

THE American Surveyor

A FOOT IN THE

TO THE FUTURE

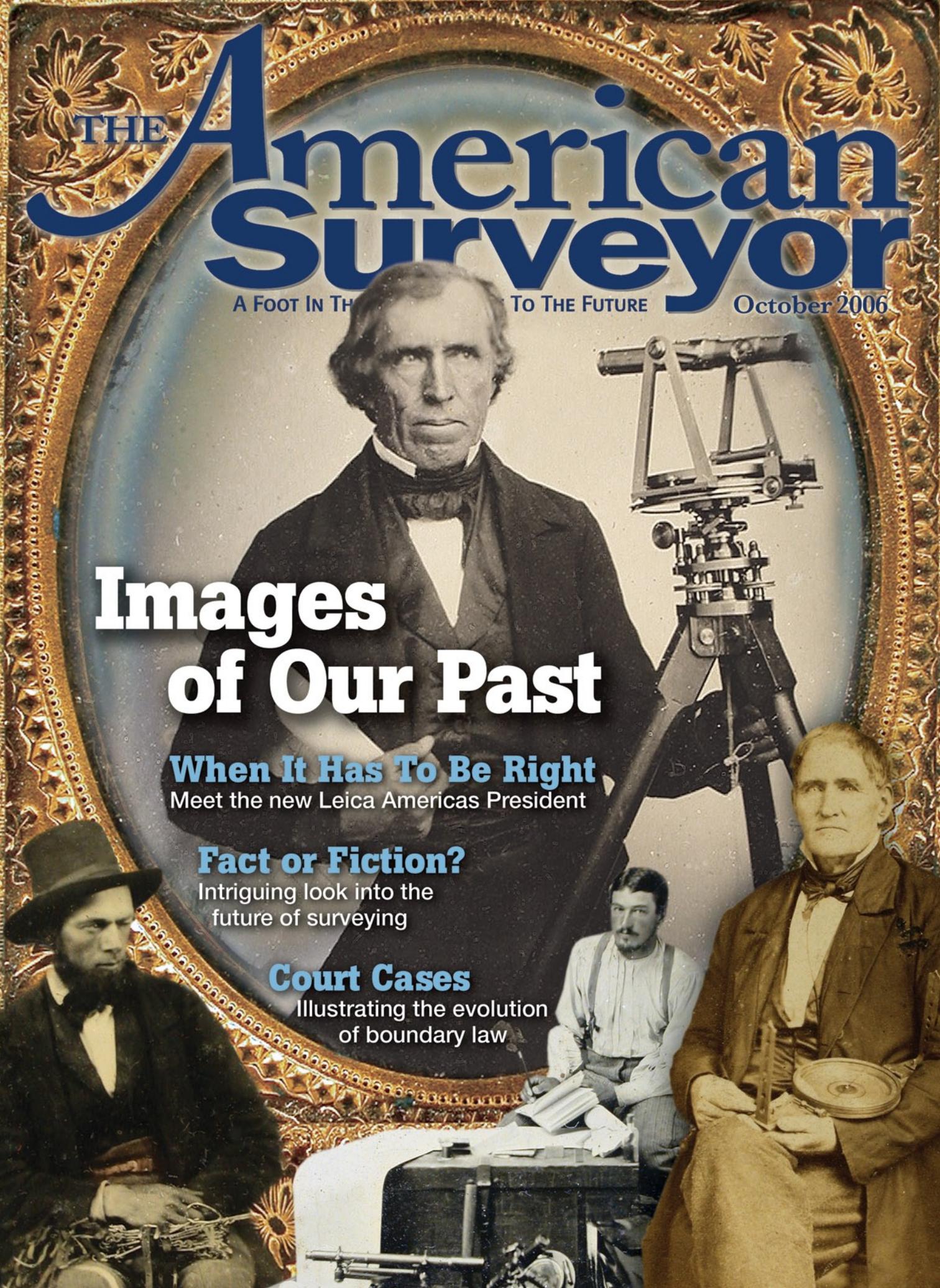
October 2006

Images of Our Past

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The American Surveyor in Photographs

{ THE FIRST FIFTY YEARS 1840-1890 }

In museum archives and private collections across the country, and still hidden away in old trunks and boxes in the attic, there are visual treasures waiting to be discovered.

>> By Dr. Bill Schultz

Plate 1 (above left) One of the earliest known images taken of a surveyor, this sixth plate daguerreotype taken circa 1845 shows the surveyor posed cradling his engineer's wye level. *Author's collection.*

Plate 2 (above right) A wonderful early 1850's pose of a surveyor – or perhaps the proud instrument maker – holding out his hat and tilting the Jacob's staff forward to better show the top of the vernier compass. (Sixth-plate daguerreotype) *Author's collection.*

Plate 3 (facing page) This young surveyor is seated next to a wye level mounted on a tripod some ten years before the American Civil War. (Sixth-plate daguerreotype) *Author's collection.*

These treasures are the old photographs that provide a direct window to the past and a glimpse of our professional heritage. Though millions of photographs have been taken, of special interest are those relatively rare images taken of American land surveyors in the second half of the 19th century. These images are truly unique, for surveyors during this time often posed before the camera with an array of survey instruments and other tools of their profession – from Gunther chains to theodolites. Starting with the daguerreotype in 1840, these images bring us as close as we will ever get to meeting the men who blazed the early sight lines and set the first boundary markers. Keenly aware of the role they were about to play in local history, many of these pioneer surveyors had a photograph taken to commemorate the occasion before they set to work on boundary, land, and railroad surveys. Sadly, a great number of these historic images have been lost, either tossed away or destroyed by the elements – even the master photographer Mathew Brady had thousands of his glass plates sold as scrap to be used as windowpanes in greenhouses. The fact that photographic images as old as 160 years have survived at all is remarkable. To better appreciate this unique visual heritage, as shown in this portfolio of surveying images, it helps to have some understanding of the various photographic processes used to photograph surveyors before the turn of the 19th century.

Photography went through a number of different processes in its first fifty years, each method being popular for a comparatively short time before being replaced by a process that was either cheaper or technically easier to produce. **Figure 1** gives a time line of the most common types of photography during this period. The first known photographic image of a surveyor is a daguerreotype (**Plates 1, 2, and 3**). This form of photography was first demonstrated in 1839 by its inventor, the Frenchman Louis Daguerre, but did not publicly take hold until around 1841. Studios first cropped up in the major cities of the northeastern United States, but quickly spread to cities across the eastern half of the country and were carried west by itinerant photographers traveling in photo wagons from town to town. Though various forms of “photography” existed before the

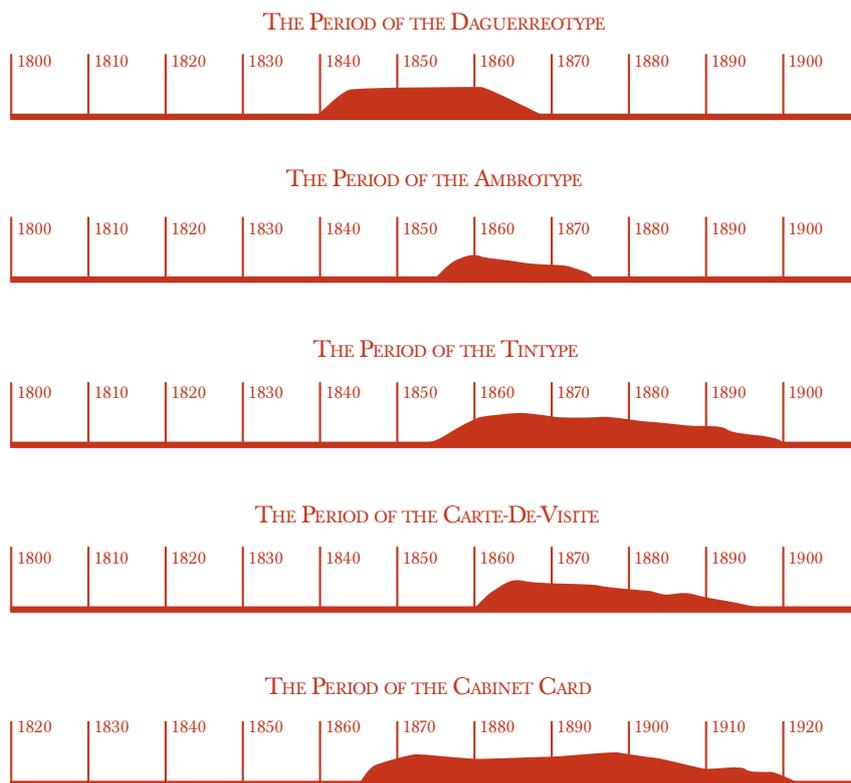


Figure 1 Time frame and relative popularity of the major forms of 19th-century photography. Adapted from *Photography The Early Years*. Courtesy George Gilbert.

daguerreotype, it was the first to give us a detailed fixed image that remains as sharp and clear as the day it was taken.

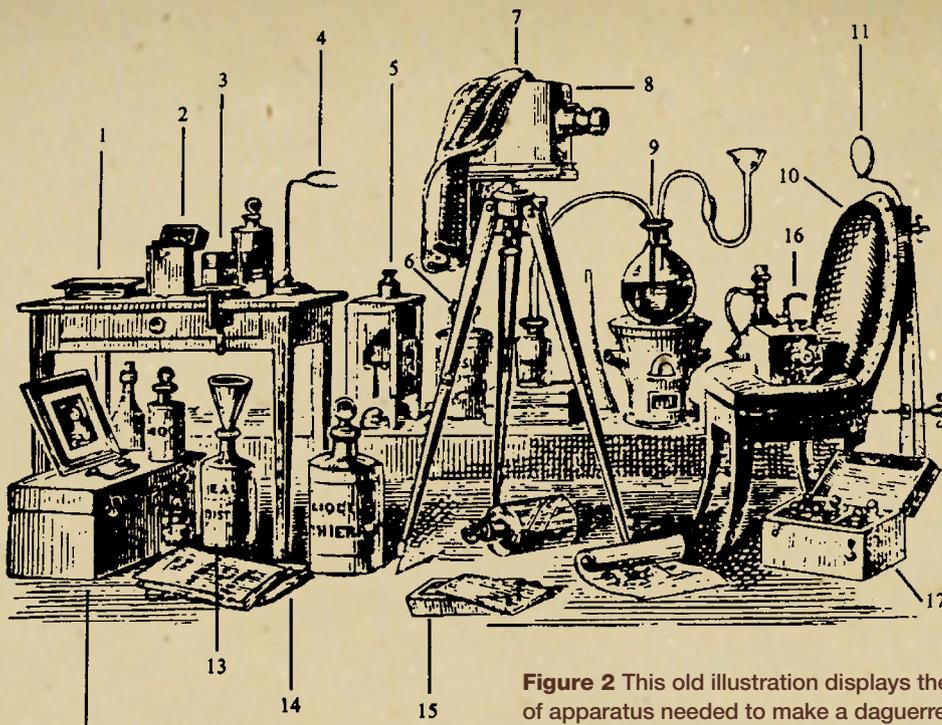
The Daguerreotype

To make a daguerreotype image in these early years was a long and complicated process (**Figure 2**). A copper plate was electroplated with silver and then buffed to a mirror-like finish. The plate was then exposed to the iodine fumes forming the photosensitive silver iodide on the plate’s surface. It was then placed into a light-tight plate holder in the darkroom until it was ready to be loaded into the back of the camera. The cover was then pulled from the plate holder and the lens cap was removed, exposing the plate to the light reflected off the subject.

During this process, two major obstacles had to be overcome. First was the need for optimal lighting at a time before electricity. This problem was partially solved by placing daguerreotype studios on the top floor of buildings under a large skylight. Unfortunately, this was of no help on cloudy days or during the winter months when there wasn’t enough sunlight. The second problem was the long exposure time that early on

could last for several minutes and left the image a total blur if the subject moved. To prevent this, a photographer’s stand was placed behind the subject with a head clamp to keep the subject relatively still.

The daguerreotype is a reversed or negative image because it was the actual plate in the back of the camera when the image was taken. After the plate had been exposed, the photographer would fix the image in sodium thiosulfate and present it to the sitter to see if he or she approved of the “likeness”. It’s incredible to think that the very person depicted in the image actually held this same image, perhaps as long as 150 years ago, or more. Daguerreotypes were then placed in small cases with glass covers to protect the plate’s fragile surface. In the early years, these protective cases (called miniature cases by collectors) were made of pressed leather on wood, often with an embossed design in the leather. In the mid 1850s, cases were also made of thermoplastic (erroneously called gutta-percha) using a combination of shellac-like material, fine sawdust, and lampblack for color, which was heated and pressed, between moulds. The cases were an art form in their own



1. buffing block
2. plate storage box
3. plate vise
4. plate rest for gliding
5. mercury chamber with alcohol burner at top
6. fixing solution
7. darkcloth for focusing
8. half-plate camera
9. retort for distilled water
10. posing chair
11. head rest
12. eqpt. carry case
13. distilled water
14. technical manuals
15. plateholder and plate
16. quarter-plate smaller camera on chair
17. chemicals box

Figure 2 This old illustration displays the range of apparatus needed to make a daguerreotype.

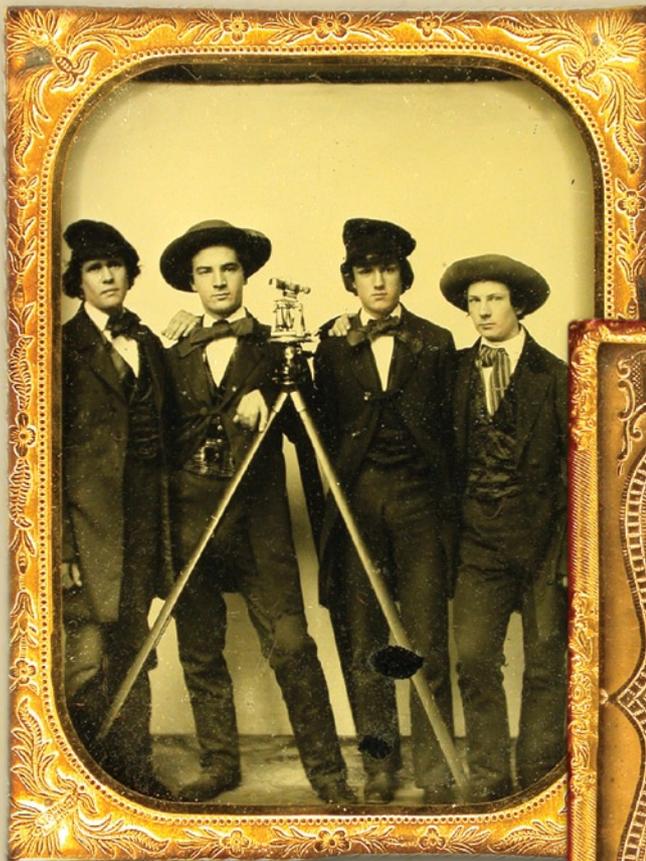


Plate 4 (left) It was common for survey crews to be photographed before heading off for months on end as seen in this quarter-plate ambrotype taken around 1860. *Author's collection.*



Plate 5 (right) As if to take a sight – this surveyor peers through the compass sight vanes (one might wonder if the photographer's assistant isn't lying on the floor out of view to hold the Jacob's staff upright). His measuring chains and pins are across his lap. (Sixth-plate ambrotype) *Author's collection.*

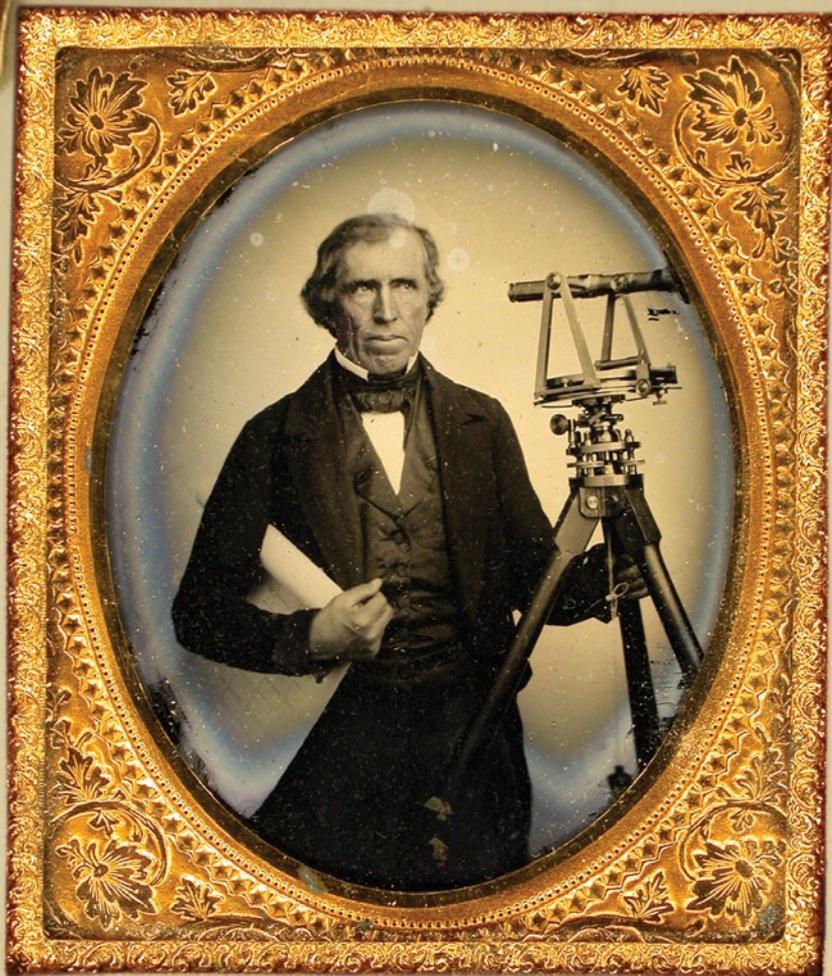


Plate 8 (above) A CDV (*carte-de-visite*) photograph taken in the early to mid-1860s shows the surveyor holding the tripod of a mounted transit. *Author's collection.*

Plate 6 (left) This sixth-plate ambrotype shows a more senior surveyor with his plot maps next to a transit mounted on a tripod complete with plumb bob. *Author's collection.*



Plate 9 Another CDV from the same time period showing an older gentleman who could be either a surveyor or instrument maker holding a vernier compass. *Author's collection.*



Entered according to Act of Congress, in the year 1862, by BARNARD & GIBSON, in the Clerk's Office of the District Court of the District of Columbia.

Plate 10 One of many CDV images taken during the Civil War and distributed in fair numbers for Brady's Album Gallery. This image, taken at Camp Winfield Scott near Yorktown, Virginia on May 2nd, 1862, shows a group of U.S. Topographical Engineers. Apart from the wye level mounted on a tripod and the measuring rods, an interesting detail is the two revolvers serving as paperweights on the maps. *Author's collection.*

right and are avidly collected. When the case is opened, one side houses the image and the other side has a cushion called the 'plush', which was at first made of silk and later on of velvet. The photographer's name is sometimes found embossed in the plush or stamped on the brass mat covering the image. The size or "plate-size" of the miniature cases went from the smallest called a sixteenth-plate ($1\frac{5}{8} \times 2\frac{1}{8}$ inches) to the largest, called a "full or whole plate" ($6\frac{1}{2} \times 8\frac{1}{2}$ inches). The most common plate size was the sixth-plate ($2\frac{3}{4} \times 3\frac{1}{4}$ inches), followed by the quarter-plate ($3\frac{1}{4} \times 4\frac{1}{4}$ inches) and half-plate ($4\frac{1}{4} \times 6\frac{1}{2}$ inches). To view the image it is often necessary to hold the daguerreotype at an angle to reflect a dark background on the mirror-like surface. Many well-intentioned folks have tried to clean the silver tarnish from the surface of old daguerreotypes only to destroy the image by creating permanent micro-abrasions on the plate surface. The daguerreotype process was to last some fifteen years and was eventually replaced by the ambrotype.

The Ambrotype

The ambrotype (**Plates 4, 5 and 6**) makes its appearance in 1851 as a cheaper alternative to the daguerreotype and lasted through the Civil War into the 1870s. An ambrotype was a glass plate coated with a tough, opaque, membranous material called *collodion* that held the light-sensitive chemicals. It replaced the expensive, silvered-copper plate. Like the daguerreotype, the ambrotype was also a negative or reversed image that was housed in a protective case – it too could be wiped off and destroyed if someone tried to clean the collodion side of the image. To make the ambrotype image look better, the back of the fixed glass plate was painted black or the image was taken on a dark ruby glass.

Though less expensive, the ambrotype had the disadvantage of being easily broken or cracked. In 1856 the tintype (**Plate 7**), also called a *melainotype* or *ferrotype*, replaced the glass plate with a thin lightweight sheet iron plate. These reversed images were originally cased like daguerreotypes and ambrotypes, but were found to be durable enough to not require a protective enclosure; some were even sent through the mail. They remained highly popular throughout the American Civil War and were still being made into the 1920s.



Plate 7 An incredible tintype taken in the mid-1870s shows an entire inventory of items used in the field. With their hats on the chair back, we see a measuring tape and drafting set on the chair seat. They sit around a camp trunk with maps, ink and field notes on the lid. Before the trunk is a wye level, hatchet, transit and backpack. *Author's collection.*

The Carte-de-Visite

One of the most popular and prolific forms of photography in the 19th Century was called the *carte-de-visite*, or "CDV" by modern collectors. This was an image on paper, first popularized in France by André Adolphe-Eugène Disdéri, who saw it being used as a visiting card bearing a person's picture. Multiple copies could be made by using the glass plate to produce positive prints on sensitized albumin paper. The American cartes-de-visite (**Plates 8 and 9**) were first produced in 1860, just in time for the American Civil War. These $2\frac{1}{2} \times 4\frac{1}{2}$ inch images were exchanged among friends, relatives, and Civil War soldiers in much the way that high school graduation pictures are exchanged today. Some of the more

famous photographers of the time like Mathew Brady, C.D. Fredericks, and Anthony & Company produced thousands of images of notable people and places (**Plate 10**) during the war. Collecting and exchanging CDVs would remain popular well into the 1890s. Another form of paper photography called the "cabinet card" (**Plate 11**) was introduced in late 1866 and was basically a larger version of the CDV, measuring $4\frac{1}{2} \times 6\frac{1}{2}$ inches. Both CDVs and cabinet cards are still commonly found in ornate Victorian photograph albums. Larger paper photographs called wet-plate prints were used to capture outdoor scenes and groups of people such as survey crews (**Plates 12 & 13**). These were often found framed on the survey office wall.

Plate 11 (right)
 Cabinet card
 from the 1870s
 of a survey crew.
Author's collection.



Plate 12 (below) Outdoor group wet-plate photograph of a railroad survey expedition taken in the late 1870s. This remarkable image shows the expedition flag in the background with the crew lined up with their survey instruments and equipment. *Author's collection.*



Plate 13 (left) This wet-plate print from the 1880s was taken in northwestern Minnesota by photographer E.A. Nelson. On the distant horizon a telegraph pole along a rail line can be seen. Kneeling in front of the group are five Native Americans who are part of the survey crew. *Author's collection.*



Plate 14 This stereoview taken in the 1870s shows a survey crew in front of their camp. When placed in a viewer the image would appear to be in three dimensions. *Author's collection.*

The Stereograph

The stereograph, also called a stereo view (**Plate 14**) was a unique type of photography where two slightly different images of the same subject were placed side by side and when seen through a viewer gave the sensation of three-dimensional depth. Though stereographs could be daguerreotypes or ambrotypes, the most common are paper photographs, popular from the late 1850s to the early 1900s. Of historical importance are the series of stereo views taken during the government-sponsored surveys, including the series taken by Timothy Sullivan while accompanying the Geological Exploration of the 40th Parallel led by Clarence King in 1867, and the Wheeler Survey of 1873, and by Jack Hillers during the Powell Surveys of 1871 and William Jackson during the Hayden Surveys from 1870 through 1879.

Preserving the Heritage

Interest in collecting and preserving early photography has only gained momentum within the past twenty years. While every year some of this visual heritage is destroyed or lost, some that have been hidden away are rediscovered. Some twenty years ago daguerreotypes of the earliest known views of the U.S. Capitol building were discovered in a California flea market. Still to be found

are a treasure trove of close to 300 daguerreotypes taken of people and places around San Francisco in the 1850s by photographer Robert H. Vance. Also lost are the original images taken on several early government surveying expeditions. Many of these plates were used to make lithograph prints for the government reports, and later stored or destroyed.

Ongoing efforts to preserve this heritage include the online image database by the Daguerreian Society (www.daguerre.org) making some of these early images available to future researchers. The online Virtual Museum of Surveying also provides a section called "The Way It Was" showing numerous surveyor images contributed by collectors. Also, an upcoming article in the journal of the Museum of Surveying, *Turning The Horizon*, will feature an article on the preservation of photographic images of surveyors. Like most things not appreciated until they are almost gone, the time has come to rediscover the visual history of the American land surveyor. *A*

Dr. Bill Schultz is a family physician practicing in the rural community of Sugarcreek, Ohio. He has been collecting and researching daguerreotype images for more than thirty years with an interest that centers on the scien-

tific exploration and surveying of the American West, together with aesthetically pleasing images that capture the American experience. He authored *Exploring the American Frontier – Legacy of the Land Surveyor in the Daguerreian Era*, which appeared in *The Daguerreian Annual 2004*.

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