INTRODUCTION

This is an expanded and updated version of an article that first appeared almost ten years ago. That particular article has long been out of print but several times a year, the question comes up about a color of a garment or object in a picture. Instead of continuing to provide a brief explanation each time, we decided to offer an revised version of the article, in which we found more quotes from primary sources, included a photography time-line and additional wet plate photographs.

Originally we wanted to include photographs of even more fabric swatches and a fabric color wheel but have not have the chance to have the wet plate photographs made. Rather than holding up the article any longer waiting to have the new photographs made, we decided to go ahead with the extended article without all the planned additions. We will add them as soon as they are available, so stay tuned for updates as this will be a work in progress, even though it will go into the archived section when the next article goes up.

This is also where you can participate. We would also like to begin a photographic gallery as part of the article. In order to show as many wet plate photographs with comparisons with the corresponding color photograph, we are requesting that you send us a color photocopy or scan of your wet plate photograph and the same outfit as a color picture. For a bonus, if you could include a close up image of the fabric in color. With your permission, we will post all photographs in the gallery and many people will be able to benefit from seeing how light, shading, and the wet plate photographic process all interacted to produce the unexpected effect on colors that we see in the photographs. Only you can make this project a success because no one wants to see multiple images of our photograph — once in the “About us” section is enough! Thank you for your assistance and we look forward to your participation.

THE MYSTERY OF WET PLATE PHOTOGRAPHS AND COLOR — FURTHER INVESTIGATIONS

Virginia Mescher

We look at photographs of people from the nineteenth century in our research. What do we see? A woman dressed in a dark color — is she in mourning? A soldier in light pants and jacket — is he a confederate or a federal soldier? Where are the people with blond hair? We see original garments and they come in a variety of colors but where are the colors gradations in photographs? We know that they did not have color photography but there should be more lighter colored garments and blond hair in photographs. Perhaps this article will answer some of your questions BUT it might just create more questions than answers.

Although the only way to study colors of clothing of the nineteenth century is to examine the actual garments, a more common and practical method is to look at drawings, engravings, paintings, and photographs made at that time. Of these, photographs are generally considered the most accurate because the potential for artistic license is limited. Photographs are an excellent way to see the style of dress, trim and accessories, hair styles and the general look of the people when they were photographed. Nineteenth century photographs do, however, have several drawbacks: we don't know if this is the way people really dressed most of the time and, since the photographs are black and white or brown tones, we are unable to determine the colors of the subject's clothing, accessories or hair. We do know that everyone was not a brunette and we suspect that they did not dress in mostly dark garments. The samples of fabric from the time period are available in a variety of colors, including yellows, reds, and oranges which are brilliant in their intensity. However, because of technical characteristics of the photographic plates, an unintentional bias is possible in trying to interpret them today. Unless these characteristics are considered, it is possible to conclude that most of their clothing was moderately dark in color.

Until photography made it possible to have a person's image easily reproduced, people were dependent upon hand-done illustrations. Of the available media, only paintings really provided any information about color. However, the artist might have changed the actual colors and, regardless of his skill, he usually would not have been able to accurately reproduce the complexity, detail, and color combinations of printed fabrics.

EARLY PHOTOGRAPHY

During the second quarter of the nineteenth century, an alternative to a hand-done illustration became possible when the art of what we now label collectively as photography was born. In 1839 the daguerreotype, which fixed an image on a silver or silver-covered copper sheet, was developed by. Despite the drawbacks of being limited to one image per exposure, being difficult to view, and the image being reversed, it continued to be used in varying degrees until the early 1860s. This method was soon followed by the calotype in 1841 which produced a paper negative which could be used to produce multiple images (not popular in the United States). Ten years later, other techniques which were variants of the same process appeared. These consisted of the ambrotype in 1851 (usually a single image on a glass plate), ferrotype or "tintype" in 1855 (a single image on

a varnished sheet of iron), and the wet collodion (glass negative and paper print), which was developed in England in 1851 by Frederick Archer. The ambrotype and ferrotype both had the advantage of usually requiring only a two to ten second exposure. However, despite the requirement for exposures up to five times as long, the method that produced excellent detail as well as making a negative for multiple images was the wet collodion. We expect that the combination of fine detail with the ability to make multiple prints on paper (these paper prints from glass negatives were the only images that were referred to as "photography") contributed to the latter methods popularity and continued use through the end of the nineteenth century. These plates were used to make individual photographs as well as stereographs (two photographs that were viewed simultaneously to produce a three-dimensional image) and cartes de visites (CDV's), the latter being patented in 1854. It was not until 1880 that George Eastman developed a dry plate formula, which did not become popular until the mid-1880s. Therefore, images from the Civil War period would probably have been either ambrotype, ferrotype, or wet collodion.

[For a more complete time-line of nineteenth century photography, please refer to Appendix I]

THE MYSTERY

Because the resulting images from any of these methods were in black and white, in an effort to show color, tinting was sometimes applied. Any color that appears in a period photograph was hand-painted on the image after the photograph was made. Like a painting, the artist could apply a realistic color or one totally unlike what the subject was wearing. Therefore, these tints cannot always be used as a color guide.

Most of the photographs, however, were left untinted. Unlike the black-and-white films of today which are relatively well-balanced for the different colors, the wet plate methods produced some results which could distort our interpretation of the period photographs. In "The Wet Plate Method Revisited," Mark and France Scully Osterman stated that "collodion plates were colorblind." Photographers used various techniques to achieve different photographic effects, but there was one effect that could not be changed; much of the shading was caused by differences in the intensity of the light. However, in the wet plate photographic process, the shade of the photographed object was also affected by the sensitivity of the chemicals on the plate to the relative intensity of different wavelengths of light. Because of the different reactions of various wavelengths, in period photographs warm yellows, reds, and oranges usually show up black; but other cool yellows close to a blue light source show up as a light color. New yellow pine boards show up dark. Blond hair often will appear a dull black as do freckles and red hair. Tan tones (including tanned faces) show up as dark gray. In a reversal of expected shades, pale pink can show up as a darker shade than dark pink. Although green contains blue pigment mixed with yellow, greens lose most shading and show up as either dark gray or black. White, due to a peculiar reaction of the chemicals to the relatively intense light, can show up white or a shade of grey. Black wool photographs as gray and gray wool, because of the blue component in gray dye, photographs as white. Blue to violet can show up anywhere from white to varying shades of gray depending on the shade of blue or violet, with the lighter shades being almost white in the photograph. Blue eyes appear as white and skin tones, due to the yellow, amber, and red shades common to most skin types, will appear at least two tones darker in shade than we would expect. The correction for this distortion in skin tones, which was

done often if the clothing would allow it, was to overexpose the image which then affects the shading of the garments.

Adding to the complexity of interpreting colors, until the advent of flash powder (which was not popular until the dry plate era after the Civil War), photographs needed to be taken with available daylight. If made early (morning to 1 PM, referred to as actinic) or late in the day, yellowish light common at those hours reacted very poorly with the chemicals on the photographic plate, so correctly exposing the picture was more difficult. In order to correct this problem, some photographers tried to create a bluish tone for the light in the studio by covering their studio skylight with either blue glass or blue tissue paper. Since the blue spectrum of light reacted better with the chemicals on the plate, this technique allowed the photographer to better control the exposure.

With all the variables, is it any wonder that one can not predict how any color will photograph using the wet plate process? The researcher not only is frustrated by the black and white tones of period pictures but there is no way to accurately predict what the original color was in the photograph. We can make educated guesses based on current research of photography, study of original garments, descriptions of current fashions and color, and if we are lucky, written accounts and actual swatches of fabrics accompanying the photograph.

DRESSING FOR THE PHOTOGRAPHER — ADVICE FROM THE PAST

Some people in the nineteenth century were aware of the discrepancies between the actual and photographed color. There were many articles in photography publications that made suggestions for the photographer in dealing with the discrepancies. General science publications as well as ladies' publications also dealt with the matter and gave advice for the lady having her picture made as to what to wear and how to dress her hair.

Although the daguerreotype was familiar to people by the 1850s, there were explanations on why and how the colors photographed as they did. In the January 1850 issue of the *American People's Journal of Science, Literature, and Art* published an article on photography. In this article, they included inexpensive daguerreotypes and the effect of light and shade on the colors worn by the photographed subject.

> ". . . . The blue, violet, and red, are the principle chemical rays. Light and shade, where these colors are contrasted with green, yellow, or orange, or even white, will not appear in the picture as an object. A person sitting for a picture with a dress where blue and white were strongly contrasted, would be surprised to find no contrast at all in the likeness, and if contrasted with orange or yellow for the lighter shade, to find the shades reversed, the light, dark, and the dark, light. For this reason, clear, blue eyes appear much lighter than they really are, while olive colored appear much darker. The dress for a sitting if any other color than black is preferred, should be chosen with reference to the complexion. Dark, or sallow complexions should have black, and if contrast is desired let it be white. Persons of clear complexion may be taken in almost any color they choose, only when the contrasts are sought, let the chemical rays be light, and the inactive dark; they will not then be

disappointed in the results."

An 1851 issue of *Scientific American* explained the color discrepancies in photographs in an article titled, "Actinism." They also mentioned how a ladies dress would appear in the photograph.

> ". . . . A blue silk dress, worn by a person of whom a photographic likeness is taken, presents a light ground — as does a blue eye; but a yellow dress — and this contrary to what the majority would suppose, produce a dark ground — it obstructs the actinism or chemical action. A bright sunny sky is not a good one for the daguerreotypist, — the cloudy atmosphere of England has been found superior to that of sunny Mexico."

The following excerpt was taken from *Lady's Almannac*, 1854 and 1855. It gave advice as to what type of hairstyle would be appropriate for a photograph and the style of dress, color and pattern that would be the most photogenic.

> ". . .The hair may be smooth or lay evenly, but should never be sleeked or matted down; and the practice of shaving the forehead or pulling out the hair is altogether too *bare-faced* for a lady . . . All lace-work should be light and thin, never massy; though it may be white or black to suit the occasion. . . . Whatever the fabric is selected, avoid large figures or broad stripes. Figures of the same material and color, as watered, striped or figured dark silks, or very narrow striped light silks, are well suited to the daguerreotype . . .
>
> Dark colors are generally more appropriate than light . . . Remember that positive red, orange, yellow or green are the same as black, or nearly so; violet, purple and blue are nearly the same as white. . . . Rich figured shawls or scarves and dresses usually show well in a picture."

Even the satirical English publication, *Punch*, addressed the subject of color in photographs. This cartoon appeared in the July 20, 1861 issue.

THE PHOTOGRAPH.

Mary. "WHY, TUMMAS, IT 'S THE VERY MORAL OF YER!"
Tummas. "PRETTY THING, AIN'T IT? PITY THE YALLER OF THE UNIFORM COMES SO BLACK!"

The *Saturday Evening Post* in 1864 offered the following advice in an article, titled, "Position and Dress for Photographs."

> "Nothing comes out better than a black silk, make long, full, and graceful. If the wearer is young, and is taken sitting, a border of black over white round the skirt is very effective. A lady not so young looks well in a black moire antique without trimming. If the lady's figure is not good, she may wear a black lace shawl elegantly arranged, or, if of a nervous disposition, she had perhaps better be seated, as a timid or frightened air looks ill in a standing figure, and she may feel more at ease. A light linsey woolsey takes well, and I have seen a tartan rep come out charmingly upon a small figure when colored. Blue and orange are colors to be avoided; the former looks white, the latter black. With regard to position, it must depend entirely on herself which attitude gives the most agreeable view of her features, whether full face, three quarters, or profile. She should get some friend who has good taste to accompany her to the artists, to arrange her dress and attitude, and to amuse and make her smile at the right moment. Some individuals never get justice done them in a photograph, and a few — a very few — are so fortunate as to astonish their friends by appearing much better than in life. Nervous people are difficult to take; where the face happens to be thin, it should be thickly dusted with the white powder.(?). This mode is adopted by one of our first photographers. But the pose needs an artist, not a mechanic; and it does not always happen that the man of positives and negatives is also a man of taste and art; so he takes his sitters just as they tumble into, or plump into a chair, looking ill at ease, anxious or scared, and sends them forth stamped on cards 'with all their imperfections on their heads.' Photographs are very much improved by tinting, if the tinting is nicely and clearly done, and the eyes well marked out. Some colorists make them heavy and lead-like, in which case they are better in their primitive condition."

The June, 1864 issue of *Peterson's* addressed the proper clothing one needed to wear for a photograph.

> "PORTRAITS IN PHOTOGRAPHY.— Nothing in Photography appears easier at first sight than a portrait. But how is it that many portraits are not at all good likeness, and that it is rare that the resemblance is so complete as to satisfy the friends and the relations of the individual who has been the model?
>
> . . . A good portrait may be rendered of no effect by a false choice of color in the dress of the model. The colors which are most luminous to the eye do not always produce the most energetic effects. For instance, red, orange, and yellow are almost without action; green acts but feebly; blue and violet are reproduced promptly. Thus, a person of a very fair complexion must not be dressed in either green, orange, or red, as the lights would be too prominent, and the whole portrait would lack energy and detail."

The following was taken from *Saturday Evening Post*, February, 1865; *Godey's*, May, 1865; and the *American Practical Cyclopedia*, 1866.

> "HOW TO DRESS FOR A PHOTOGRAPH.— A lady or gentleman, having made up her or his mind to be photographed, naturally considers, in the first place, how to be dressed so as to show off to the best advantage. Let me offer a few words of advice touching dress. Orange color, for certain optical reasons, is, photographically, black. Blue is white; other shades or tones of color are proportionately darker or lighter as they contain more or less of these colors. The progressive scale of photographic color commences with the lightest. The order stands thus white, light-blue, violet, pink, mauve, dark-blue, lemon, blue-green, leather-brown, drab, cerise, magenta, yellow-green, dark-brown, purple, red, amber, morone, orange, dead black. Complexion has to be much considered in connection with the dress. Blondes can wear much lighter colors than brunettes; the latter always present better pictures in dark dresses, but neither look well in positive white. Violent contrasts of color should be especially guarded against. In photography, brunettes possess a great advantage over their fairer sisters. The lovely golden tresses lose all their transparent brilliancy, and are represented black; whilst the 'bonnie blue e'e,' theme of rapture to the poet, is misery to the photographer; for it is put entirely out. The simplest and most effective way of removing the yellow color from the hair, is to powder it nearly white; it is thus brought to about the same photographic tint as in nature. The same rule, of course, applies to complexions. A freckle quite invisible at a short distance is, on account of its yellow color, rendered most painfully distinct when photographed. The puff-box must be called in to the assistance of art. Here let me intrude one word of general advice. Blue, as we have seen, is the most readily affected by light, and yellow the least; if, therefore, you would keep your complexion clear and free from tan and freckles whilst taking your delightful rambles at the seaside, discard by all means the blue veil, and substitute a dark-green or yellow one in its stead. Blue tulle offers no more obstruction to the actinic rays of the sun than white. Half a yard of yellow net, though not very becoming, will be found very efficacious, and considerably cheaper than a quart of kalyor. The cause freckles is simple enough. It is nothing more than the darkening of the salts of iron contained in the blood by the action of light. A freckled face is, therefore, an animated photograph."

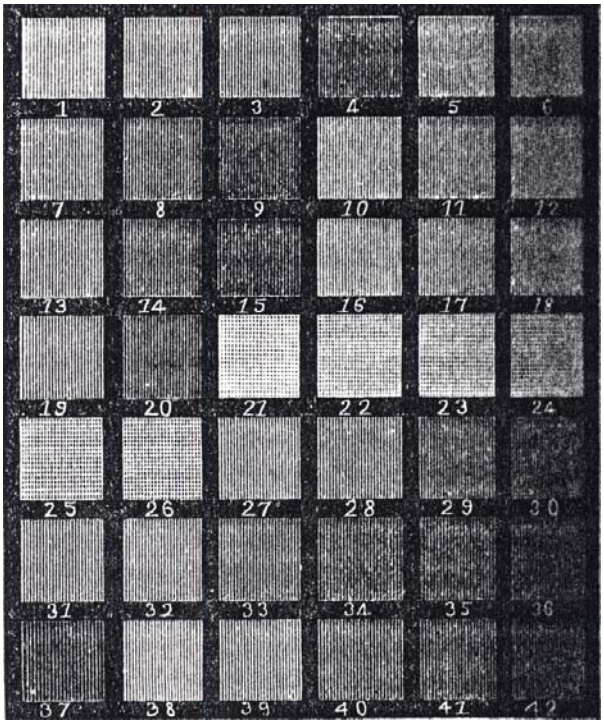
Even as late as 1870 advice was being published on how to dress for the photographer. The following was taken from an advice book written by Dr. A. D. Youman.

> "PHOTOGRAPHS, To Dress For.--In dressing for photographs it is useful to know that dark-brown, dark-green, maroon, and plain black goods, without gloss, will take a rich drab color.
> Silks of the same color will take considerably lighter.
> Snuff-brown, dark leather, dark-drab, scarlet, cherry, dark orange, crimson, and slate will take a very rich drab color.
> Violet, blue, purple, pink, and magenta will take very light, and should be avoided."

THE PHOTOGRAPHER'S ADVICE

The color discrepancies also concerned the photographer. The following is taken from an 1870 issue of the *Philadelphia Photographer* magazine. It demonstrates the problem that photographers had with their customers not knowing how the color of their clothing would show up in a wet plate image and a solution that could be offered by the photographer to his clients.

> "Ayer's Chart of Photographic Drapery — Mr. George B. Ayers, whose capital work, "*How to Paint Photographs in Water Colors,*" has passed through two editions of a thousand each, and is probably in the hands of many of our readers, has again supplied a want to the profession which is likely to be as substantially appreciated as his book.
>
> Every one who has worked at the camera knows what perplexities arise from the want of something to show the customer how this or that color will "take," or, rather, how it will "look" in the finished photograph. The photographer is continually annoyed by parties who will sit in a certain dress, and then, finding it does not "look" as they desire, insist on a second, or even a third sitting, averring as a reason that they "do not like the expression," when the real fact of the matter, is that they do not like the dress. All this is done at expense of the photographer, and he cannot very well avoid it if he would be considered accommodating.
>
> Mr. Ayers, however, has opened a way by which the trouble may be entirely overcome. He has collected, with a great deal of care and after much trouble, *forty-two* squares of woolen fabrics, of the varied colors and shades known in the dry goods trade, and arranged them systematically in rows, each square having a number. They are then carefully photographed, size about 11" x 14" mounted on a card 17" x 25", with a numbered table of the colors, and a full explanation in Mr. Ayer's graphic style, printed thereon. The accompanying drawing of the chart will make its arrangement more plain and intelligible. (Please see advertisement for further particulars.)



A specimen copy is before us, and we pronounce it a most perfect and useful affair, such as every photographer has long wanted, and such as every photographer should have to exhibit to every lady customer. Then, if Maria comes to be 'taken' in her new, pet blue dress, and, finds it will 'look' absolutely *white* in the picture, she can save both her own and the photographer's time by postponing the sitting until she can appear either in her old wine-color, or until her snuff-brown is done.

She *sees for herself*, and thus avoids the dreary explanations, argument, and trouble to which the profession has always been subjected.

> We think photographers will readily perceive the value of Mr. Ayer's chart, and place a copy in their galleries forthwith. Our publishers have undertaken to issue it for him, and copies may now be had. For a list of colors included, please read the advertisement." [No advertisement accompanied the copy of the article used by the author.]

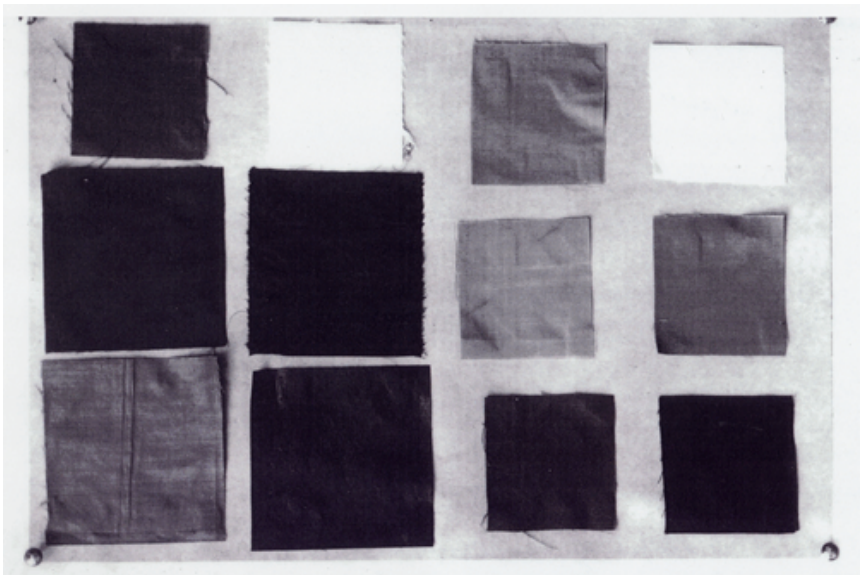
Backdrops were also very important. Some photographers used white for certain subjects. Others used a medium blue which allowed overexposure and prevented the skin tones from blending in with the backdrop. The men actually had an advantage here because the presence of full whiskers or sideburns and either a hat of full head of hair considerably decreased the problem of blending with the backdrop.

According to Mark and France Scully Osterman, two of only a relative handful of skilled wet plate photographers in the world, most nineteenth century photographers refused to allow their subjects to wear white, since it would be impossible to capture the detail in the dress and keep the skin tones light enough. Photographers suggested that a medium blue be worn instead so that the face would appear as a normal tone and the medium blue clothing would appear white when the photographer overexposed the plate in order to adjust the skin tones.

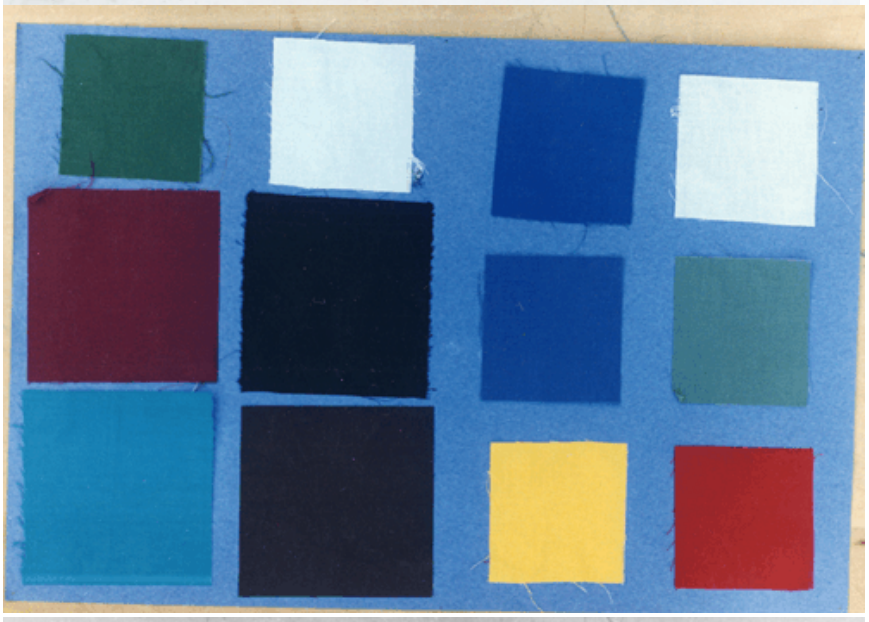
The Ostermans recommend that if a woman is going to have a wet plate image done, she wear dark green, red, deep blue or brown. Also, she should not wear makeup and, for modern women who frequently spend considerable time exposed to the sun, every effort be made to avoid developing a tan since both of those elements tend to darken the complexion in period photographs. Otherwise, following the advise of period photographers, one can not go wrong.

COMPARISON OF FABRIC SWATCHES, THREAD CHARTS AND PHOTOGRAPHS

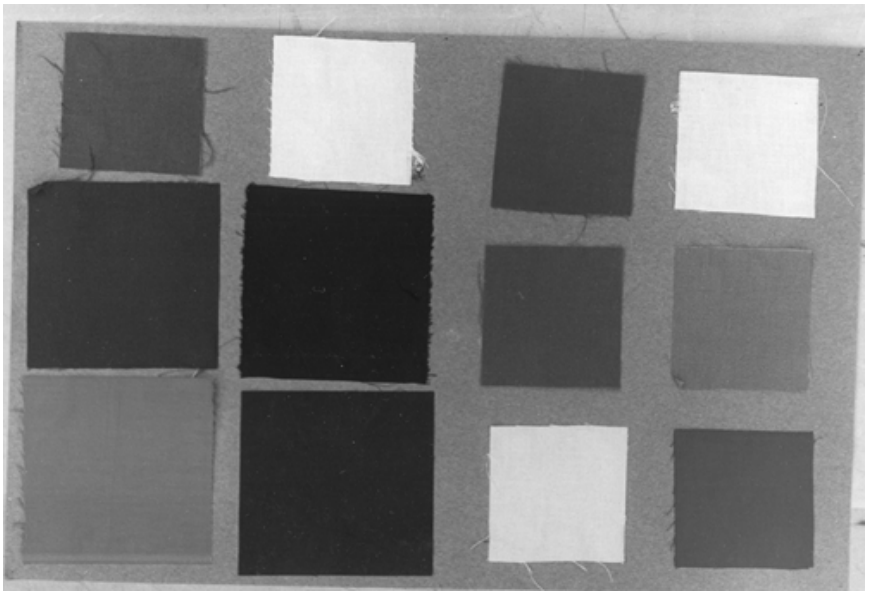
In order to demonstrate the various color discrepancies, please view the images of swatch collection. Some of the prints have a quite unexpected effect when photographed in this manner. This sample is not intended to be a comprehensive collection of all the colors and prints that were available, but it does give a representative sampling in order to view the effects of the photographic methods. Keep in mind that the fabric content, i.e. silk, wool, cotton, or linen, will also have a great deal to do with how the garment and color will photograph and we do not have access to the variety of fabrics that were available in the nineteenth century. The thread chart will give the reader a wider range of colors to view. The color photographs of the fabrics and threads are shown along with modern black and white images as well as the wet plate images.



Wet plate of solid fabric swatches.

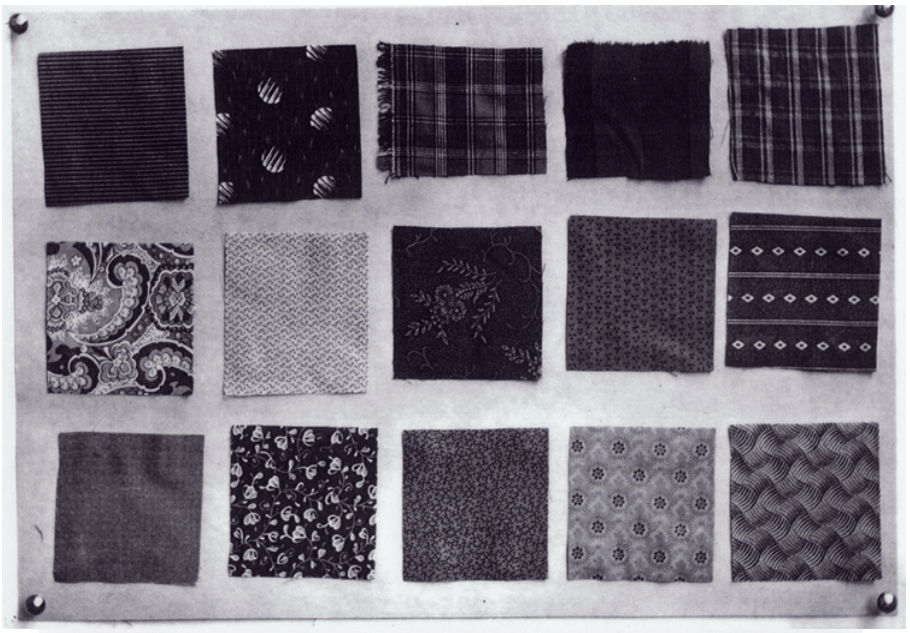


Color image of fabric swatches



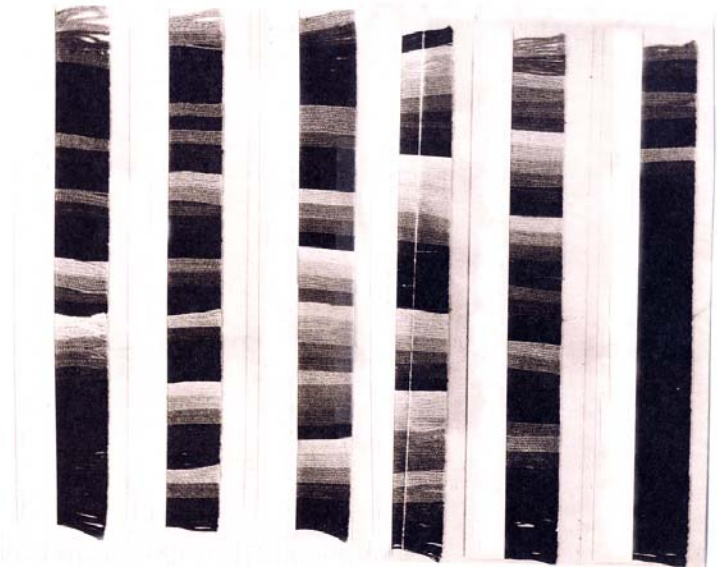
Modern black and white image of fabric swatches

Wet plate image of printed fabric swatches



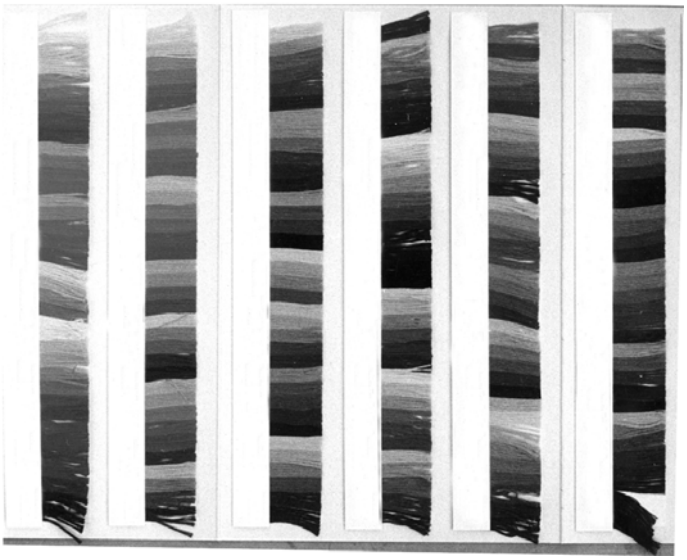
Color image of printed fabric swatches

Modern black and white image of fabric swatches

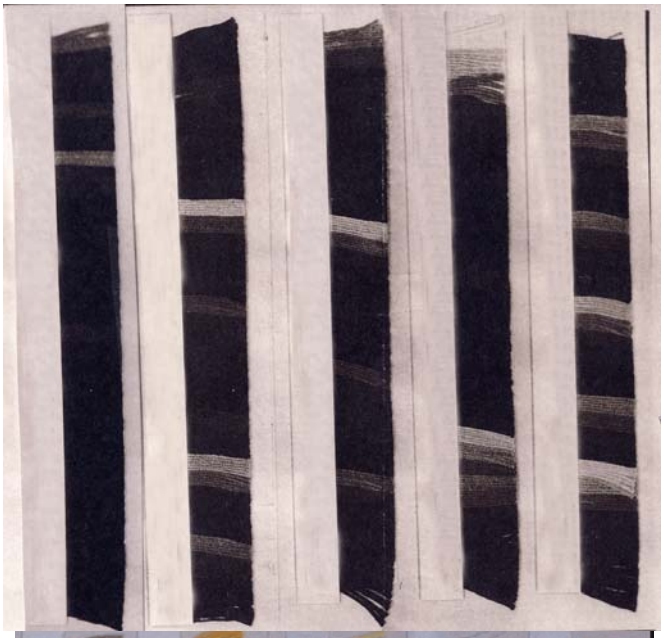


Wet plate image of thread chart - page 1

Color image of thread chart - page 1

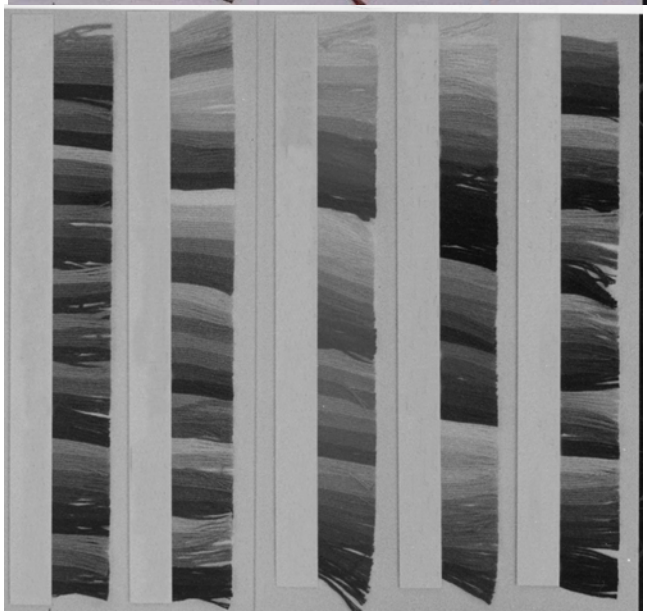


Modern black and white image of thread chart - page 1



Wet plate image of thread chart - page 2

Color image of thread chart - page 2



Modern black and white image of thread chart - page 2

Also included is a wet plate image of the Atlantic Guard and Soldiers Aid Society (AGSAS) and both a color photograph and black and white photograph of the same image. The reader can see in the wet plate photograph the colors show up differently from the swatches and illustrate that there is no absolute in how a color will be effected by light and shadows, thus changing the effect in a wet plate photograph.

Wet plate image of AGSAS members

Color image of AGSAS members

Modern black and white image of AGSAS members

Seeing the difference between the actual colors in a photograph and the resulting shades in a wet plate image of the same scene is startling. There is no real way that we can now look at a period photograph and know what color or shade the subject was wearing, or, for that matter, the color of anything else in the picture. The only way to really have some idea of fabric colors or colors used for decoration by people of the time is by reading diaries and viewing actual garments, fabric sample books, or finding a remnant of an original fabric. From fabrics we have seen, the people of the time definitely had bright colors in abundance and we expect did not dress in predominantly dark colors as might be inferred at first glance with our twentieth century eyes. This photographic comparison definitely showed that, if a picture says a thousand words, the wet-plate pictures' words were sometimes fiction.

A Special Word of Thanks:

The author first became interested in the phenomenon of how wet plate photographs interpreted actual colors when she was a photograph taken by Mark and France Scully Osterman and read the accompanying article. After contacting them, they consented to not only prepare the wet collodion image of the sample swatches but to review this article for technical accuracy. We are deeply indebted to them and only regret that, for the sake of not making the article any longer than it became, we were not able to include more of the fascinating process of 19th century photographic techniques that they shared with us.

Thanks, too, to the Atlantic Guard Soldiers' Aid Society for the use of the images of their members.

APPENDIX I

Time Line of Nineteenth Century Photography
From the First Photograph to Color Photographs

1802 Thomas Wedgewood [of Wedgewood pottery] and Humphrey Davey produced the first **negative**, but they did not grasp the importance of their discovery. They did not obtain a recognizable image because their exposure time was not long enough.

1818 Joseph Nicphore Niepce produced the first known photograph, called a **heliograph** by copying an engraving and produced a negative image.

1826 Niepce successfully produced his first "photograph from nature" and the exposure took eight hours. This was the first positive image was created.

1838 **Stereoscope** was invented by Charles Wheatsone but it was not introduced to the general public.

1839 Louis-Jacques Daguerre, a French artist, used a camera obscura to make a **Daguerreotype** which was the first practical photographic process. The exposure were very long but the images were permanent. Only one image could be made from each exposure and the details showed well in the image. The process produced positive images on silver plates and was used mainly for portraits. Color could be added by hand. Popular between 1839 to 1856 but was seldom seen after 1862.

1840 **Paper negatives** were discovered by Fox Talbot in England.

1841 Fox Talbot perfected the **calotype or salt print** (beautiful form). Negatives were produced on sensitized paper (silver iodide and silver nitrate) and positives were made by contact exposure. The advantage of this process was that multiple images could be made from the one negative.

1849 Sir David Brewster invented a **stereoscope** that would view either paper prints or transparencies made on tissue paper. He also invented a two lens stereo camera.

1851 **Wet collodion or wet plate** was introduced by Frederick Archer. This was the first practical method for making negatives on glass. The plate was coated, sensitized, exposed and processed while the collodion was still wet. This method dominated photography until the mid-1870s when gelatin-emulsion dry plates were introduced.

1851 **Stereoscopes** were introduced to public at the Crystal Palace Exposition in London and Queen Victoria liked them which increase their popularity. Photographs were taken with a stereo camera and produced a 3-D image. This was wonderful for viewing landscapes and outdoor images since photographs could not be reproduced in newspapers, magazines or books and enabled the public to seen famous landmarks and natural wonders. Comic

stereographs were popular. These were mainly produced from 1851 to 1943. This was the forerunner of the View-Master.

1851 **Ambrotype** invented by Frederick Archer and Peter Fry. This type of photography used a variation of wet collodion process and produced a positive appearing image. The dark, underexposed negative image on glass was bleached, and the image appeared positive when the glass was backed with black. The image could be then be colored by hand. It was less expensive than daguerreotype and usually only one image was produced unless the exposure time was increased. These were seldom produced after 1864.

1854 **Carte-de-Visite** introduced in France by Andre Disderi as a low cost portrait and were originally used as calling cards. [See the archived Virginia's Veranda's article, "Visiting and Visiting Cards: Not Just for the Ladies."] It was a small photograph mounted on a card approximately 2 ½" by 4" and was popular until 1890s. The wet plate process was used and the camera used had 4, 6, or 8 lenses. The exposures were made by uncapping one or more lenses at a time and the subject could change positions. The developed plate was contact printed onto a single sheet of treated paper and the selected poses were cut and mounted on cards. Unwanted poses could be masked during the printing. These were made from 1854 to 1925. An entire industry of making albums, to hold the cdv's, was created.

1855 **Ferrotype** was developed by an American J. W. Griswold. This type of photograph was also known as a tintype. The image was produced in a thin sheet of steel that had been japanned (painted black or brown) and coated with a collodion emulsion. The plate was exposed, developed and produced a whitish-silver negative, which when it was viewed against the dark background appeared as a positive. Only one image could be made at a time but was inexpensive.

1861 Dr. Oliver Wendall Holmes designed the common **stereoscope** we know today. It was a hand held model.

1880 **Dry plate** formula was developed by George Eastman. This meant that a dry film could used in cameras and paved the way for a user-friendly camera.

1888 **Kodak No. 1 camera** introduced. Only took four steps were needed to take a picture so an average person could take pictures without having to be a photographer. The camera had 100 roll exposure film roll which was then sent to Rochester, New York to be developed.

1889 **Transparent celluloid film** introduced by Kodak which eliminated the need to return the film to Kodak for processing. For more convenience, it could be processed in local photographic labs.

1892 Frederick E. Ives invented the first camera that took three-color separation negatives which produced the first **full color images.** The process was patented in 1894 and the camera was known as the Kromscop.

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