking at the technical aspects of the above mentioned photographers' work. As some of the techniques of these photographers deemed to not be helpful, only those helpful in determining Baldus' method will be discussed in detail. These were chosen based on the works that had similar as well as different qualities.

A look at the available textual records of each photographer chosen for comparison will begin this section, paired with a look at the objects themselves (the prints). Also an analysis of microphotograms taken with Katy Whitman in the conservation department of the Art Gallery of Ontario allows a look at each image at one hundred times its original size. By viewing a work at this magnification, certain traits which were unseen during a regular viewing can now be examined. These images will be shown throughout this case study as they will aid in determining the similarities and differences between the characteristics of the known processes and the works of Baldus.

The following list consists of the specific prints chosen for comparison to Baldus' prints. Each work has been chosen from either the collection at the Art Gallery of Ontario or the George Eastman House. The technique of Niépce as it was very early, will only be looked at as a beginning reference for the photogravure process. The in depth look at other photographers' works will begin with Talbot and end with Stieglitz.

1. William Henry Fox Talbot  
*Harbour Scene* (printed on zinc) 1858-60 (plate), 1970(print)  
*Window Tracery & Heroic Sculpture* (printed on copper) 1858-60 (plate), 1970 (print)
2. Charles Nègre, *View of a Town from a Distance with Trees and Vegetation*, 1861
3. Peter Henry Emerson, *The Basket Maker*, 1888
4. Alfred Stieglitz, *The Ferry Boat*, 1910

These photographers were chosen as part of this case study as they have accessible technical manuals and were working before, during and after Baldus' career. Niépce and Talbot, worked before Baldus' time, Nègre, chosen as he was one of Baldus' contemporaries, and Emerson and Stieglitz worked soon after Baldus' career had come to an end. Following the description of the processes, a discussion of how the characteristics of each help determine a potential process will be presented.

Before exploring the processes of other photographers which reveal similarities when compared to Baldus, it is important to discuss the very little information available regarding Baldus' method. A short paragraph is found within Louis Figuiers' article in, *Les Merveilles de la Science ou Description Populaire des Inventions Modernes*. This hints at Baldus' method, but is not confirmed, as all other sources continue to discuss the fact that his process was unknown. Figuiers states that, "Baldus no longer used the electroplating process or bitumen of Judea. He covered his plate with chromium salt, and exposed it using his glass negatives. It was then etched in a bath of ferric chloride and was then ready to be printed using intaglio methods."<sup>26</sup> With this information, further research could be made to presuppose that Baldus would use the chromium salt, deposited (usually by way of heat) onto the surface of the copper plate in order to make the plate stronger. It was applied over a water- sensitive fibrous layer of gelatin on the plate to allow for swelling, which would help attract the ink during application. Copper can become scratched and worn down easily through consecutive use, and the press can wear down the metal and flatten out the markings. By using chromium salt, a greater number of impressions

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<sup>26</sup> Louis Figuiers, "La Photographie" *Les Merveilles de la Science ou Description Populaire des Inventions Modernes* 3, (Paris: Furne, Jouvet, 1869): 134-144.

can be made and a consistent quality of image can be maintained. Édouard Baldus adopted the use of these salts from Talbot for the use in his process.<sup>27</sup>

#### NICÉPHORE NIÉPCE (1765-1833)

Niépce began his experiments by looking for ways to produce images by means of light sensitive substances. He tried plates coated with light sensitive varnishes, and then in 1816 began to experiment with paper that was sensitized with silver chloride, that would then be exposed to light in a camera obscura. In 1820 he had discovered that bitumen of Judea became insoluble in water when exposed to light. He coated a glass plate with bitumen thinned with oil of lavender, and then laid it over an engraving he had oiled to make transparent. After an exposure lasting several hours in sunlight, the bitumen became insoluble in the parts under the clear areas of the engraving. Niépce developed the image by washing the plate with oil of lavender and turpentine. This act would dissolve the soluble bitumen from the areas protected from the hardening action of the light by the lines of the engraving. The insoluble bitumen remained in place. Over the next few years Niépce experimented with bitumen on pewter and zinc plates in order to prepare plates that could actually be inked and printed. His best results with this were in 1826 with his engraving of the *Cardinal D'Amboise*, following the same procedure as above, using a pewter plate instead of glass.<sup>28</sup>

#### WILLIAM HENRY FOX TALBOT (1800-1877)

William Henry Fox Talbot was best known for discovering two major fundamentals of printing. Firstly, that gelatin sensitized with potassium dichromate became insoluble when exposed to light, and that it could be used as an etching resist (similar to bitumen of Judea). He also revealed the photographic veil which used a screen of gauze to break up an image into various layers which could then be etched. At first, he used a steel plate which he coated with gelatin

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<sup>27</sup> \_\_\_\_\_. *Dictionary of Art Terms and Techniques*, 2010. [www.masterworksfineart.com/art/glossary/php](http://www.masterworksfineart.com/art/glossary/php). Accessed May 2, 2010.

<sup>28</sup> Crawford, William. *The Keepers of Light: A History & Working Guide to Early Photographic Processes*. (New York: Morgan and Morgan, 1979): 242.

sensitized with potassium dichromate, then, made use of his veil. He then exposed the plate to the sun for two or three minutes. The result was that the gelatin exposed between the lines of the screen became insoluble. Talbot removed the screen and placed a flat object such as a leaf over the plate and exposed it to light again. This made the gelatin insoluble in the parts not covered by the object. Talbot then washed the plate with water to rinse off the soluble gelatin. As an outcome, a series of tiny lines corresponding to the image would appear on the plate. He then would cover the plate with ink, wipe it in order to push the ink down into the etched lines and clean the surface areas. Then he would lay a sheet of paper already soaked in water (to soften the fibers) on the plate and then send it through a press.<sup>29</sup> (Fig. 22 & 23)

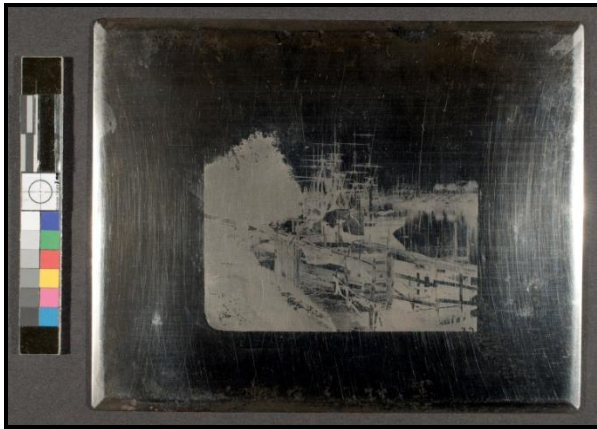


Fig 22. William Henry Fox Talbot, Harbour Scene (Zinc Plate)

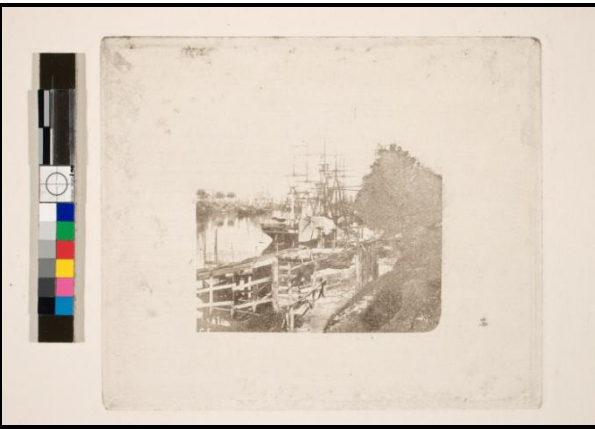


Fig 23. (Print)

His improved method, developed a few years later was called photoglyphy. It was minimally different from the above, but he used a copper plate instead of a steel plate sensitized with potassium dichromate, and also started using an aquatint grain which could be dusted onto the plate. This chemical would aid in creating microscopic lands on the plate which will not etch. After exposure, Talbot would dust the plate with gum copal powder while heating it. On cooling, the copal would stick to the surface. He then etched the plate in a solution of ferric chloride. The solution penetrated the gelatin in the spaces left open between the copal grains, and diffused through the gelatin to the metal beneath at a rate that depended on the exposure the

<sup>29</sup> Crawford, William. *The Keepers of Light: A History & Working Guide to Early Photographic Processes*. (New York: Morgan and Morgan, 1979):244.

gelatin layer had received. In the areas corresponding to the shadow tones, where the gelatin protected by the opaque areas of the positive had received only a minor exposure, the ferric solution penetrated speedily into the metal and began to etch it. In the highlights and middle tones, where the gelatin had experienced more exposure the solution took longer to reach the metal. Consequently, the highlights were etched less deeply than the shadows. Talbot found that he could control the rate of etch by using ferric chloride baths of different specific strengths.<sup>30</sup> (Fig. 24 & 25)



Fig 24. William Henry Fox Talbot, Window Tracery Fig 25. (Print) & Heroic Sculpture (Copper Plate)

### CHARLES NÈGRE (1820-1881)

Nègres' gravure process was based on the work of Niépce. The accounts of his process, like Baldus' method, are somewhat vague and contradictory, but, it appears that his principal method was as follows; Nègre first coated a steel plate with bitumen or, alternatively with dichromated gelatin. He exposed this beneath a negative (some sources say a positive) and afterward dissolved the unexposed portions of the coating. Then he connected the plate to the negative pole of a battery and electroplated a layer of gold over its surface. The highlights were completely covered with the gold plating, the middle tones partially so, and the shadows least of all. Nègre then covered the plate with a rosin grain and etched it in nitric acid. The gold acted as a resist. In all probability, the resulting etched pockets were deeper and wider in the shadows than in the highlights which would allow for the most ink to be wiped into the lines. The process

<sup>30</sup> Crawford, William. *The Keepers of Light: A History & Working Guide to Early Photographic Processes*. (New York: Morgan and Morgan, 1979):245.

was difficult and the plates would frequently fail to attain proper middle tones.<sup>31</sup> (Fig. 26 & 27) the microphotograms located beside each photographer's works are shown to give a view of the works under a microscope. This notion will be discussed further as it is useful when looking at paper grain.



Fig 26. Charles Nègre, View of a Town from a Distance with Trees and Vegetation (Photogravure)



Fig 27. (Microphotogram of Photogravure)

### KARL KLIC (1841-1926)

Though Karl Klíc is not part of the photographers being used in comparison to Baldus' works, it is necessary to briefly mention him as he remodeled the photogravure process by making slight changes to the work of Talbot. This new method which is still taught all over the world today was entitled the Talbot-Klíc method of photogravure and came to fruition during the year 1879. Klíc first dusted a copper plate with resin then melted the resin with heat. This produced the aquatint grain. Next, he sensitized a sheet of gelatin coated pigment paper with dichromate and exposed it to light in contact with a positive. After briefly soaking the pigment paper in water he laid it, gelatin side down, on the copper plate and smoothed it into solid contact. Removing the paper backing, he washed the gelatin which was now transferring onto the copper plate with warm water, thus removing the soluble gelatin and leaving a coating of insoluble gelatin which was thicker in the highlights than in the shadows. From here on the

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<sup>31</sup> Crawford, William. *The Keepers of Light: A History & Working Guide to Early Photographic Processes*. (New York: Morgan and Morgan, 1979):283.

process was identical to Talbots. Klíc etched the plate in ferric chloride, allowing the solution to quickly penetrate the thinner areas of gelatin (the shadows of the image) and the ferric chloride would take longer to reach the areas of the highlights since the gelatin in those areas was thicker. The plate was then printed in the same fashion as Talbot; inked up, wiped clean leaving ink between the lines, and run through a press.<sup>32</sup>

#### PETER HENRY EMERSON (1856-1936)

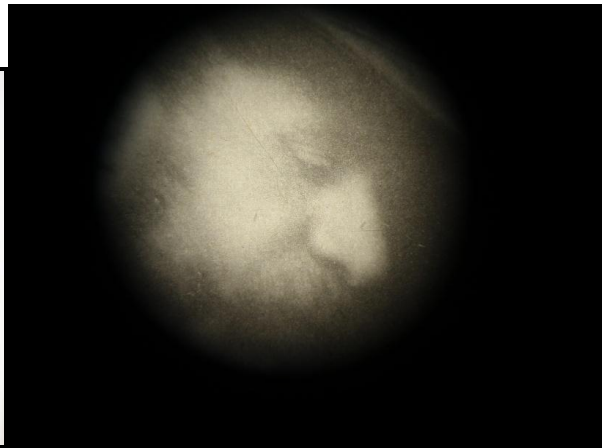
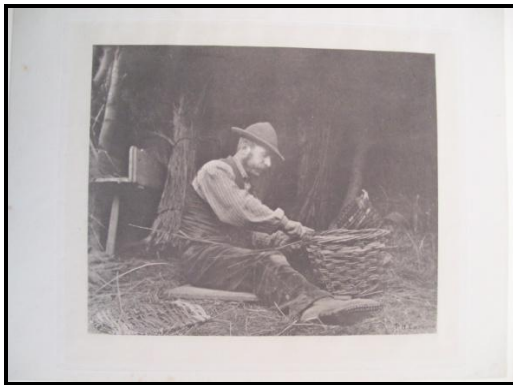


Fig 28. Peter Henry Emerson, *The Basket Maker* (Photogravure) Fig 29. (Microphotogram of Photogravure)

Peter Henry Emerson made the majority of his gravures after 1880. As he was inspired by the works of Talbot, he was dedicated to using the Talbot-Klíc method of printing. Emerson admired the soft qualities achievable with gravure printing, and would mimic them within his works. It is clear when viewing his works under a microscope; the grain left behind is very shallow, leaving behind small etched lines that would result in a small difference in depths of lines on his plates. This would be the reason for his minute tonal scale in his works, as he used less etching time to create a softer image with mostly mid-grey tones.<sup>33</sup> (Fig. 28 & 29)

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<sup>32</sup> Crawford, William. *The Keepers of Light: A History & Working Guide to Early Photographic Processes*. (New York: Morgan and Morgan, 1979):246.

<sup>33</sup> Crawford, William. *The Keepers of Light: A History & Working Guide to Early Photographic Processes*. (New York: Morgan and Morgan, 1979):248.

ALFRED STIEGLITZ (1864-1946)

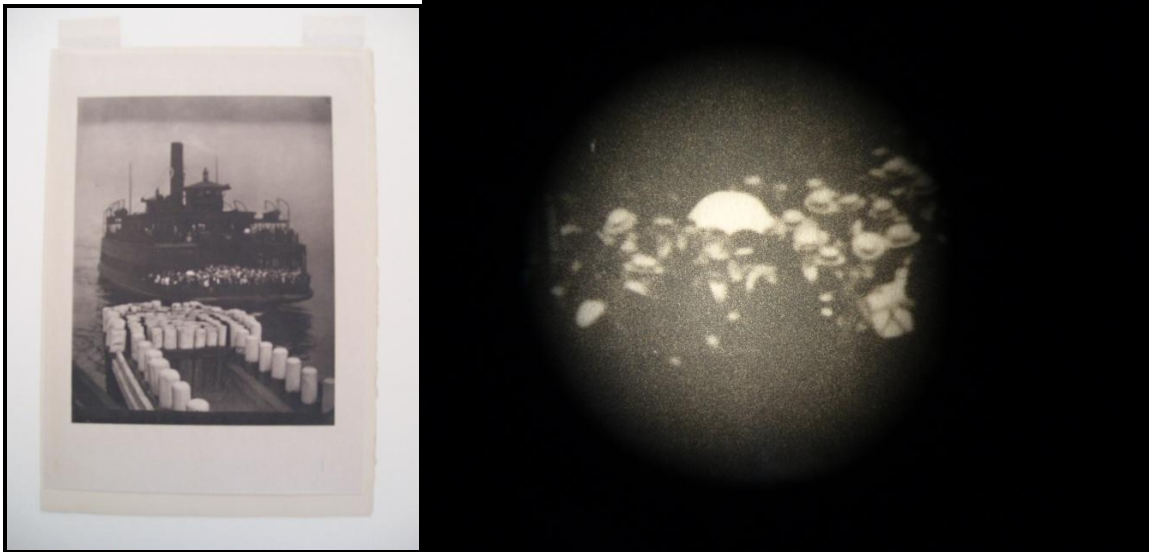


Fig 30. Alfred Stieglitz, the Ferry Boat Fig 31. (Microphotogram of Photogravure)  
(Photogravure)

Alfred Stieglitz pursued making a name for the photogravure within the arts mainly by publishing many magazines, finding photographers, running numerous galleries and producing his own inventive photographic images, many which were printed using the method of photogravure. Stieglitz used the photogravure process for most of the images in his revolutionary periodicals, *Camera Notes* and *Camera Work*. The photogravures in these journals allowed a larger audience to understand the clever qualities of photography. He was so certain of the quality of these gravures that he seldom sent them to be displayed at international exhibitions of artistic photographs. Stieglitz, like Emerson also made use of the Talbot-Klíc method of printing. The only difference in his printing process was that he would aim to create etched lines that were not primarily in the mid tones like Emerson, but ranged greatly across tones creating far more dramatic contrast in his works.<sup>34</sup> (Fig. 30 & 31)

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<sup>34</sup> \_\_\_\_\_. The Art of Photogravures: A Comprehensive Resource dedicated to the Photogravure. Accessed: 02 January 2010. [www.photogravure.com](http://www.photogravure.com)

## ÉDOUARD BALDUS (1813-1889)

When viewing the works of Baldus versus the other photographers being analyzed under a microscope, many distinctive traits become visible. Drawing upon the main aspects of printmaking, nine characteristics that would help determine Baldus' method were chosen. These were; ink quality, visible relief on the paper support, paper thickness, type of plate used, paper grain seen in the microscopic image provided, contrast of tones, visible retouching and finally, the amount of detail Baldus' prints occupy. A comparison of these properties in the prints from *Les Principaux Monument de la France*, to the work of the other printmakers, as well as comparing the processes of each photographer helped shape an educated guess of what Baldus process may have been.

### INK QUALITY:

Other than in the work of Charles Nègre, the ink quality seen in the works of the photographers being analyzed does not compare to Baldus' at all. The inks used for the other works are matte when viewed, whereas the ink used on Baldus' prints is rich and velvety. Printmaking inks are made up of a thick clear resin type liquid, plus finely ground pigments or minerals for richness of colour. Different thinners are also used to make the ink flow. Ink must be made so it is able to stick to the plate, so the ink will have a high quality appearance on many different surfaces. It seems that Baldus used a printing ink that had more finely ground pigments in its composition compared to those used by the other photographers examined as the black Baldus ink appears to have many tones within it. The other photographers used matte, multi-purpose inks, which could have also been used in painting.

### VISIBLE RELIEF ON PAPER SUPPORT:

The embossment seen on a print can indicate the type of plate being used as well as the pressure setting of the press when the plate passed through it. Typically in printmaking the press needs to be set at a higher pressure when printing with copper plates as it is more difficult for the ink to be transferred from the plate to the paper than with other materials. Thus, there is more likely to be an embossed edge when the printer was using copper, due to this high pressure setting. This characteristic is shown when looking at the works of Talbot; his prints made from

copper plates have a very deep embossed edge whereas his prints from zinc plates have a very shallow edge. In the case of Charles Nègre who was said to use zinc plates, there is little to no embossed edge seen within his prints, proving this notion to be true. The wider the tonal ranges the artist is trying to achieve, the higher the setting used. This is because of the increased amount of ink needed in the etched lines. Nègres' prints lack tonal range. This means that there are very few, if any, deeply etched lines filled with ink when the plate passes through the press. Thus, he would have used a low pressure setting on the press. The same applies to Peter Henry Emerson's work, as it also possesses a limited tonal range, and has no embossed edge, even though it is known to have been printed on copper. Baldus' works are highly detailed in tonal range and possess a beveled edge, meaning the press was set on a higher pressure and that he was printing from a copper plate.

#### PAPER THICKNESS (determined by touch):

All photographers considered in this case other than Nègre and Baldus used very thin papers when printing. Papers recorded as being as thin as transparent rice papers to vellum. Nègre and Baldus, on the other hand used substantially thicker papers. The decision to use stronger paper may have been made to improve print permanence as this was important during Baldus and Nègres' time. Baldus' paper the heaviest (therefore the thickest) which allows for a high pressure to be used on the printing press without tearing through the paper.

#### TYPE OF PLATE:

Niépce began making photogravures by using a zinc plate and later would use pewter. Talbot first experimented with zinc plates, following in the footsteps of Niépce, but soon after would start using copper. Charles Nègre who used a method developed with the help of Niépces' process, used zinc. Baldus, as noted above used copper plates as he was able to achieve a wide range of tones which was not possible with zinc plates at the time. Emerson and Stieglitz working after Baldus would develop their works using the Talbot-Klíc method, thus making use of copper plates as well.

## INK STRUCTURE/GRAIN (VISIBLE VIA MICROPHOTOGRAMS):

The extreme sense of detail achieved by Baldus in his prints is easily seen. Even under magnification of one hundred times the original size, the grain is still extremely small. (Fig. 32-35)



Fig 32. Édouard Baldus, Pavillon Sully (Louvre Paris) (Héliogravure)



Fig 34. Édouard Baldus, Arc de Triomphe de l'Etoile-Paris (Héliogravure)



Within the other photographer's works viewed by way of a microscope, the grain is either very visible such as in the works of Talbot and Nègre (Fig. 27), or very small such as in the work of Emerson. (Fig. 29) In a gravure print under magnification, the aquatint grain of a photogravure prints is always visible, whether small or large. It is evident that the gravure process is not a continuous tone process as it breaks down the image into a pattern of random microscopic pits on the surface of the plate. When using an aquatint grain, the desired coverage of the plate is 50%,

an equal balance of solid and open areas.<sup>35</sup> When particles of dichromated gelatin are heated onto the plate the surface of the plate (in Baldus' case, the copper plate), it creates a pattern much like the one seen below at a much greater magnification than the microphotograms. (Fig. 36)

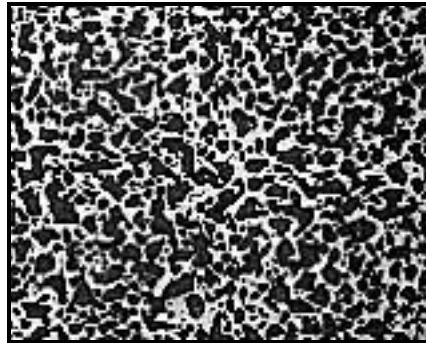


Fig 36. Grain Detail of a Photogravure

What enables the plate to be etched to various depths is the linear sensitivity of dichromated gelatin to light. This allows the acidic formula used to etch to seep through the plate depending on how thick or thin the gelatin is. Where the gelatin is thin, etching is deep, and where thick the etching is shallow. The deeply etched parts of the plate hold more ink and the lightly etched parts hold less ink. After the Talbot-Klíc method was introduced, this grain could achieve many more levels in the plates, and thus would allow for much more print detail.<sup>36</sup> (Fig. 37 & 38)

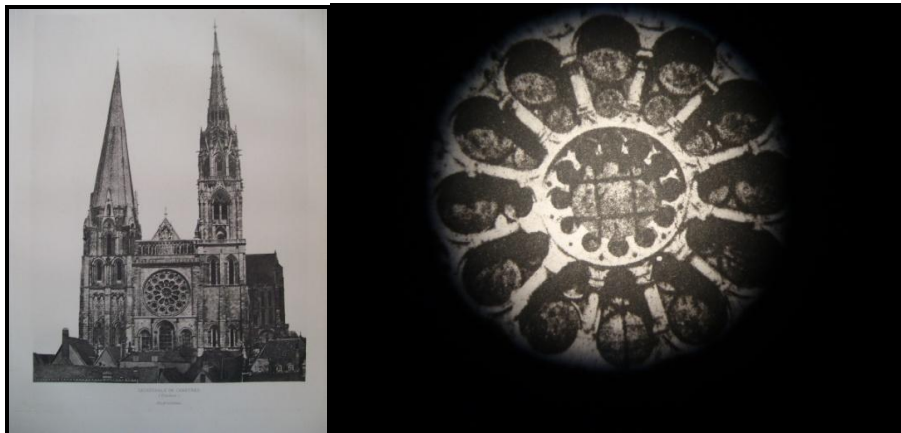


Fig 37 Édouard Baldus, Cathédrale de Chartres (fleches) (Héliogravure)      Fig 38. (Microphotogram of Héliogravure)

<sup>35</sup> Morrish, David and Marlene MacCallum. *Copper Plate Photogravure: Demystifying the Process*. Boston: Focal Press, 2003.

<sup>36</sup> \_\_\_\_\_. *Alternative Photography: Historical Photographic Methods*. Copyright 2000, Accessed: 02 July 2010. <http://alternativephotography.com/wp/processes/photogravure/intaglio-photogravure-printmaking>

If a comparison was made of the grain structure of the collotype created by A.L Poitevin in 1855, to the gravure, we could see that the ink structure developed by this process is similar to that of the photogravure, but less randomly dispersed. It is evident that the gelatin layer absorbs ink in a different way for each process.

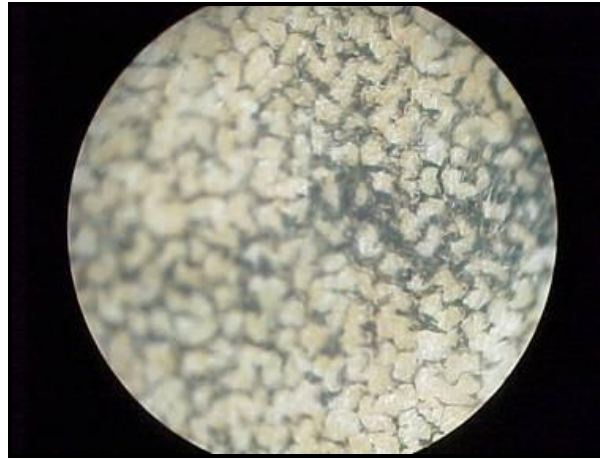


Fig 39. Microscopic view of a collotype (ink structure)

In the collotype, an etched piece of mirrored glass (10cm thick) is coated with a light sensitive emulsion (chromated gelatin) which makes it sensitive to light.<sup>37</sup> The plate is exposed beneath a negative and the amount of light admitted in exposure determines the extent to which the emulsion hardens. The less light exposed, the less the gelatin hardens. When the plate dries, a fine puckered grain is left behind. (Fig. 39) The individual grains swell in water to varying degrees, matching the extent to which they repel the waxy collotype inks. The contrast can be increased by moistening the emulsion.<sup>38</sup> This process is only suitable for small editions, unlike the photogravure, which can produce a larger number of prints per plate. Though these two processes use similar chemicals and materials, it is important to note the difference in grain structure to be aware of the difference between the two, and further understand the random structure of the gravure plate.

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<sup>37</sup> Reilly, James. *Care and Identification of 19<sup>th</sup> Century Photographic Prints*. Eastman Kodak Company, 1986.

<sup>38</sup> \_\_\_\_\_. Ted's Photographics: The Science of Photography- Mechanical Printing. Accessed: 10 July 2010. [http://www.ted.photographer.org.uk/photoscience\\_printing.html](http://www.ted.photographer.org.uk/photoscience_printing.html)

### CONTRAST OF TONES:

The tones and variations in light and shadow are the distinguishing features in a photogravure. The tonal range is quite large within Baldus' works, larger than for any of the other photographers studied here. Less contrast of tones is a feature of using a zinc plate rather than copper (which strengthens the conclusion that Baldus was using a copper plate) but this trait can be controlled to some extent by the photographer, as he would be able to etch in acid for a shorter or longer period of time to achieve a small or large range of tones.

### VISIBLE RETOUCHING:

Talbot retouched around edging in order to clean up certain markings. He would also retouch to emphasize certain lines of buildings, to distinguish them from the background. Baldus on the other hand, as mentioned earlier, used retouching to allow certain aspects of sculpture to stand out. He would not usually use this technique on buildings as these works were created to show architectural truth for architects. Other photographers being studied did not show evidence of retouching in their works.

### AMOUNT OF DETAIL:

It is clear that Baldus' prints are the most detailed of the photographers being compared. But, the detail seen in Charles Nègre's works, as well as Talbot's works on copper are very comparable to each other. Nègre was said to print on zinc, which makes achieving detail harder when printing. As Nègre electroplated his plates, he may have been able to acquire a large range of detail, as electroplating allows the plate to hold more etched lines. For Baldus, it is possible, that at some point he too electroplated his prints, but for the process being hypothesized, it is safe to say he did not.

## SUMMARY OF FINDINGS

It is believed after this analysis that the fundamentals of Baldus' process are based on the later works of Talbot. Though Baldus was constantly attempting to create a process that was permanent, and would eventually begin experimenting with chemicals to achieve this, his process seems to have been very similar in set up, materials and method as that of Talbot. His change in chemicals would allow for more prints to be produced from one plate, as well as have a stronger plate that would last longer during the printing process. This decision to use different chemicals could be the main reason why his prints could be mass produced quickly and were inexpensive. Baldus also used materials similar, if not the same as Nègre. As they were working at the same time, they could have been using the same papers and inks and though Baldus, again, may have added certain chemicals to his inks and treat his papers for longer amounts of time to allow for a greater amount of detail, tonal range and longevity of prints.

With the above points in mind, and with the information gathered throughout this thesis, the proposed step by step method of Édouard Baldus' héliogravures is as follows;

1. Photographs were taken using collodion glass plates. Baldus would stand at a high vantage point on scaffolding that he and his workers would build in order to achieve the angle seen in his imagery. The negatives created in some cases were made for his albumen prints, but would also be used years later in his gravures.
2. Specific images mostly of sculptures were created using a reversing prism. This tool was used in order to produce a print that would not be reversed.
3. Once the negative was ready, it would be set aside and other materials would be prepared. The copper plate used for printing these set of héliogravures would be cleaned to remove any dust particles.
4. The edges of the copper plate would be beveled to round the corners. Sharp corners tend to cut through printing papers when run through a press. This is seen in the final produce as the four corners are slightly rounded.
5. Baldus would then coat the plate with dichromated gelatin later (usually by way of heat) this would occupy 50% of the plates grain, aiding in the absorption of inks.

6. Baldus would then most likely coat the copper plate with chromium salt (as discussed in Figuiers' writings). As Baldus' was concerned with permanence throughout his career, it is likely that these gravures, as they were printed during the later portion of his career, would have been printed with the use of this chemical for its plate strengthening qualities.
  - a) If he used the electroplating process that Nègre was said to be using, (which has been suggested that he did at some point) he would then connect the plate, coated with bitumen, or dichromated gelatin to the negative pole of a battery and electroplate a layer of gold over its surface. The gold would completely cover the highlighted areas of the image, the middle tones partially so, and the shadows the least of all. As the process was difficult to control, the plate would frequently fail to attain proper tonal range. Thus, it is more likely that Baldus coated the plate with bitumen, or a type of salt such as chromium.
7. After exposing the glass negatives to the copper plate, the plate would be washed and dried, thus being ready to be inked.
8. It is believed that Baldus used the same acid to etch as Talbot did with his copper prints which was a solution of ferric chloride in water. Use of this acid produced good results in the past, and Baldus would most likely have used it as well. The acid used by Talbot would etch fast and was relatively inexpensive at the time. Because efficiency was a large part of Baldus' business approach, it is very possible that he made use of this etching chemical.
9. The solution would be either mixed with different ratios of water to create different strengths of the solution to achieve different levels of etching or Baldus would use the same strength of the acid but dip the plate for different amounts of time. The acid would penetrate the coating on the copper plate and etch the image that had been transferred. The plate would probably be placed in a succession of acids baths. Etching would begin with the lines that needed to be the shallowest (the highlights) and so on.
10. As various dips in acid needed to be done in order to create such different tones within the Baldus prints, he had to have used some sort of varnish to prevent the parts that had already been etched from further, unwanted etching. Within the history of printmaking, it was said that some printmakers would use the printing ink as a varnish as others would use a type of asphaltum, used to coat the plate at the beginning of the process. As the printing ink was the cheaper of the two options Baldus most likely used this approach.

11. After the ink was painted on the areas to not be etched further, the plate was then placed in the acid bath again to get the mid tone lines and then the process was repeated to get the darkest areas. The result was a plate etched with many minute reservoirs of various depths.
12. Once the plate was etched to his liking he would retouch certain lines by drawing over them. This would typically be done with a sharp scraping tool to further open the etched lines, leaving room for more ink.
13. If the plate was made from a negative previously used for his albumen works, he would now use the burnishing method to eliminate the lines of the image that he did not want to show up in printing. These areas would typically be parts of the image that showed people. To remove these parts of the print, Baldus would use a significant amount of linseed oil (a type of plate oil, also used to thin out inks) and a smooth metal tool. He would rub in a circular motion with the metal tool the etched lines that correspond to the areas of the image that were not wanted. This circular motion would wear down the copper and leave behind a flatted surface, which at worst, would show up as a smudge mark when printed.
14. Once the plate was suitable, the press would be set up using a high pressure as there are a great number of reliefs found on his prints. The higher the pressure on the press, the heavier the steel roller that passes over the plate, thus allowing more ink to be drawn out of the etched lines.
15. As Baldus used thick paper to print his works the paper would need to be soaked in warm water to break up the paper fibers for anywhere from thirty to sixty minutes.
16. While this was happening, the ink would need to be mixed. Baldus' inks were typically very rich, so he would have used an ink that was a thick resin type liquid, plus finely ground pigments or minerals for richness of colour. To make sure the ink would roll on easily, plate oils (such as linseed oil) could be added. As his inks were very thick, he would not have used much plate oil.
17. The ink would be rolled on the plate.
18. Then he would use a cloth to wipe off excess ink, and buff the plate with circular motions to force the ink down into the different depths of lines. Once the ink was in the lines and

had been completely cleaned from the surfaces of the plate that would not require inks, as well as the edges, the plate would be ready to print.

19. The paper would then be carefully laid onto the plate which was placed on the printing press, making sure an even border would be left on the paper.
20. The felts, typically found on etching presses, used as a cushion would be laid on top of the plate and it would then be passed through the press. (Fig. 40)



Fig.40 19<sup>th</sup> Century Etching Press

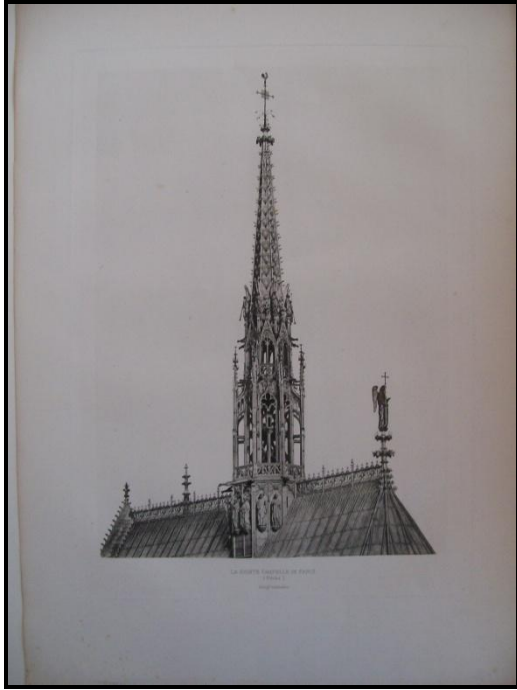
21. The print was then lifted off the plate, and further prints would be made.
22. The prints would be dried, sometimes hung to dry, sometimes laid flat with heavy weight on top to avoid curling of the damp paper. This part of the process would be based on the preference of the printmaker, and would be difficult to guess what Baldus would have chosen.
23. After the prints were finished, Baldus would typically use a letterpress plate in which occupied his signature stamp. Letterpress is a relief printing process, made so that the raised surface of the plate would be what was to be printed, in this case, his signature. The paper would be laid on top and the stamp, used in many of his works, would be transferred onto the paper.

## CONCLUSION

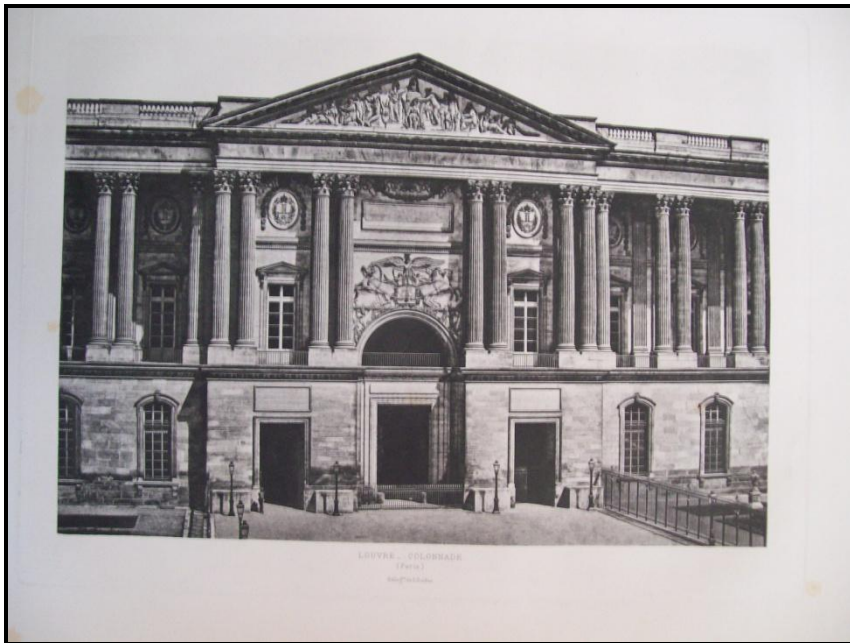
Twenty six héliogravures by Édouard Baldus held in the Art Gallery of Ontario's collection, originally a part of the album *Les Principaux Monument de la France, reproduit en héliogravure par E. Baldus 1869-70*, which is held at the Canadian Centre for Architecture were studied in detail. The aesthetic and technical choices made by Baldus for production of his héliogravures were hypothesized. By looking at the working methods of other photographers active before, during and after Baldus' career, as well as by comparing other printing processes used by Baldus which he used the same negative to print from, an overview of Baldus' working method for his héliogravures has been proposed. As this process remains under appreciated and discussed in nineteenth century photographic history, it is important to learn as much about it and make the potential process available to those interested in it. The fact remains that Édouard Baldus was a seminal figure in the héliogravure process, using it for the second half of his career, and should be recognized for that.

## APPENDIX A

Twenty six prints from Art Gallery of Ontario (*Les Principaux Monument de la France, reproduit en Héliogravure par E. Baldus 1869-70*)



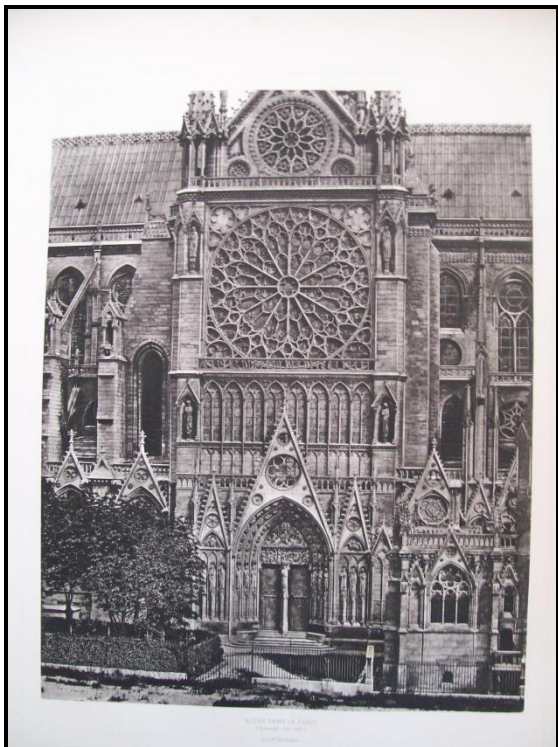
La Sainte Chapelle de Paris (flèche)



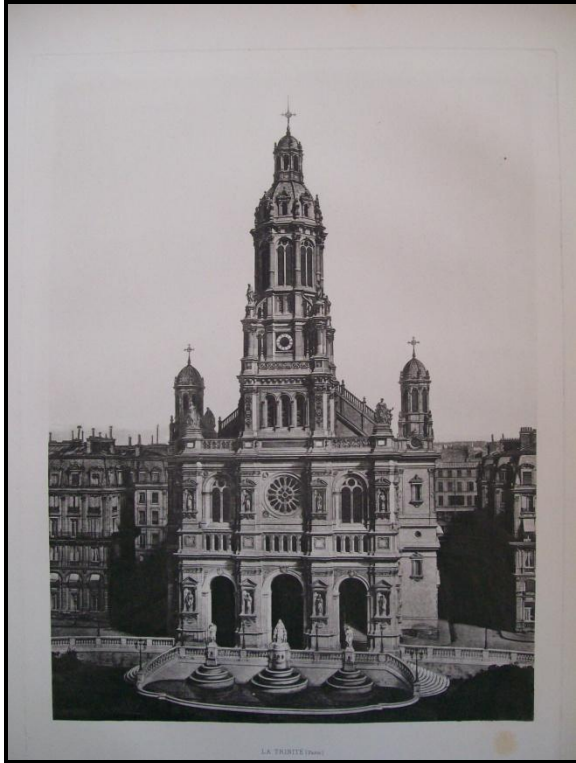
Louvre Colonnade (Paris)



Pavillon de l'Horloge (Louvre – Paris)



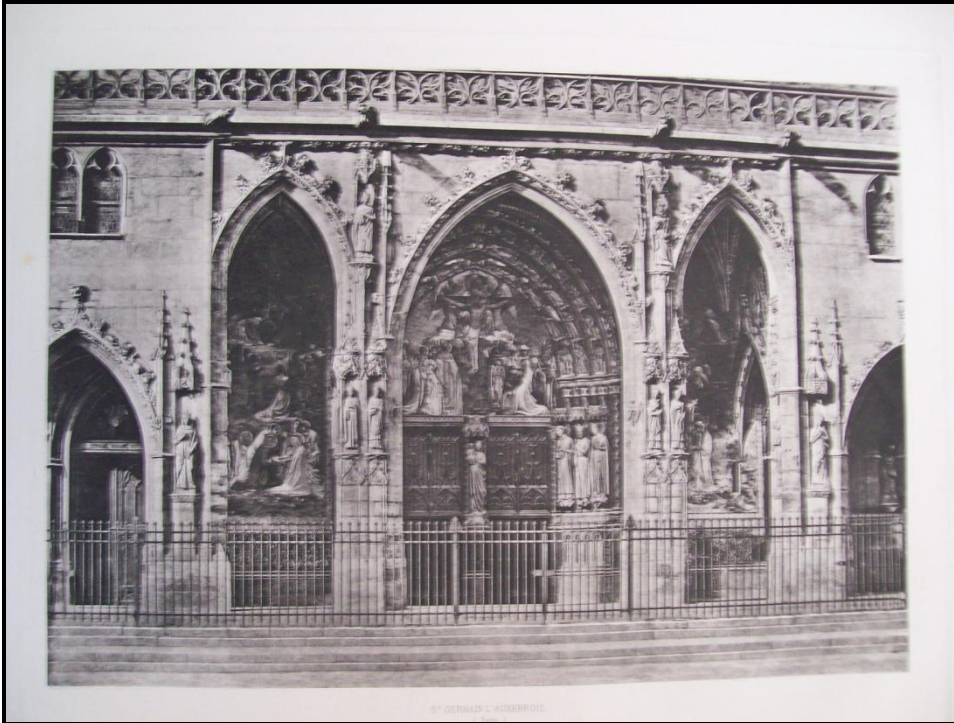
Notre Dame de Paris (tranept côté sud)



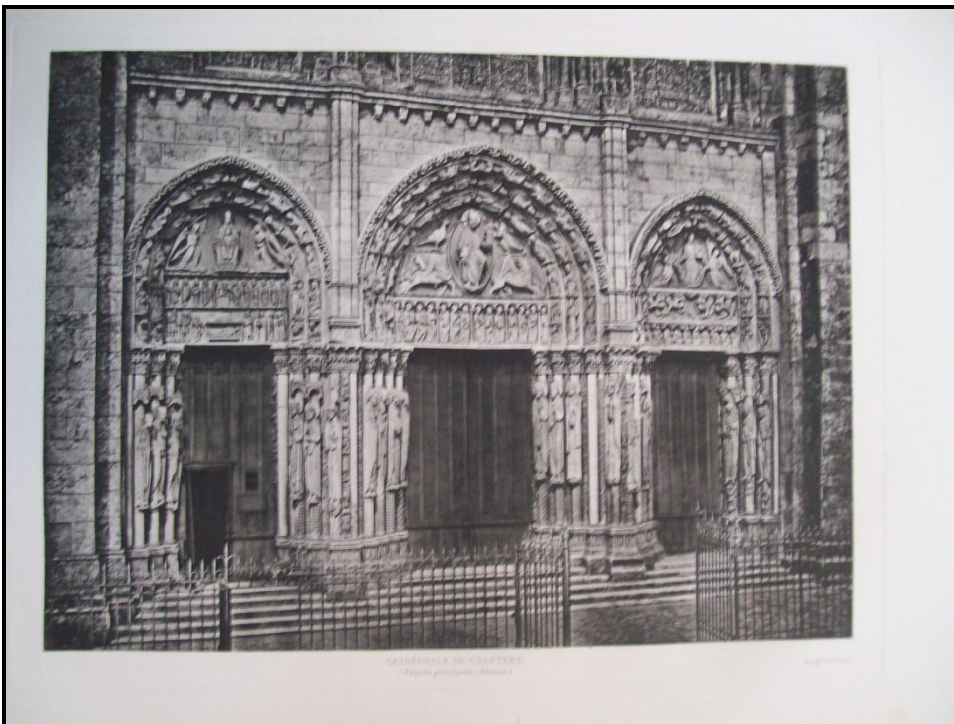
La Trinité (Paris)



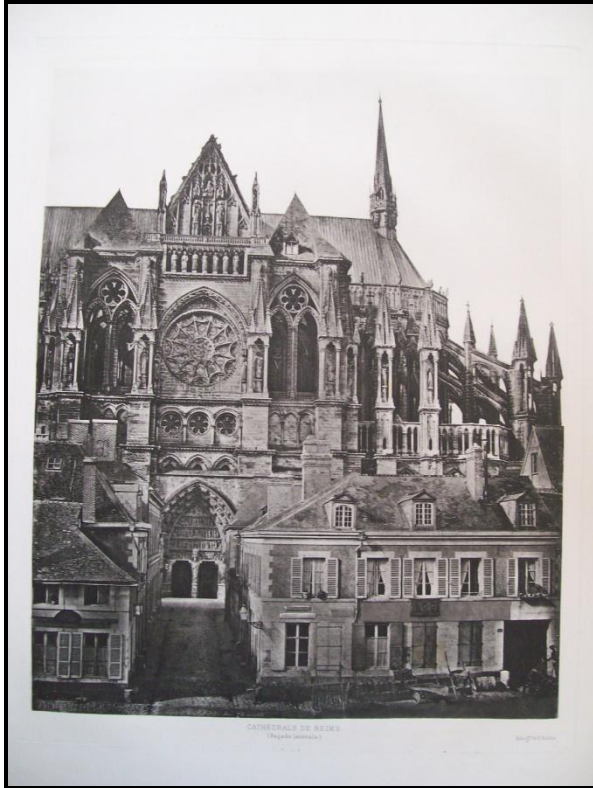
La Sainte Chapelle de Paris (façade latérale)



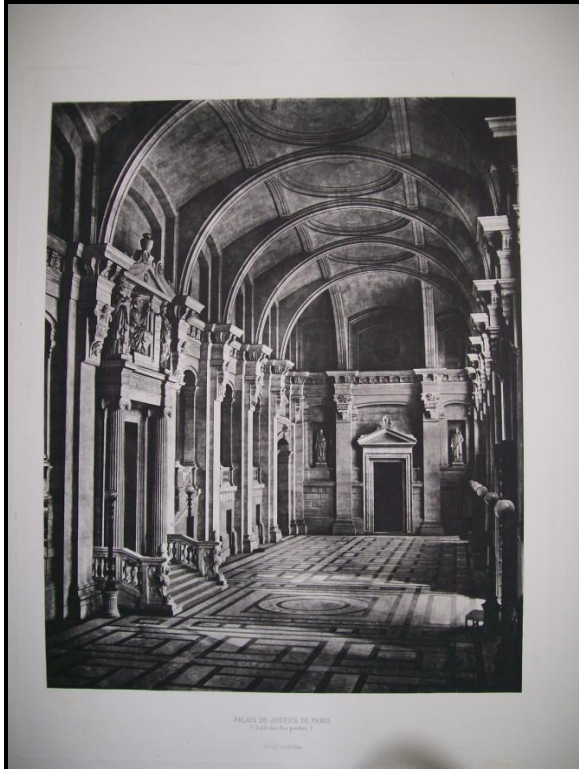
St. Germain L' Auxerrois (Paris)



Cathédrale de Chartes (façade principale portail)



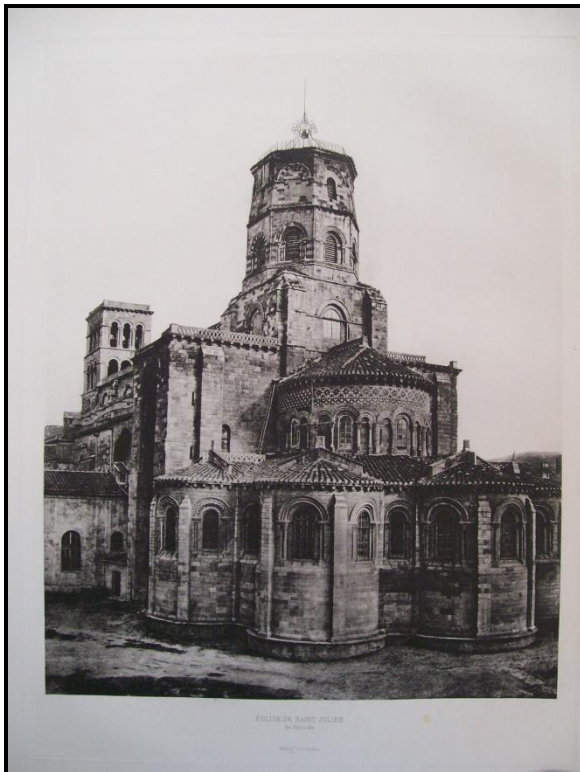
Cathédrale de Reims (façade latérale)



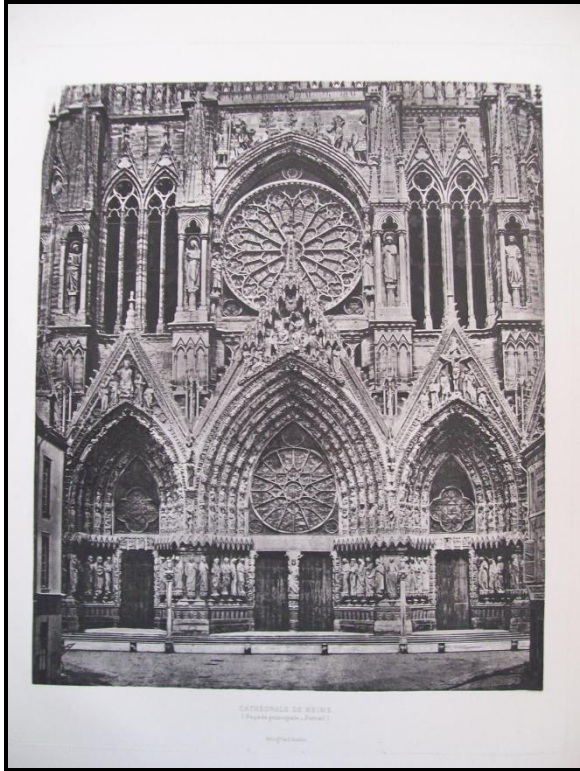
Palais du Justice de Paris (tour de l'Horloge)



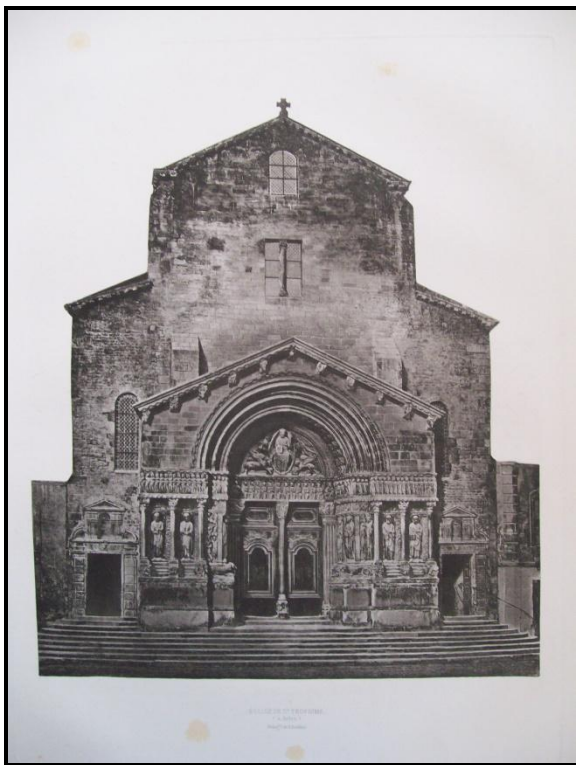
Église de St. Pierre (a Caen - abside)



Église du Sainte Julien (de Broudie)



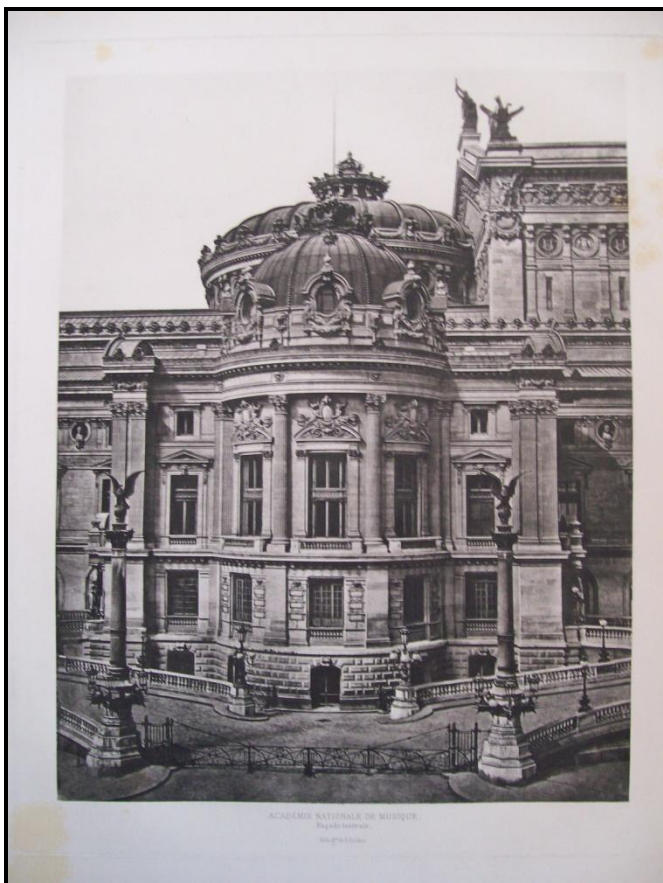
Cathédrale de Reims (façade principale portail)



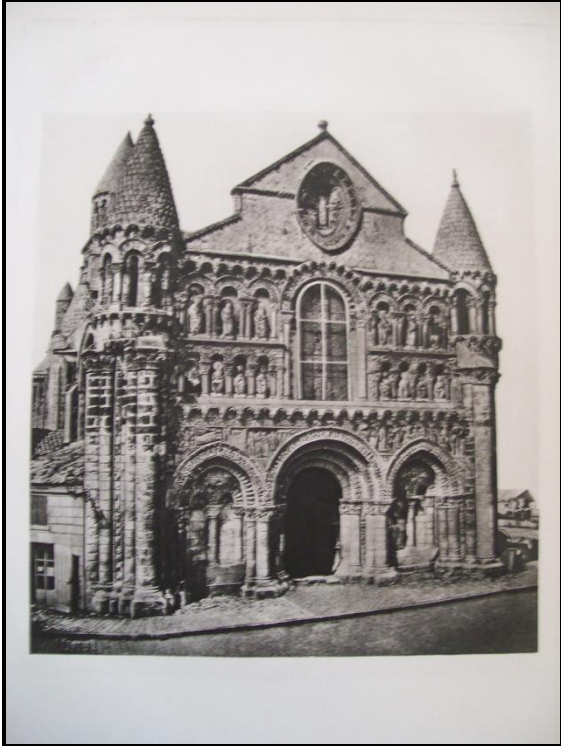
Église de Saint Trophime (a Arles)



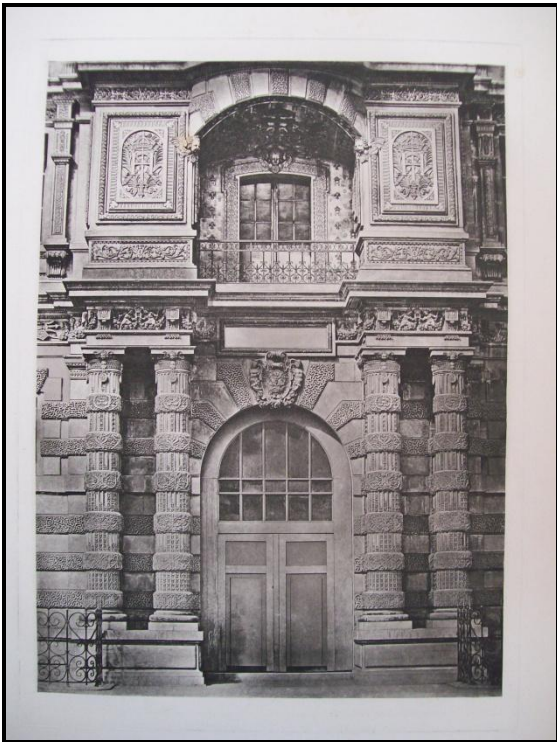
Tribunal de Commerce de Paris (façade sur la quai)



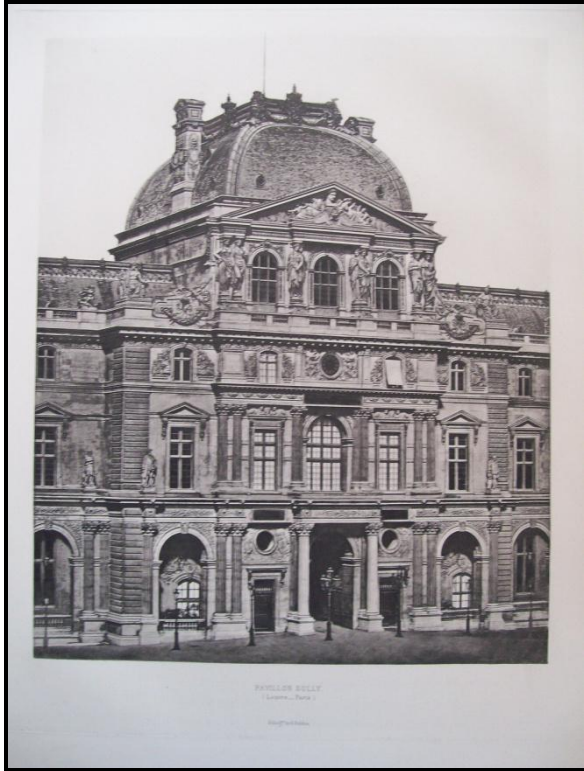
Académie National de Musique (façade latérale)



Notre Dame du Poitiers (façade)



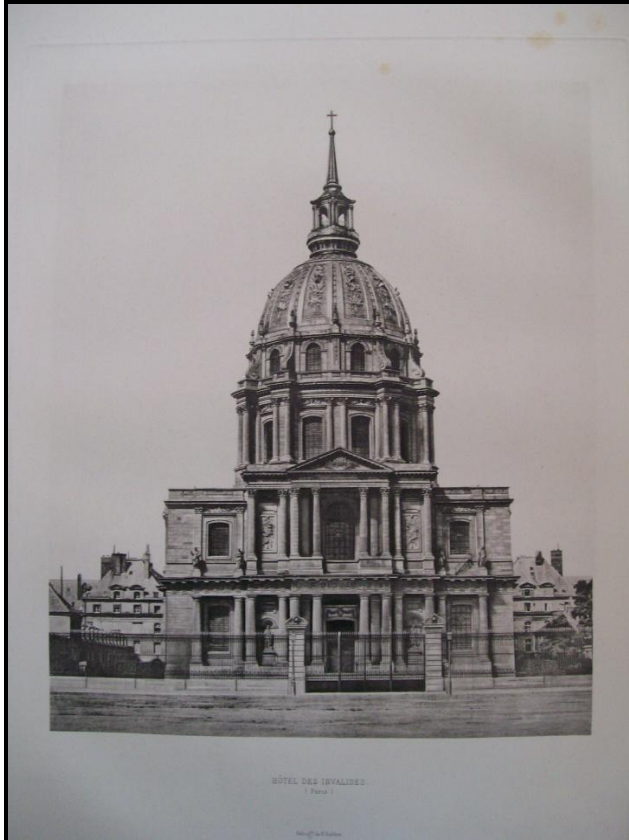
Bibliothèque du Louvre (portes sur le quai)



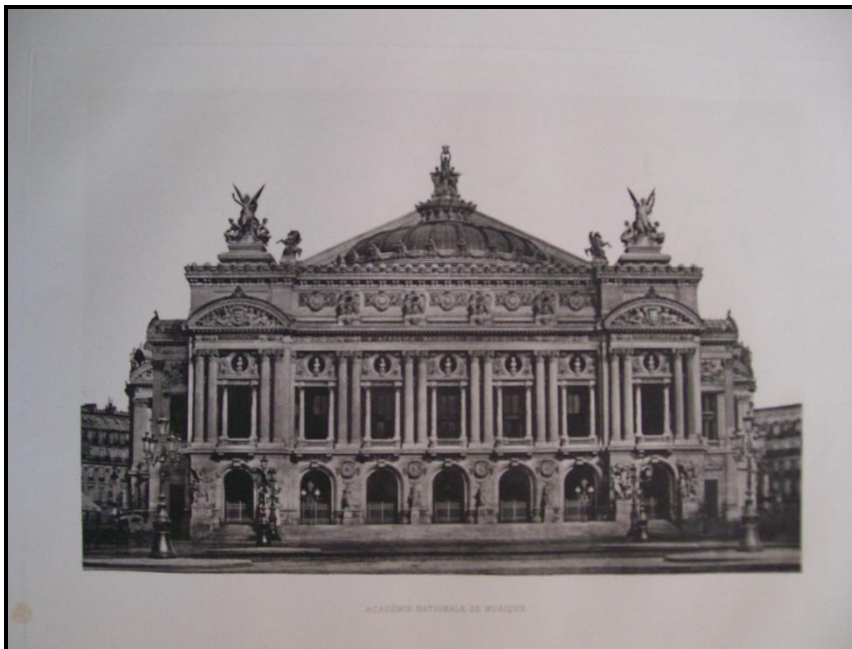
Pavillon Sully (Louvre – Paris)



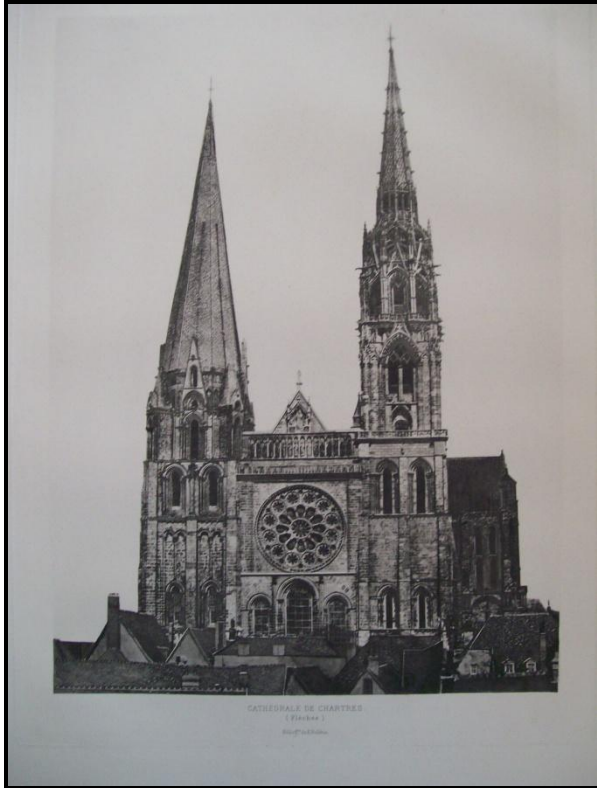
Arc de Triomphe de l'Étoile



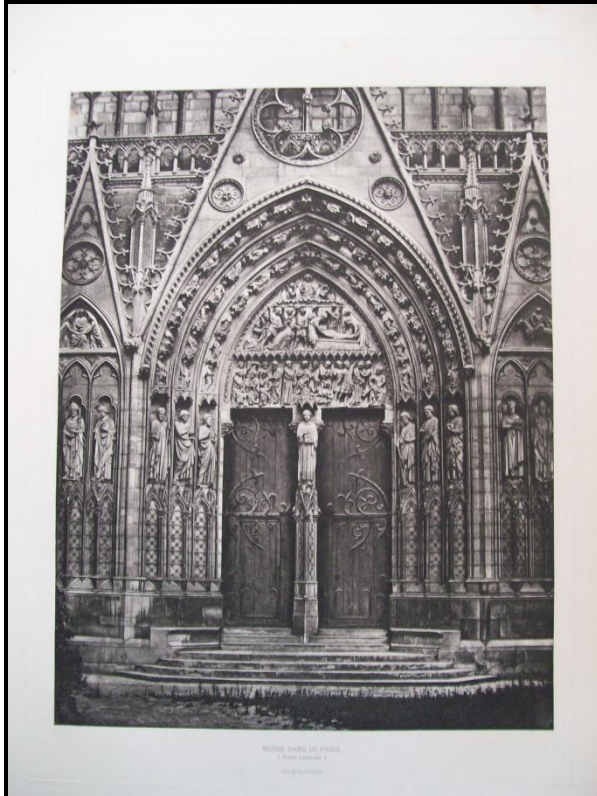
Hotel des Invalides (Paris)



Académie Nationale de Musique



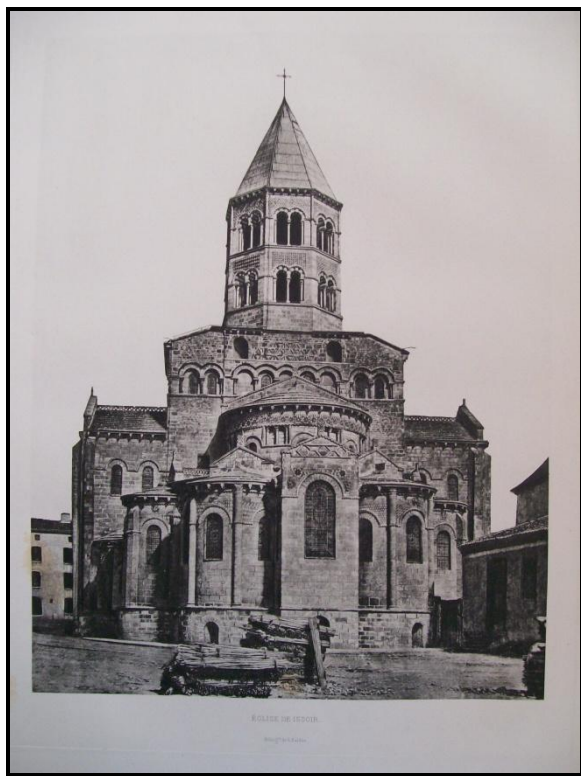
Cathédrale de Chartres (fleche)



Notre Dame de Paris (porte latérale)



Porte de la Bibliothèque (Rue de Rivoli)



Église du Issoire

APPENDIX B  
Order of prints within *Les Principaux Monument de la France*  
(\* 26 prints found within Art Gallery of Ontario)

1. Palais des Tuileries (Avant l'Incendie de 1871)
2. Arc de Triomphe du Carrousel (Paris)
3. Pavillon de l'Horloge (Louvre – Paris) \*
4. Pavillon Sully (Louvre – Paris) \*
5. Porte de la Bibliothèque (Rue de Rivoli) \*
6. Hotel des Invalides (Paris) \*
7. Arc de Triomphe de l'Étoile \*
8. Le Depart (Arc de Triomphe de L'Étoile – Paris)
9. Place de la Concorde
10. La Trinité (Paris) \*
11. Notre Dame de Paris
12. Notre Dame de Paris (face latérale)
13. Notre Dame de Paris (trancept côté sud) \*
14. Notre Dame de Paris (porte latérale) \*
15. Bibliothèque du Louvre (portes sur le quai) \*
16. Académie Nationale de Musique \*
17. Académie National de Musique (façade latérale) \*
18. Palais du Justice (façade sur le quai)
19. Palais du Justice (façade sur la place Dauphine)
20. Grande Grille du la Coeur d'Honneur (Palais de justice Paris)
21. Palais du Justice de Paris (tour de l'Horloge) \*
22. Palais de Justice de Paris (Sal des pas Perdus)
23. La Sainte Chapelle de Paris (façade)
24. La Sainte Chapelle de Paris (façade latérale) \*
25. La Sainte Chapelle de Paris (flèche) \*
26. Tribunal de Commerce de Paris (façade sur la quai) \*
27. Tribunal de Commerce (Cour intérieure)
28. Chateau de Blois (façade sur la Cour)
29. Cathédrale de Reims (façade principale portail) \*
30. Cathédrale de Reims (façade latérale) \*
31. Église du Sainte Julien (de Broudie) \*
32. Église du Issoire \*
33. Notre Dame du Poitiers (façade) \*
34. Cathédrale de Chartes (fleche) \*
35. Cathédrale de Chartes (façade principale portail) \*
36. Église de Sainte Gilles (a St. Gilles)
37. Palais du Justice a Rouen
38. Église de St. Pierre (a Caen - abside) \*
39. Église de St. Pierre (a Caen fleche)
40. Fontane de l'Esplanade (Nîmes)
41. Ampithéâtre Romain (Nîmes)
42. Théâtre Romain a Orange (intérieure)
43. Église de Saint Trophîme (a Arles) \*
44. St. Germain L' Auxerrois (Paris) \*
45. Louvre Colonade (Paris)

## APPENDIX C

Bold entries indicate works from *Les Principaux Monument de la France* which were printed from the same negative of pre-existing albumen prints.  
Albumen prints were located within the albums, *Vues et Monument de France* (3 prints - underlined) and *Monument de Paris* (11 prints – italicized) (CCA)

1. ***Palais des Tuileries (Avant l'Incendie de 1871)***
2. Arc de Triomphe du Carrousel (Paris)
3. ***Pavillon de l'Horloge (Louvre – Paris)***
4. ***Pavillon Sully (Louvre – Paris)***
5. ***Porte de la Bibliothèque (Rue de Rivoli)***
6. ***Hotel des Invalides (Paris)***
7. Arc de Triomphe de l'Étoile
8. Le Depart (Arc de Triomphe de L'Étoile – Paris)
9. ***Place de la Concorde***
10. La Trinité (Paris)
11. ***Notre Dame de Paris***
12. Notre Dame de Paris (face latérale)
13. Notre Dame de Paris (trancept côté sud)
14. Notre Dame de Paris (porte latérale)
15. ***Bibliothèque du Louvre (portes sur le quai)***
16. Académie Nationale de Musique
17. Académie National de Musique (façade latérale)
18. Palais du Justice (façade sur le quai)
19. Palais du Justice (façade sur la place Dauphine)
20. Grande Grille du la Coeur d'Honneur (Palais de justice Paris)
21. Palais du Justice de Paris (tour de l'Horloge)
22. **Palais de Justice de Paris (Sal des pas Perdus)**
23. La Sainte Chapelle de Paris (façade)
24. ***La Sainte Chapelle de Paris (façade latérale)***
25. La Sainte Chapelle de Paris (flèche)
26. Tribunal de Commerce de Paris (façade sur la quai)
27. Tribunal de Commerce (Cour intérieure)
28. Chateau de Blois (façade sur la Cour)
29. Cathédrale de Reims (façade principale portail)
30. ***Cathédrale de Reims (façade latérale)***
31. **Église du Sainte Julien (de Broudie)**
32. Église du Issoire
33. Notre Dame du Poitiers (façade)
34. Cathédrale de Chartes (fleche)
35. Cathédrale de Chartes (façade principale portail)
36. Église de Sainte Gilles (a St. Gilles)
37. Palais du Justice a Rouen
38. Église de St. Pierre (a Caen - abside)
39. Église de St. Pierre (a Caen fleche)
40. Fontane de l'Esplanade (Nîmes)
41. **Ampithéâtre Romain (Nîmes)**
42. Théâtre Romain a Orange (intérieure)
43. Église de Saint Trophème (a Arles)
44. ***St. Germain L' Auxerrois (Paris)***
45. ***Louvre Colonnade (Paris)***

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