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The West, Then and Now

Peter E. Palmquist, Guest Editor

The Very Image of the Past

Old Photographs and the Restoration of Historic Railroad Equipment

Kyle K. Wyatt

IN the restoration of historic railroad equipment, or any other historic restoration or reproduction, accurate information on past appearances is crucial to the success of the project. This has been repeatedly brought home to me in projects I have worked on since 1977, first with the California State Railroad Museum in Sacramento, and more recently with the Nevada State Railroad Museum in Carson City. In research supporting a restoration, good, clear photographs are an invaluable resource.

At the beginning of a project to restore an old railroad car or locomotive, or a wagon, an auto, a ship, an airplane, or a house, the artifact is often a composite of numerous modifications made over the years of its existence. Key to the restoration process is unraveling these changes, what they were and when they were made. Photos may document the structure and record changes over time, including changes in painting and lettering styles.

Valuable as photographs are, there are some problems and limitations to be faced in drawing conclusions from them. First, the date of the photo, important for developing a chronology and in correlating the photo with information from other sources, is seldom recorded. Second, most images available for restoration projects are in black and white, providing at best only rough guesses about the colors actually used and sometimes obscuring information when two colors are "read" as the same shade of gray.

To understand what a given photograph records, it helps to have a basic knowledge of the different characteristics of the common photographic emulsions that have been used in producing black and white images.[1] In particular, different emulsions are more or less sensitive to specific parts of the light spectrum, ranging from red to blue or violet. (For our purposes, we will overlook the specialized emulsions used for infrared photography.)

The earliest photographic process to see widespread use was the daguerreotype, introduced in 1839. It consisted of a copper sheet plated with polished silver on which a mercury amalgam formed the image. This resulted in a direct positive image that did not lend itself to production of multiple copies.

In the early 1850s, the collodion or wet-plate process was introduced, and in its several forms soon superseded the daguerreotype. Collodion is a viscous, quick-drying solution of nitrocellulose in alcohol and ether with potassium iodine added. This solution was poured onto a glass plate, which was then dipped into a silver nitrate solution. This whole assemblage had to be exposed and developed before the collodion dried; thus the "wet-plate" name. The result was a negative that could be printed on paper as a positive, making multiple copies of an original image easily available.

As the collodion itself was a light gray color, placing a black background behind the glass negative yielded a positive image, especially if the silver image was lighter or weaker than normal. This was sold as an Ambrotype. By placing the collodion on a tin sheet with a Japan black surface instead of on glass, the photographer could produce a tintype. The tintype was less fragile than the Ambrotype and superseded it in the 1860s. One effect of using a metal base such as in a daguerreotype or a tintype was that the image was reversed from left to right like in a mirror. A correct image received viewing or printing through the glass, such as was done with an Ambrotype or a wet plate negative.

The inconveniences of the wet plate process led to the development, introduction, and rapid acceptance of dry plate negatives about 1880. This was a glass plate with an emulsion that could be factory produced well in advance. The convenience greatly increased the popularity of photography, resulting in many more photographs being taken (providing us with information). It also facilitated the standardization of emulsions, since factories mixing large batches under controlled conditions could produce much better uniformity than could photographers custom mixing small batches of the old collodion in the field.

Small nitrocellulose film negatives were first introduced about 1891, and came to generally replace glass for large negatives by the 1910s and 20s. Unfortunately, nitrocellulose had a tendency to break down over time, and was also rather flammable. This led to its replacement by acetate safety film in the 1930s (which had a tendency to shrink under the emulsion over time) and more stable polyester bases in the 1950s.

Different emulsions were sensitive to a wide or nar-

row range of the visible light spectrum, and this is reflected in the photographic prints that we see. Wet plates were overly sensitive to the blue end of the spectrum and similarly insensitive to reds, oranges, yellows, and greens. These latter tended to print as dark to black, while skies were light with little detail. In practice, negatives were often masked and overprinted or otherwise retouched to provide clouds in the sky.

The introduction of dry plates collaterally encouraged the development of emulsions sensitive to a wider range of light. In the 1880s, orthochromatic emulsions extended the range through the greens and yellows and as far as the oranges. This was followed by panchromatic emulsions which extended the range through the reds. These entered large scale production in the 1920s and are still the common type today.

Around the turn of the century, photographers started using colored filters, which could selectively block a color and enhance its complement. Skies, for instance, could be darker or lighter as the photographer preferred, just by using the appropriate filter. All of these factors and changes affect the image we see in a black and white print.

Also, photos were generally not taken for the purpose of recording the details most needed in restoration; thus important information may exist only in a fuzzy blow-up from the corner of a photo, if present at all.

Finally, it is often impossible to gather together *all* the pertinent images in a timely fashion. Almost inevitably, a new photo will surface clarifying a detail after that portion of the project has been completed, forcing the restorer to decide on whether to go back and redo the work or to accept the inaccuracy. In the end, photos are one of a number of resources available to support a restoration, invaluable for the information they provide but not the sole definitive source.

Beauty and the Beast, or Using What You Have

It is very rare that a researcher is able to locate enough clear, sharp photos showing all the details needed for a restoration project. More often we must make do with murky images enlarged from faded second and third generation prints. The photographs of the Nevada Central combination coach and the Santa Cruz & Felton coach provide examples of some of the extremes. Both of these images have surfaced within the past two years, and both would have been helpful in the 1978 restoration of Monterey & Salinas Valley combination car No. 1 by the California State Railroad Museum.

In 1874, Carter Brothers, the new California railroad car building company, constructed their first passenger cars — two combination (combine) coach and baggage cars — for the short-lived Monterey & Salinas Valley Railroad. In 1879, the cars (and the rest of the railroad equipment) were sold to the Nevada Central Railway, where Figure 1 was taken about 1881 or 1882. Amazingly, combination car No. 1 survived in a much rebuilt form and has now been restored to its original appearance in the Monterey & Salinas Valley. Figure 1 shows either combination car No. 1 or 2 and confirms the basic details of the car as determined from other photos, and more importantly by physical research during the restoration. The body of the car appears to be relatively light in color in the photo, with the letter board somewhat darker. (Physical research suggests that the Nevada Central painted its cars a buff color around this time.) The unusual "U" pedestal-type passenger trucks (the part with the wheels) can be easily identified, but few details of the trucks are clear. All of this was known from other sources during the restoration.

Other photos of the car do exist, but this is the largest known image of the complete car from this time period. Had it been available during the restoration process, it might well have led to changes in the way the restoration was carried out. For instance, general body details are more obvious in this photo than in others used in the restoration, showing such details as the lack of a belt rail under the window sills (absent in the photo but included

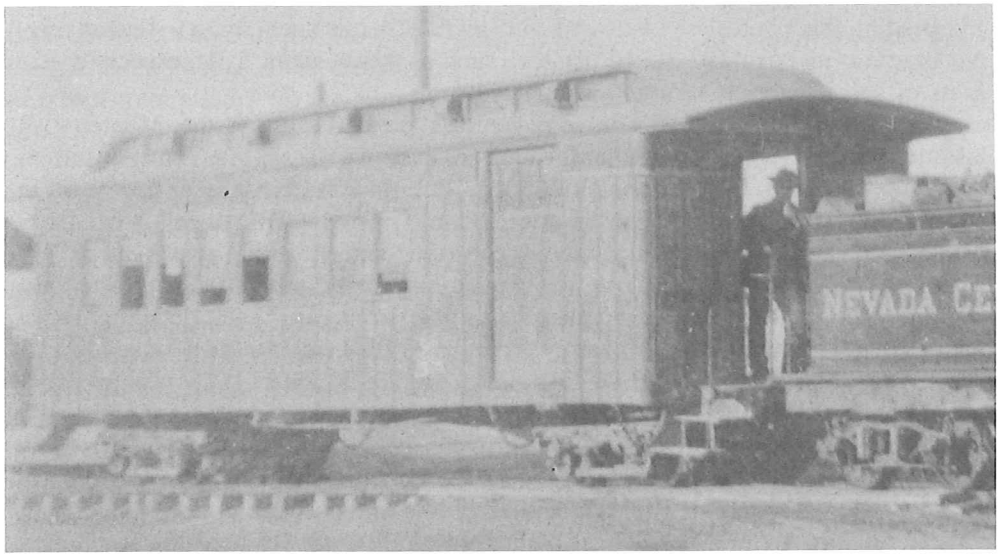


Figure 1 — Nevada Central combination coach #1 or 2, *ca.* 1881-1882. The car was built by Carter Brothers in 1874 in Monterey for the Monterey & Salinas Valley. The photo is an enlargement from a portion of a modern 4-by-5 copy negative, made of a faded second or third generation print. (Photo, Kyle K. Wyatt collection)

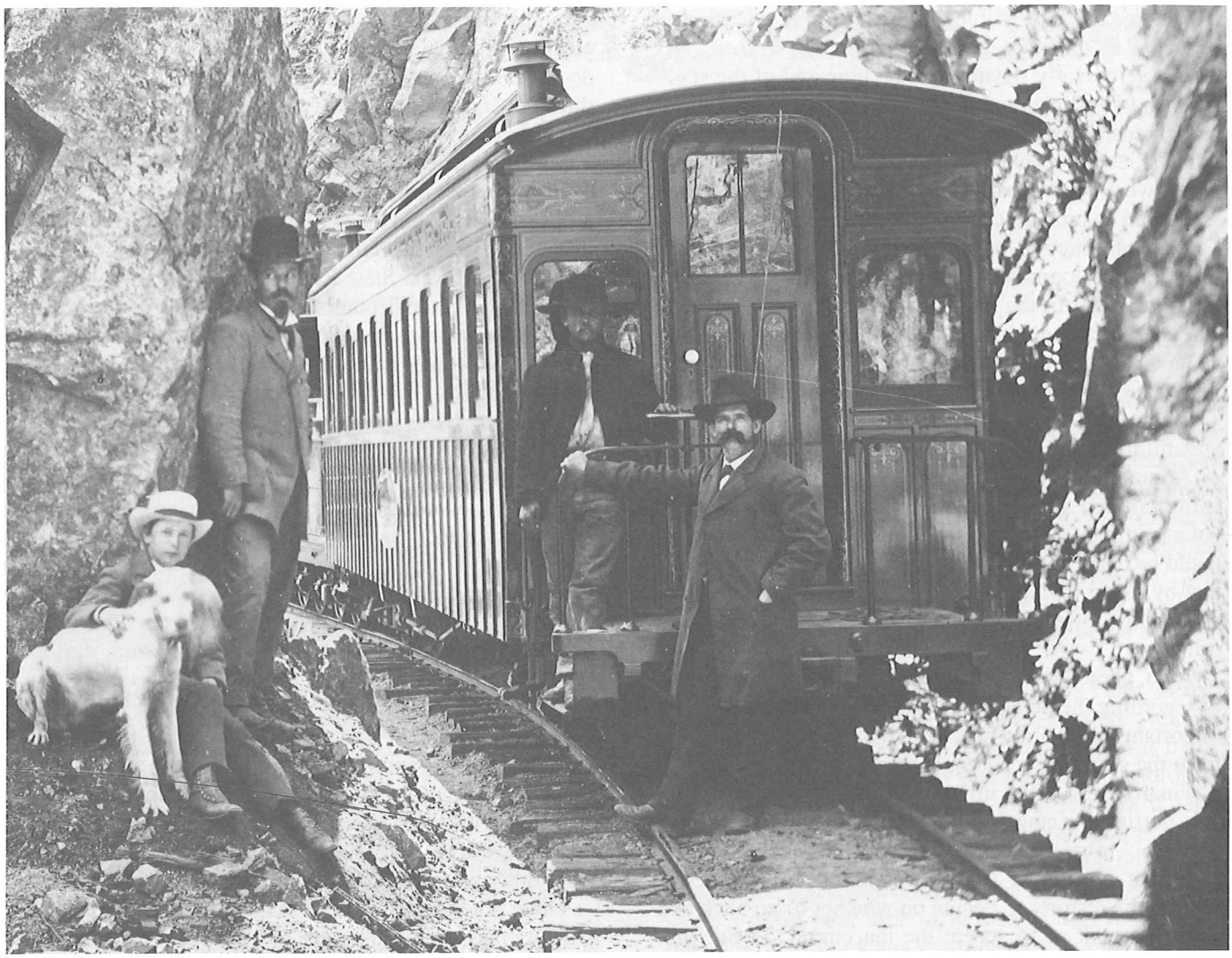


Figure 2 — Santa Cruz & Felton coach, *ca.* 1875-1879. The car was built by Carter Brothers in 1875 in Santa Cruz. The photo is an enlargement from a portion of the original wet-plate stereo negative. (Photo, Nevada Historical Society, Elliott collection, Reno, NV)

in the restoration) and the lack of turnbuckles on the truss rods under the car (not seen in the photo, but present in the restoration).

Although some questions are clarified by this photo, there are many left unanswered. No lettering can be discerned in this photo. Although hints of some lettering are visible in a couple of other photos used in the restoration, most of the limited information came from physical research on the car itself, supplemented by study of typical practices of the time as exhibited in photos of cars on other railroads. No solid evidence was found of the original exterior striping or other decorations on the car, so that in the end, a design had to be developed based on original decorations that were found in the interior. In retrospect, these are very different in character from patterns typically found on the exteriors of cars in this period.

In 1875, Carter Brothers built two passenger coaches for the Santa Cruz & Felton Railroad, located just across Monterey Bay from the Monterey & Salinas Valley. These were a first-class car with glass windows and a second-class car without glass. Figure 2 is a rare, very clear early view of the first-class coach, taken sometime between 1875 and 1879. It is uncommon to find an original negative such as this to work from, especially one with so much detail.

In a restoration project such as the Monterey & Salinas Valley combine No. 1, we often have to turn to photos and other information from similar cars to fill in gaps in information. The Santa Cruz & Felton car, manufactured by the same builders within a year and in very close geographic proximity, offers perhaps the best example of what the striping and paint detailing on the Monterey & Salinas Valley car *may* have looked like.

At first glance, Figure 2 appears to show a car painted a dark color, but a closer look at this and other photos of the car from the same time period suggests that both the sides *and* the letter board are a light color, perhaps a similar yellow to that found on the Monterey & Salinas Valley car. Yellow would tend to "read" as a

Figure 3 — Virginia & Truckee coach-caboose #9, restored to its original 1873 appearance by the Nevada State Railroad Museum. Early cabooses frequently were used in third class passenger service. The print is from a modern 4x5 negative. (Photo, Daun Bohall, Nevada State Railroad Museum collection, Carson City, NV)

darker color on a print from a wet plate. Adding to the dark appearance is the shadow from the overhanging end roof.

This photo also raises some different questions from Figure 1. There are many detail differences in construction between the Monterey & Salinas Valley combine and this Santa Cruz & Felton coach, and it is not safe to simply assume that the two cars are alike in other respects. A crude painting made in Monterey in 1875 shows one of the combines in the distance. It suggests a somewhat different striping and letter board treatment, although the image is too small for much detail. Neither of these two sources is definitive.

All such choices are subjective judgments made by the researcher on a case-by-case basis. And we *know* that *the* photo will turn up after it's all over. (There *must* be a builder's photo of the Monterey & Salinas Valley car out there. While we're dreaming, we *know* it will also be a color photo.) Meanwhile, we roll our own dice and look for more photos.

Tracking Changes over Time

Photos are one of the best ways to track changes made to a structure over time. They are valuable in correlating and interpreting physical evidence and can even indicate where and when to look. Organizing and identifying photos is sometimes rather difficult because we seldom have accurate dates to go with our pictures, but even so they can usually be put in roughly chronological order. Figures 3, 4, and 5 illustrate the changes that Virginia & Truckee car No. 9 underwent during its time in service for the railroad. The changes are documented in surviving railroad shop records and are presented in a 1981 restoration feasibility investigation report to which I contributed.

Figure 3 shows Virginia & Truckee coach-caboose No. 9 as restored to its original 1873 appearance for the Nevada State Railroad Museum. In the 19th century, many cabooses were set up for third-class passenger traffic. As there are no known photos of car No. 9 or its twin No. 10 during this period, the restoration was based primarily on the results of physical and documentary research.

In figure 4, miners' coach No. 10 illustrates how both cars were rebuilt about 1875, removing the baggage compartment. The photo was taken *ca.* 1937, when the car was painted a yellow that is a close match for a Kodak film box. Coach No. 10 remains in this configuration today.

Figure 5 shows Virginia & Truckee caboose No. 9 as rebuilt in 1913 with a cupola in the center of the roof, a configuration we commonly associate with more modern cabooses. The car remained this way until 1938, when Paramount studios purchased it and removed the cupola for the movie *Union Pacific.* The photo was taken *ca.* 1937, with No. 9 also painted Kodak yellow.

While car No. 9 has undergone more extensive changes than most cars experience, this sequence does illustrate the value of using photos in tracking changes. Based on the information in the photos, a researcher might know to look for evidence of the long-gone caboose cupola or know where to look for lettering covered up by numerous layers of movie paint. The photos also aid in deciding which time period to use to restore the car (although as the case of car No. 9 shows, a time period can be picked with no supporting photos).

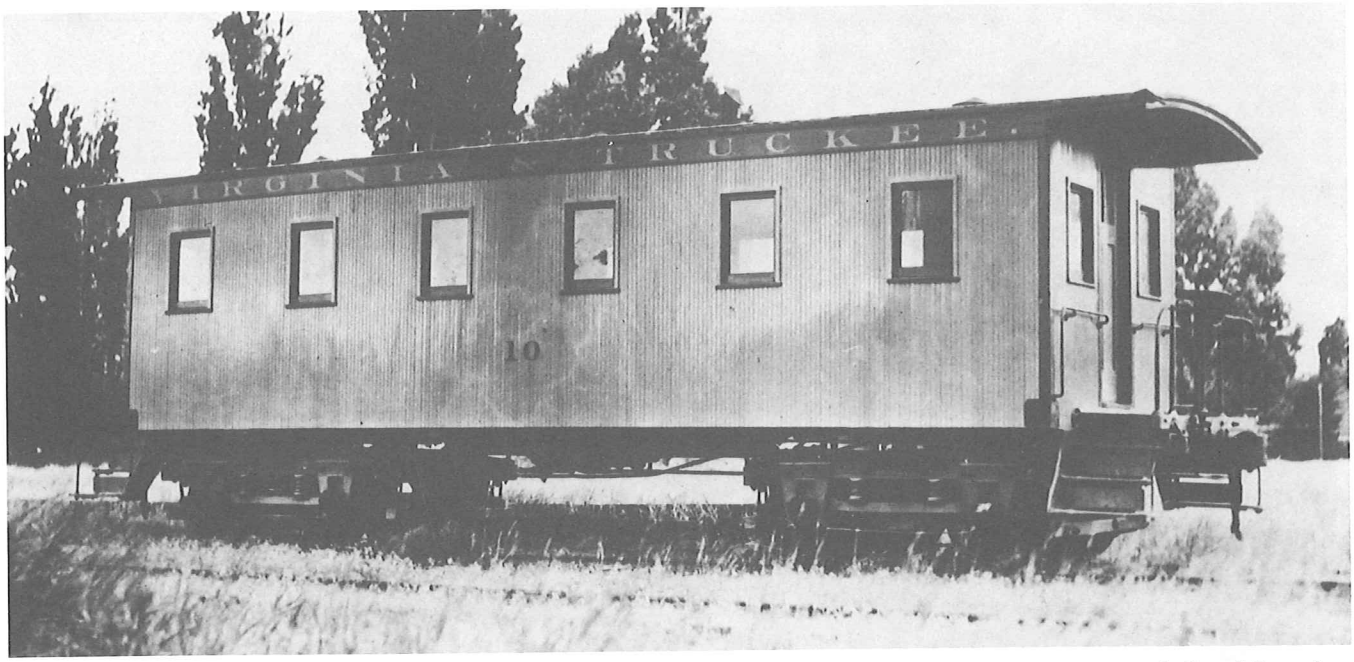


Figure 4 — Virginia & Truckee miner's coach #10, *ca.* 1937. Coach #10 is a twin to #9. This shows how both cars were rebuilt as full coaches about 1875. Coach #10 retains this configuration to this day. This photo is from a modern copy negative of a second or third generation print. (Photo, Nevada State Railroad Museum collection, Carson City, NV)

Figure 5 — Virginia & Truckee caboose #9, *ca.* 1937. This shows how car #9 was rebuilt in 1913 into what we more commonly consider to be a caboose appearance. This photo is from a modern copy negative of a second or third generation print. (Photo, Nevada State Railroad Museum collection, Carson City, NV)

The Color Myth in Black and White Photos

There is a persistent myth in the restoration field, perhaps aided by computer scanned and analyzed images, that a researcher can identify colors in a black and white photograph. There are several problems with this, even assuming you are working with a clean, clear print from an original negative. (We won't *even* discuss photos shot through filters.)

First, given the nature of rendering colors on a black and white emulsion, it is quite possible for several very different colors to end up as the same shade of gray. Compounding this are the vagaries of lighting conditions (sunny, overcast, direction, etc.), reflections, shadows, surface textures, and other field conditions that conspire on occasion to make similar surfaces read very differently and different surfaces very similarly, even within a single photograph. Figure 6 provides an example of this, as do most of the other photos in this article.

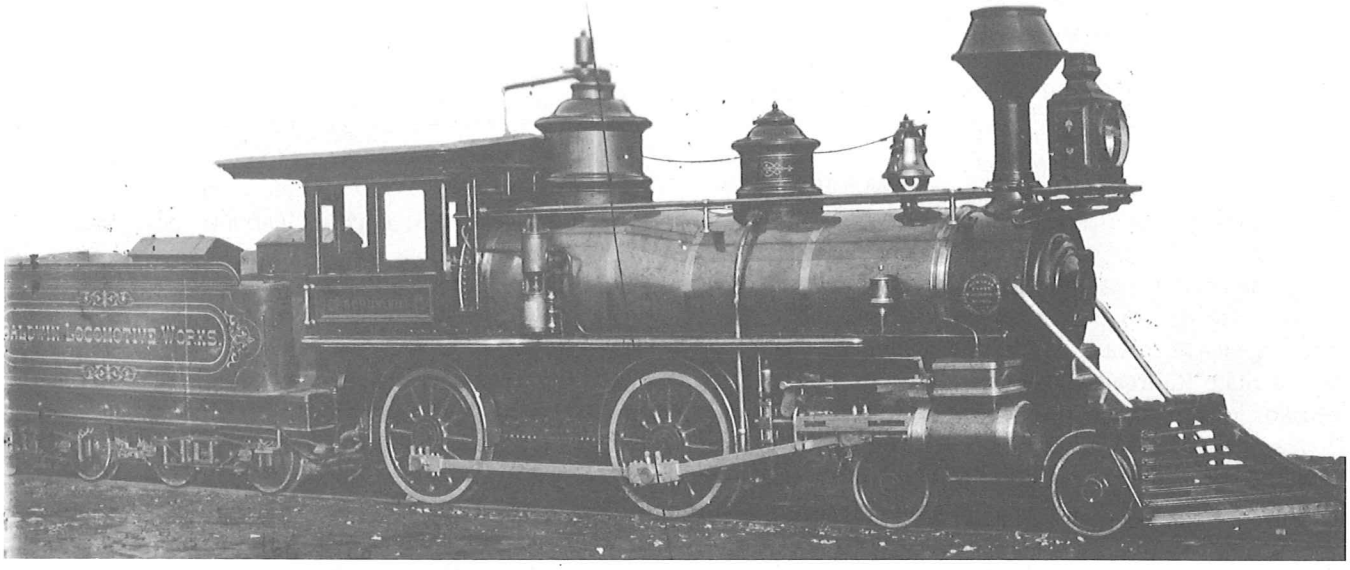
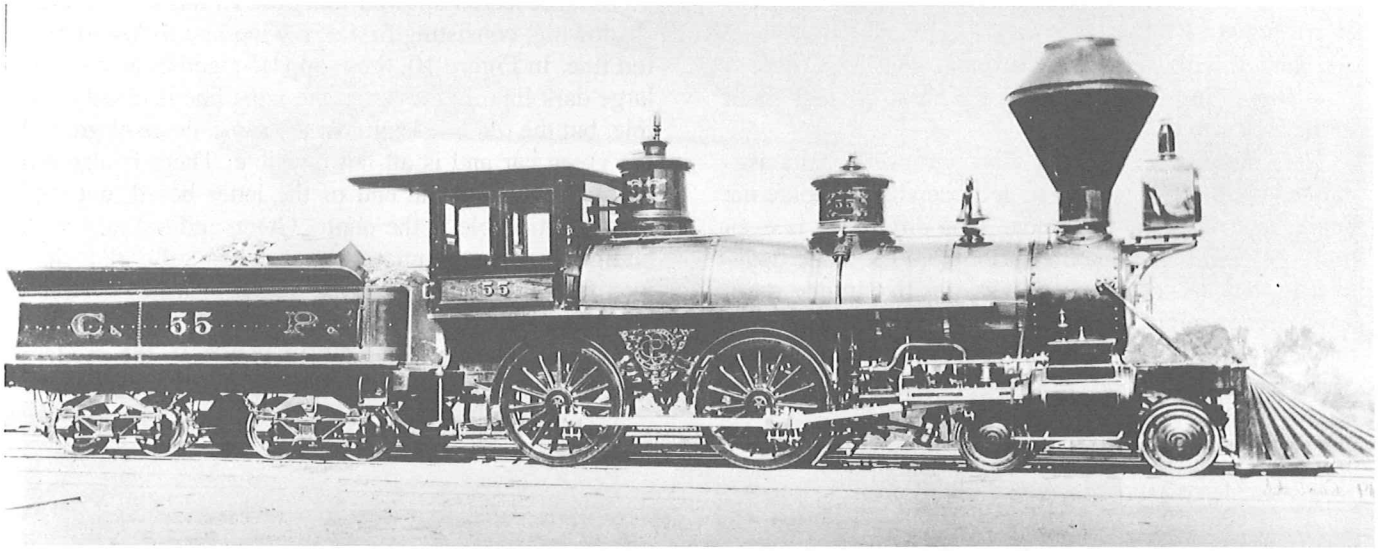


Figure 6 — Baldwin Locomotive Works builder's photo of the locomotive *Schuylkill,* as it was exhibited at the 1876 Centennial Exhibition at Philadelphia. This photo is a contact print from the original wet -plate negative. (Photo, Railroad Museum of Pennsylvania collection, Strasburg, PA)



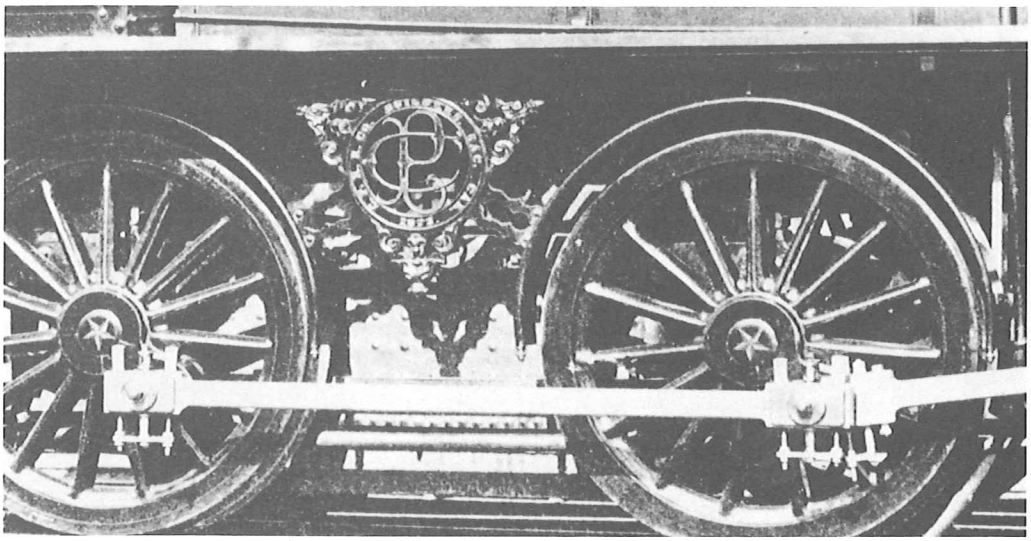


Figure 7 (above) — Builder's photo of Central Pacific locomotive second #55, built in the railroad's shops in Sacramento in 1873. This photo is from a modern copy negative of an original print. (Photo, D. L. Joslyn copy negative, Guy L. Dunscomb collection, Modesto, CA)

Figure 8 (right) — Enlargement from the same negative as figure 7, showing the fancy builder's plate between the drivers. (Photo, D. L. Joslyn copy negative, Guy L. Dunscomb collection, Modesto, CA)

A great deal is presently known about the colors and decorative details used by the Baldwin Locomotive Works in the 1870s. The original Baldwin paint and finish records survive, including a color sample book illustrated with painted examples. Also, several 1870s Baldwin locomotives restored and documented by the California and Nevada State Railroad Museums exist. These retained original detail paint under numerous subsequent paint layers, waiting to be exposed, traced, and color-matched as part of the restoration process. Based on the Baldwin records, the *Schuylkill* (Figure 6) is painted nearly identically to the *Sonoma* at the California State Railroad and the *Eureka*, restored by Dan Markoff of Las Vegas.

According to the original Baldwin specifications for the *Schuylkill,* the tender, the sand box (on top of the boiler), and the wheels are *all* painted in Baldwin's standard "Lake" color, similar to a dark maroon. The steam dome (also on top of the boiler) has a polished brass wrapper with iron top and bottom, also painted Lake. The cab is varnished natural finish walnut. The boiler jacket (with copper rivets) is American iron, a dark gray color with some blue highlights. The bands on the jacket are polished brass. The smoke box and smokestack are painted with stack paint, black at a guess. (There is little supporting information on the color of stack paint in the Baldwin records.)

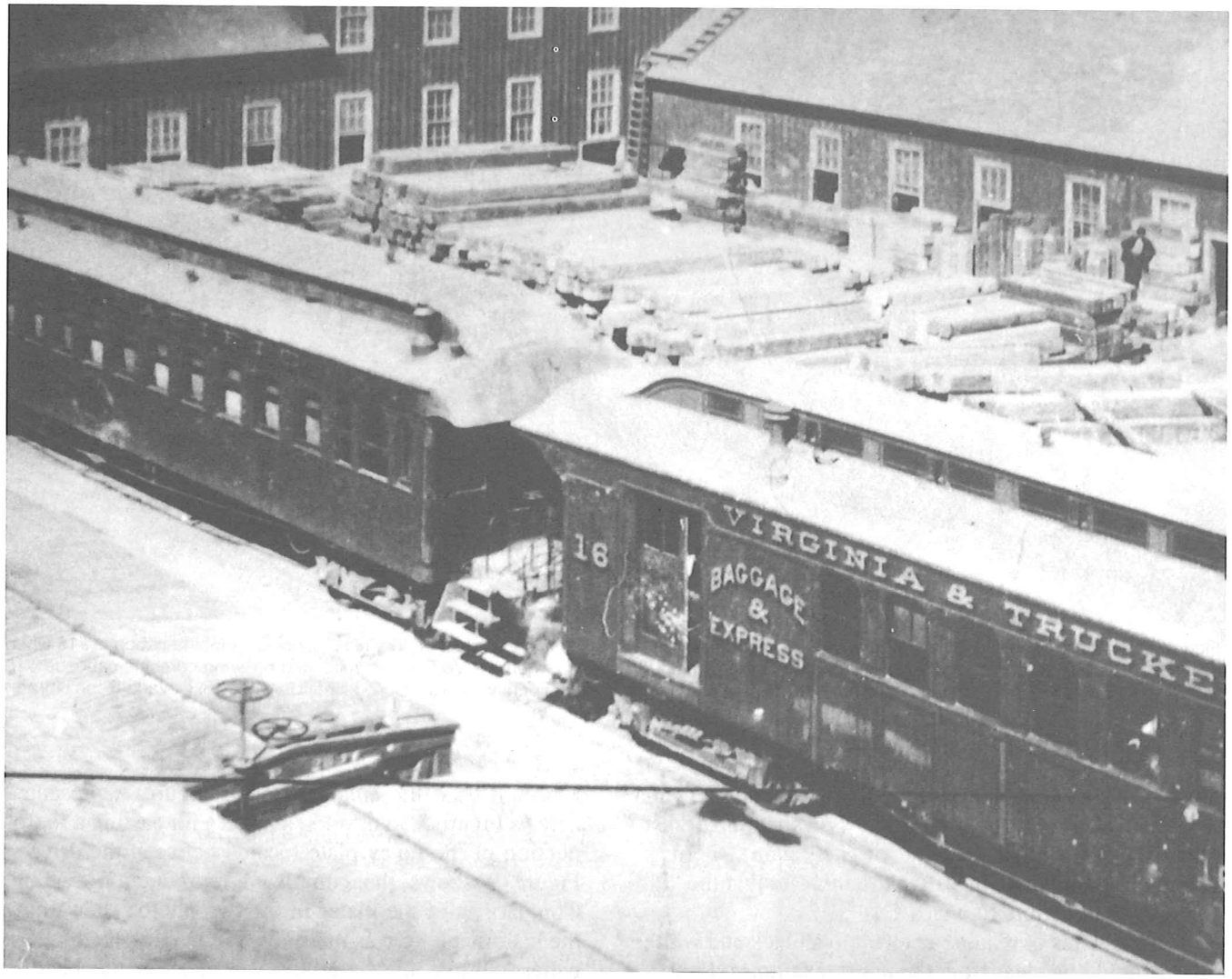
Note the different shades of gray on different Lake-painted parts in the photo. Most especially, compare the tender side with the sand box. This difference is even more pronounced in another print from the same negative. In the absence of other, more positive information, a researcher might be led to believe that the tender on the *Schuylkill* was painted a different color from the rest of the locomotive, but the Baldwin records are very clear on the painting information. The truth, at a guess, probably has more to do with lighting conditions and different types of surfaces. Also, note the changes in gray tones as you progress around the curved surface of the sand box.

Just as a single color car appears as different shades of gray in a single photo, so too, can different colors appear to be the same. Jumping ahead to Figure 10, the Virginia & Truckee combine-caboose No. 16 (on the right) and Central Pacific Silver Palace car No. 2 (on the left) appear to be very nearly the same shade of gray; Central Pacific No. 2 is only slightly darker in this enlargement of a stereo card that was originally printed from a wet plate negative. In reality, No. 2 is painted canary yellow (with a wine-colored letter board), while No. 16 is a split-pea-soup green.

Note also the dark drop shadowing on the letters and the striping on No. 16 (perhaps hard to see in the halftone reproduction presented here). Contrast this with Figure 11, showing No. 16 as restored to the same time period by the California State Railroad Museum. In this print from a modern panchromatic negative, the green car appears much lighter than in the old wet-plate image. Physical research showed that No. 16 has *double* drop shadowing, consisting first of a wine line followed by a red line. In Figure 10, these appear together as a single large dark line. In the latter, the wine line is clearly visible, but the red line is almost the same shade of gray as the green car and is all but invisible. There is also red striping detail on the end of the letter board, but it is hardly noticeable in the photo. Green and red may both be light in a panchromatic image instead of dark as in a wet-plate image, but they are actually easier to distinguish from each other in the wet-plate.

For a final example, look at Figure 9, the modern panchromatic image of the reproduction builder's plate on Virginia & Truckee locomotive No. 18. In color, the

Figure 9 — Reproduction builder's plate cast for the restoration of Virginia & Truckee locomotive #18 to its *ca.* 1882 appearance by the Nevada State Railroad Museum. V&T #18 was built in the Central Pacific shops in 1873, shortly after Central Pacific second #55 was completed. Photo from a modern 4x5 negative. (Photo, Bob Dockery)



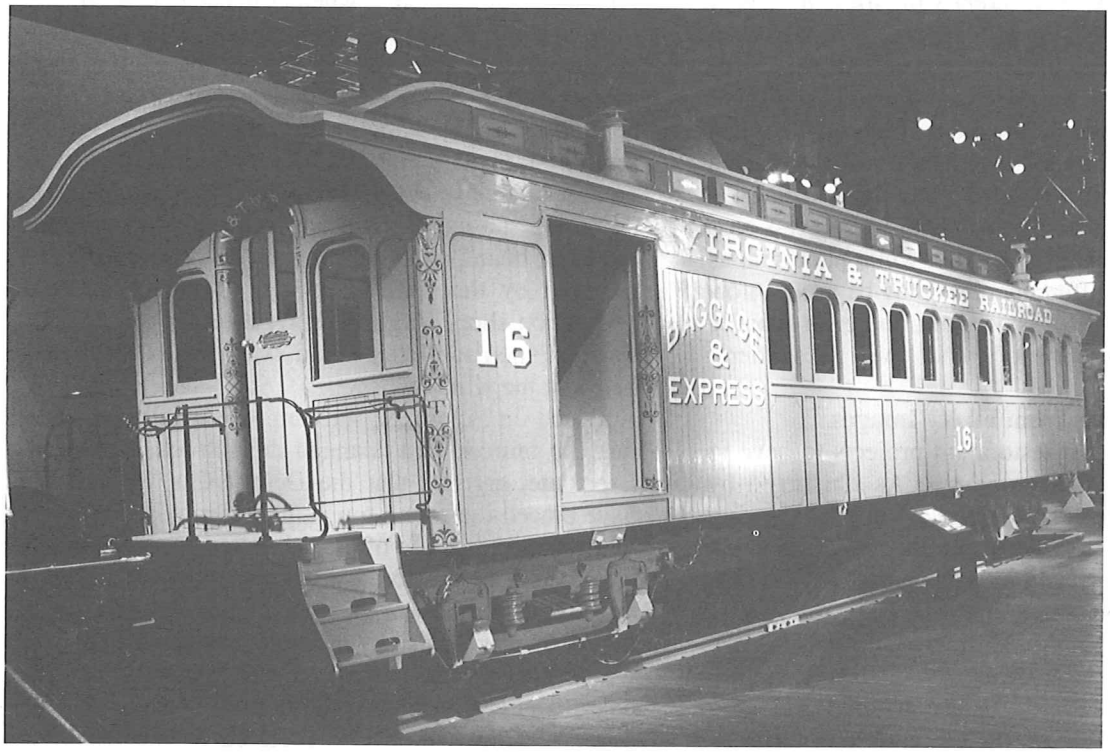


Figure 10 (above) — Virginia & Truckee combine-caboose #16 (on right) and Central Pacific Silver Palace sleeping car #2 (on left) in Virginia City in 1875. The car was built in 1874 by the Detroit Car Works. Photo is an enlargement from part of a copy negative of an original stereo print. (Photo, Nevada Historical Soceity, Reno, NV)

Figure 11 (left) — Virginia & Truckee combine-caboose #16 as restored to its 1874 appearance by the Califorina State Railroad Museum. Photo from a modern 4x5 negative. (Photo, California State Railroad Museum, Sacramento, CA)

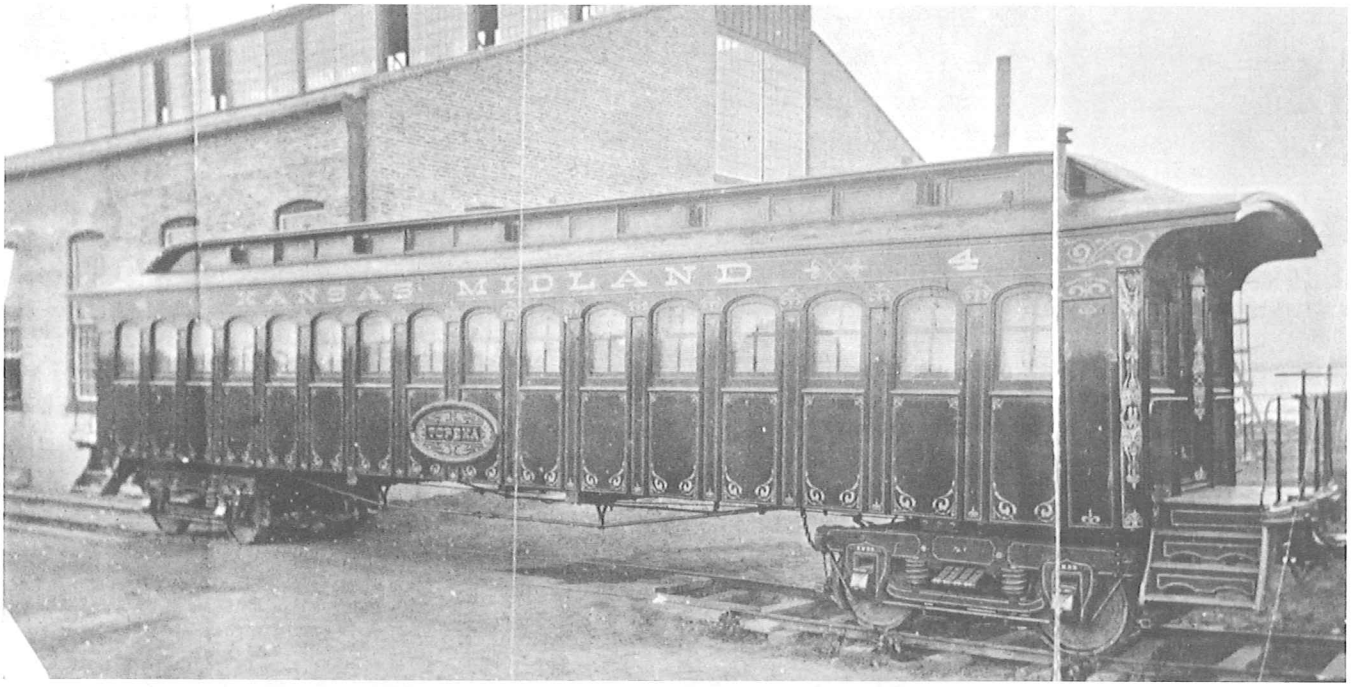


Figure 12 — Kansas Midland coach #4, *ca.* 1873, showing similar striping detail to that used on Virginia & Truckee combine-caboose #16 when it was built. The Detroit Car Works sent this photo to the Virginia & Truckee when the V&T was considering ordering combine-caboose #16 (and twin #15). Photo from a modern copy negative of an original print. (Original print in Special Collections, University of Nevada Reno Library)

letter "C" is painted white, while the "P" is a golden yellow. For reference, the basic plate is a medium forest green. Looking closely at the original paint, there is scarcely the slightest hint of gray to indicate that the "P" is anything but white like the "C."

The problems of reading colors into a black and white image should be clear from the above examples. First, a single color can read very differently in different parts of the same image, as shown by the Lake locomotive in Figure 6. Furthermore, different colors can read very similarly, as shown by the wine and the red drop shadowing in Figure 10, and by the red striping on the green car in Figure 11. Finally, each type of emulsion reads a number of specific colors rather differently, especially at the end of the color spectrum toward red. We can conclude that while details in black and white photographs may indicate where different colors may be used, information from other sources is needed in order to actually pick colors and to truly identify what color goes where.

Sharp Ideas from Fuzzy Images

It is very common in restoration projects to have to pull details out of old photographs. As illustrated by Figures 1 and 2, there is a great variety in photo quality from which to extract the detail. In all such cases, what is in the photo is subject to interpretation, and the best guess of the researcher at the time may be proven wrong by evidence found later.

In restoring Virginia & Truckee locomotive No. 18, built by the Central Pacific shops in 1873 just after Central Pacific 2nd No. 55, the Nevada State Railroad Museum used the enlargement of Figure 7, presented here as Figure 8, to develop a pattern for casting a reproduction of the fancy plate located between the drivers. Figure 9 shows the completed reproduction casting. Comparison of the plates in the two photos shows how the historic photo was interpreted in making the modern pattern. While the basic form is clear in the historic photo, questions such as whether to use flat-faced letters or round-faced letters are more difficult to answer. Unanswered by the photo is whether the plate is cast in bronze or in iron; the reproduction is in iron.

Figures 10, 11, and 12 illustrate another problem in relying on photos. Figure 10 shows Virginia & Truckee combine-caboose No. 16 in 1875. Faintly visible, painted on the sub-letter board between the windows below the letter board, is an arch-topped decorative figure. As received by the California State Railroad Museum's restoration shop, Virginia & Truckee car No. 16 had a flat-bottomed sub-letter board extending partway down between the windows.

Based on Figure 10, museum researchers concluded that the railroad had changed the sub-letter board at a later date, arguing that the Detroit Car Works would have placed the round-top painted figure under an arch in the bottom section of the sub-letter board. This is the way the car was restored, as illustrated in Figure 11.

After the wood work had been completed on No. 16, Figure 12 was located by a private researcher, and a print was provided to the museum. It shows that the sub-letter board was indeed flat on the bottom between the windows, matching the car as received by the restoration

shop before work started. This is the classic restoration researcher's nightmare: New evidence proves that the researcher guessed wrong and arrives after money has already been expended implementing the wrong choice. In the case of Virginia & Truckee No. 16, the work was already too far along to go back and correct the error. While plugs could have been added to fill the arches, through time and weathering, they would have come loose in an unsightly way. As Figure 11 shows, the finished car still has the arched sub-letter board between the windows.

Conclusions

This article has been a tour through some of the uses (and abuses) of photographs in restoration projects. In such work, information is the coin of the realm. Many times photographs can play a crucial role in this process, providing answers unavailable from any other source; but, frequently, they are less than definitive. Details can be fuzzy, colors can blend together or separate unexpectedly, and you may not know which picture was taken first; but with careful use they can be an invaluable resource. Photos are but one source among many, and are strongest when judiciously used in conjunction with other sources. Without photos, we would be much the poorer in our vision, understanding, and appreciation of the past 150 years of history.

NOTES

1. Information for the following is drawn from Beaumont Newhall, *The History of Photography* (New York: The Museum of Modern Art, 1982), 18, 59, 62-63, 73, 124-126, 129.

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In 1984 Wyatt received a Master's degree at the University of the Pacific, with a thesis on the early railroads of Tuolumne County, California. He is currently working on his Ph.D. dissertation in Western American history through the University of California, Davis.