

PHILATELIC GRADING; OBJECTIVE METHODOLOGIES

By David Waller

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Advanced collectors often rely on grading to verify a stamp's condition and relative value. While the cost of professional grading is reasonable, it becomes expensive when there are a large number of stamps that require certification. In view of these costs, there is a balancing act (*i.e.*, a return on investment) when deciding which stamps to grade. Up until recently, most philatelic grading confirmed the general condition of the stamp (*e.g.*, used or unused and the condition of the gum) and whether it is "genuine" (*i.e.*, not altered or fake). Today, physical certificates often help to establish a value in the event the collection is sold.

As early as 2010, the author began working on methods that would replace the subjective aspects of stamp grading with physical measurements and in 2012 forwarded a manuscript to the American Philatelic Society for publication in *The Philatelist*. With further research the manuscript was finally published by the Poway Stamp Club in 2023. Since that time, grading has included numerical assignments, but these grades are often based on subjective determinations.

The methods developed for grading stamps based primarily on objective determinations is the topic of this exhibit. These methods have been established for six grading categories: 1) centering; 2) registration; 3) gum; 4) perforations; 5) color; and 6) engraving. While the methods were developed initially for grading early issue United States stamps because of their rarity and higher value, they may also be applied for grading more recent issues as well as foreign stamps. In addition, three prototype philatelic certifications are presented containing the data collected from these objective methodologies.

It is hoped that these methodologies will be used to develop a more reliable and uniform system for assessing the condition and thereby value of stamps. Please note that methodologies for grading altered stamps (*e.g.*, stamps that have been repaired, reperfected, or otherwise modified from their original state) may require additional methodologies not addressed in this exhibit.

¹ www.collinsdictionary.com.

—❁❁— **CENTERING** ❁❁—

(Published in the Poway Stamp Club Newsletter May 8, 2023, pgs. 20-25)

According to The Philatelic Foundation (PF)² “[c]entering is by far the most important among all the factors determining the grade of a sound stamp.” They state that “A perforated stamp will be judged upon the centering of its design within the perforations. Imperforate stamps will be judged upon its centering within its margins and the size of those margins”. This phrase, “centering of its design within the perforations”, also includes stamps in which all the margins are equivalent (Figure 1A) as well as those stamps in which the margins on the top and bottom are equal but different from the equal side margins (Figure 1B).



Figure 1: Scott # 618 **A)** shows a stamp with essentially equivalent margins (Accent Art Glass, ebay no. 664880384) and **B)** shows the engraving centered within the borders of the stamp paper (*i.e.*, the top and bottom margins are essentially equivalent, and side margins are essentially equivalent but different from the top and bottom margins, (Stamps USA/Canada, ebay no. 313136680326).

Without a clear distinction between these two designs (*i.e.*, centered within the perforations), the valuation based on their grade becomes challenging.

Professional Stamp Experts (PSE)³ state that their “standardized philatelic grading scale enables a consensus [of] expert opinions about single stamps and pairs to be expressed accurately and consistently using well-established philatelic terminology...” PSE experts use the following terminology to convey their opinion:

- “GEM – Perfectly-balanced margins Post Office Fresh (POF)
- Superb – Perfectly-balanced normal sized margins, POF
- XF/S – Not quite perfectly-centered margins, POF
- XF – Extremely well-centered margins, POF
- VF/XF – Almost extremely well-centered, POF
- VF – Very well centered, POF
- F/VF – Margins reasonably clear on all sides
- F – Margins just clear on one or more sides
- VG/F – Perforations touch or cut stamp design slightly
- VG – Perforations cut into stamp design”

² <https://wyzaerd-pf-prod.s3.amazonaws.com/wp-content/uploads/2013/12/PF-grading-booklet.pdf>.

³ <https://gradingmatters.com/all-about-grading.html>.

While some if not all these grades have been used for many years, questions arise as to how terms like “perfectly”, “not quite perfectly”, “extremely”, “almost extremely”, “very well”, “reasonably clear”, and “just clear” should be interpreted (*i.e.*, quantified). The use of subjective terms like these makes consistent grading more difficult from one stamp to the next. When applying this type of system, shouldn’t a stamp that is graded “perfectly-balanced normal-sized margins, POF” be considered GEM (*i.e.*, not superb) because it is a perfect example of the stamp produced as intended. If this is the case, then how should a similar stamp with unusually large “perfectly-balanced, POF” margins be graded? Should such a stamp be graded higher than “GEM” or are these specimens anomalies (freaks)? The current systems do not provide for this unique condition. More recently the term “Jumbo” has been used to describe these stamps and they often command a higher price, but does this mean they are rarer than a stamp with “perfectly-balanced” narrower margins? Maybe. While this is not a perfect system, it is still being used today by sellers on online auction houses like ebay and Hipstamp.

Philatelic Stamp Authentication and Grading (PSAG)⁴, provides a comprehensive definition of centering. They state that “the most important and easiest to understand element of grading is the relative centering of a stamp. PSAG measures the distance from the nearest edge of the perforation holes to the beginning of the design in 8 places (2 on each side of each corner) on a stamp. These measurements are then comparatively gauged against each other to develop the relative balance quotient. This numerical figure is then converted into a number ranging from 50 (severely off-center with one or more sides of perf holes cutting or touching the design), to a maximum of 100 (perfectly balanced and equal margins on all four sides). In addition to the measured centering grade, the margin size affects the centering grade in two ways. Stamps with margins less than 75% of the average margin size for a given catalog number may carry up to a 10-point deduction. Conversely, stamps with margins 25% larger than normal carry an add-on adjective of “J” for JUMBO” (italicizing and underlining provided for emphasis). This system addresses many of the issues that affect consistency in grading concerning centering and has been adopted by others like Certified Collectibles Group and Authenticated Stamp Guarantee, LLC⁵.

PSAG appears to be the first company to replace the subjective letter grading system with a quantitative mathematical value for the equivalency of a stamp’s margins. While this system is far superior to the previous systems, the question arises as to how these quantitative determinations are accomplished and what is an “average margin” for a particular issue.

⁴ <https://www.stampauthentication.com/grading-stamps>.

⁵ <https://www.asgstamps.com/stamp-grading/grading-scale/>.

One method of obtaining quantitative values for the margin distances is to create an enlarged image of the stamp so that physical measurements may be taken, compared, and the values normalized (*i.e.*, each value measured is divided by the highest value to obtain a number between 0 and 1). An example of how this is accomplished is shown in Figure 2.



Location	Measurement	Normalized	Side Average
Top Left	3.50	0.71	74
Top Right	3.75	0.77	
Left side Top	3.75	0.77	74
Left side Bottom	3.45	0.70	
Right side Top	4.60	0.94	97
Right side Bottom	4.90	1.00	
Bottom Left	4.65	0.95	95
Bottom Right	4.60	0.94	
	Measurements	Sum	Sum/8 x 100
Totals	8	6.78	85

Figure 2: Scott # 370 has been enlarged so that more accurate measurements may be taken of the margins in all four corners (*i.e.*, the green squares, Momen Stamps Inc ebay no. 385099976119). The margins are measured by caliper and the value is calculated from the edge of the engraving to the closest edge of the second or third perforation from the corner of the stamp. These values are normalized by dividing by the highest calculated value. The normalized values are added together, divided by their total number (*i.e.*, 8) and multiplied by 100 to obtain a grade.

The grading certificate should provide these measurements to avoid confusion and allow future experts to confirm previous calculations. The numerical value given to the stamp would be determined by adding all eight normalized values together, dividing that sum by eight, then multiplying that value by 100. In this case, the numerical value for the stamp presented in Figure 2 would be 85. Current grading systems such as the one used by PSAG only provide a final grade and not an explanation of how the grade was calculated.

So, what is an “average margin” for a particular issue and how is it determined? This should be the distance between the engraved impressions of the stamps on a sheet (D_s) divided by two (2) minus the radius (r) of the perforations, (Average Margin = $(D_s/2) - r$, see Figure 3).



Figure 3: A) Imperforated issue Scott # 373 showing the distance (D_s) between the engravings in the Author's collection and **B)** perforated issue Scott # 372, Accent Art Glass, ebay no. 235751069239.

The term “Jumbo” would apply to a given margin when it exceeds the “average margin” distance. It is unclear whether all four margins must exceed the average margin distance for the stamp to be designated Jumbo or whether it is just the overall size of the stamp as compared to other non-Jumbo specimens of a given issue. Figure 4A shows Scott # 618 having margins that exceed the average margin distance determined from the stamps shown in Figure 4B. In this case, the stamp in Figure 4A would be designated “Jumbo”.



Figure 4: **A)** Scott # 618J with approximately equivalent margins that are about 50% greater than the “average-margin” distance (Harvard-MBA, ebay no. 404292202123) and **B)** a block of Scott # 618 from which the “average-margin” distance may be determined (Your GoodChoice for 26-Years, ebay no. 375468312791).

Another method that may be used for visual assessment of margin equivalency is the four-corner image. While this visual tool is helpful to quickly assess the margin equivalency, it should not be substituted for the mathematical calculations discussed above.

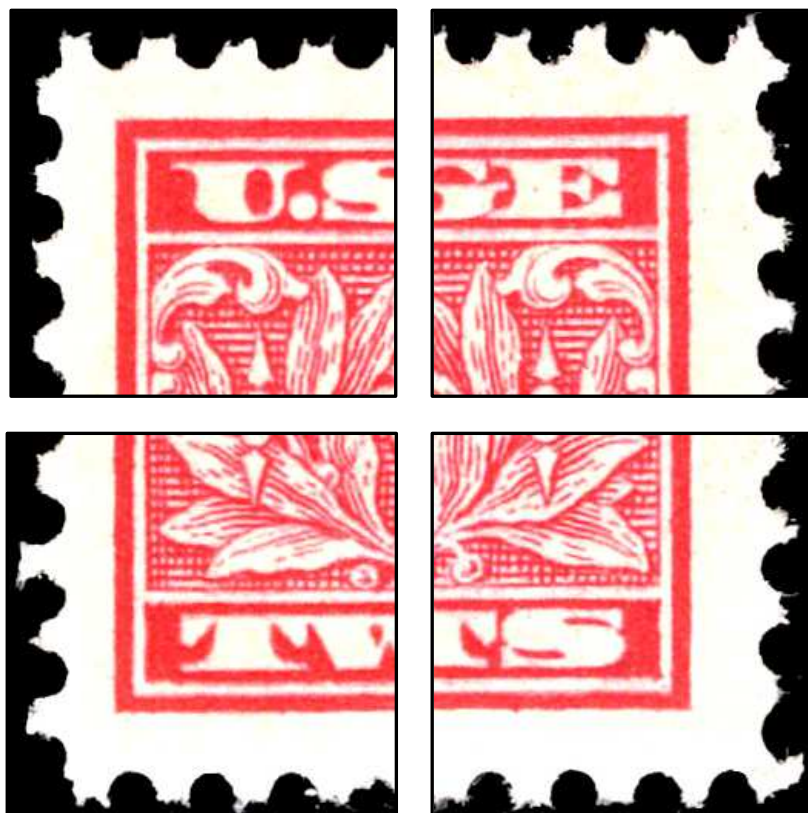


Figure 5: is a typical four-corners display of the stamp shown in Figure 2 demonstrating how this method may be used to easily identify and compare the margins of this stamp.

Margin distances are easily determined for stamps with linear engraved borders. It is more difficult for stamps that do not have these borders such as the U.S. 1901 Pan-American Exposition Commemorative issues. In this case, a box may be drawn along the engraving and measurements calculated using this guideline (see Figure 6).



Figure 6: A 2-cent 1901 Pan-American Exposition commemorative issue (Scott # 295) with a rectangular box (*i.e.*, green) encompassing the frame as a reference to allow accurate measurements of the four margins. This stamp is from the Author's collection.

The use of methods that obtain quantifiable values for determining a stamp's centering provides a more uniform system for philatelic grading and eliminates the subjective terminology that makes consistency difficult. Further, distinguishing between stamps with margins intended for a particular issue, what PSAG regards as the "average margin", and those that have margins that exceed these distances, often designated "Jumbo", is important in determining the rarity and estimated values of these unique specimens.

When a stamp is graded using these methods, it would be beneficial to provide an image (*i.e.*, actual size or enlarged image with a magnification value) of the specimen with the calculations noted. The average margin distance for the stamp issue being graded should also be provided as a reference and a determination made based on those distances as to whether the specimen qualifies for "Jumbo" status. Finally, the overall numerical value should be provided; determined by the sum of the normalized margin distances divided by eight and multiplied by 100. This system creates a more accurate, consistent, and reproducible determination of a stamp's centering and appropriate valuation.





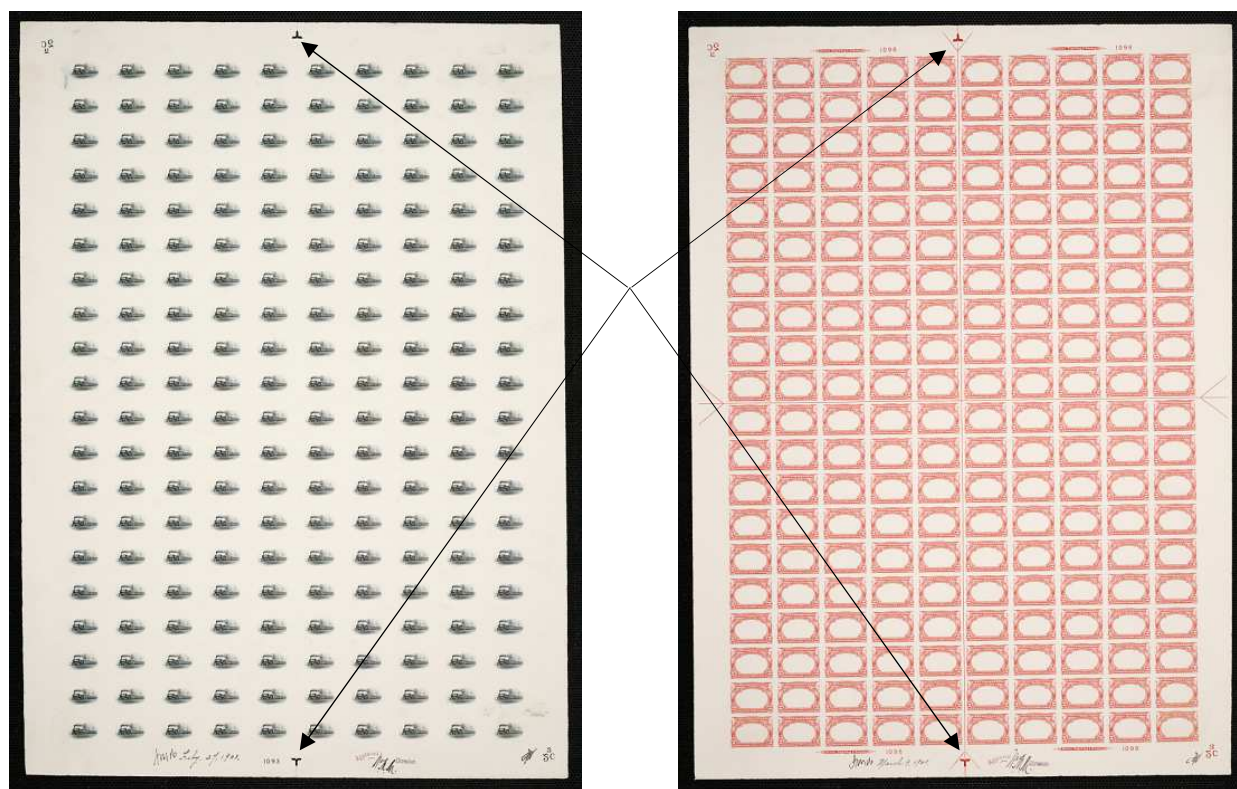
REGISTRATION



(Published in the Poway Stamp Club Newsletter June 14, 2023, pgs. 24-30)

The first bicolored U.S. stamps were the 1869 Pictorial Issues (Scott #s. 118-122 and 129-132) and the first bicolored U.S. commemorative stamps (produced by the Bureau of Engraving and Printing) were the Pan-American Exposition issues of 1901 (Scott #s. 294-299). Two of the 1901 commemorative issue stamps are used here as examples to further elaborate on the registration process and demonstrate how important this criterion can be for grading these higher-valued stamps.

The technology in the late 19th and early 20th centuries could not print both colors simultaneously. Consequently, these stamps were printed from two plates in two separate operations, one for each color of ink (*i.e.*, intaglio multi-plate printing process).



A

B

Figure 7: **A)** shows a vignette sheet for Scott # 295 and **B)** shows a frame sheet for Scott # 295. Registration marks on these sheets at the top and bottom are indicated by arrows⁶.

In the Pan-American Exposition issue, the center image, or “vignette,” was printed in one color (*i.e.*, black, Figure 7A) and engraved on one plate. The outer image, or “frame” was printed in a different color (*i.e.*, green for the 1-cent, carmine for the 2-cent, Figure 7B, red brown for the 4-cent, ultramarine for the 5-cent, brown-violet for the 8-cent and yellow-brown for the 10-cent denominations) and engraved on a different plate.

During printing, the paper went through the press twice, once for each color⁶.

This system of using two plates and two printing passes created opportunities for errors. While almost all the stamps were printed correctly, errors occurred when the registration marks were not properly aligned, (*i.e.*, one mark directly on top of the other, Figures 8A-B, 9A-D), a plate was reversed after cleaning, or the paper was rotated before it went through a second time. The last two events produced the famous inverted specimens of the 1-cent, 2-cent, and 4-cent denominations (Figure 10).

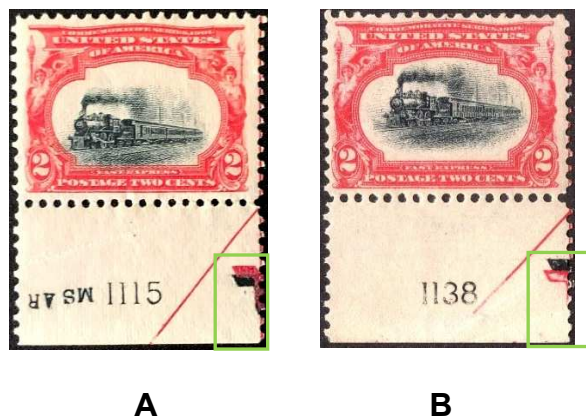


Figure 8: **A)** shows the registration marks for this Scott # 295 with the black registration mark shifted down and slightly to the left (andrew 2u, ebay no. 205123591603) and **B)** the mark shifted up and slightly to the right (*i.e.*, green boxes). When properly registered, the second mark is aligned directly over the first mark so that when printed they merge into a single mark (DJ's Stamps and Auctions, ebay no.146013756029).

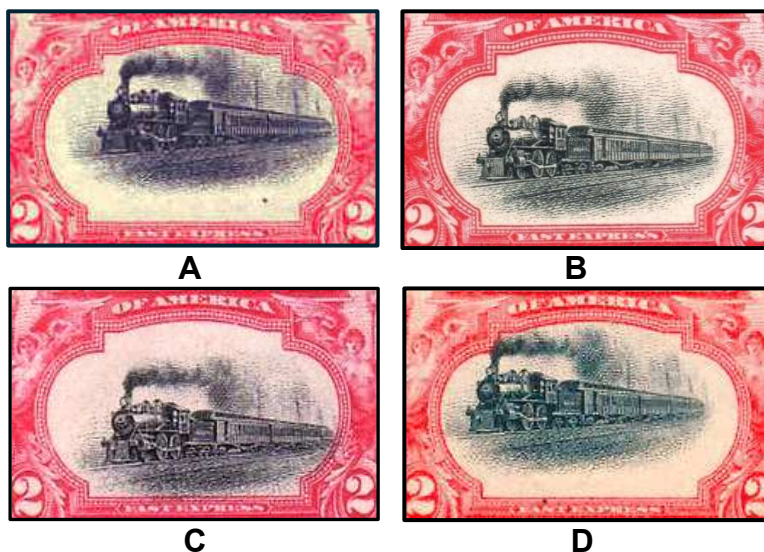


Figure 9: **A)** shows the vignette shifted upward and slightly to the right, **B)** shows the vignette shifted downward, **C)** shows the vignette shifted to the right and downward, and **D)** shows the vignette shifted to the left and upward.

⁶ <https://postalmuseum.si.edu/exhibition/stamps-take-flight-creating-america%E2%80%99s-stamps-classic-engraving/adding-a-second-color>



Figure 10: shows the vignette of Scott #s 294⁷, 295⁸, and 296⁹ inverted in the frame.

Several sheets with errors were caught and destroyed, but at least one of each of these inverted error sheets made it through to the Washington, D.C., Post Office. To avoid future problems, the word “TOP” was added to subsequent bicolored issues. In Figure 11, this mark appears in red at the top of the sheet for Scott # 651.



Figure 11: shows the upper salvage of a sheet of Scott # 651. The “TOP” designation was added to prevent inversion of the vignette in the frame. Both plates contained this designation, so one was printed with the frame in red and the other was printed with the vignette in black. This partial sheet is from the Author’s collection.

So how is proper registration determined? Proper registration may be observed in a die proof or determined from an intact grouping of stamps with salvage containing registration marks (Figure 8A-B). In the Pan-American Exposition issue, each denomination has a different shaped frame and each must be treated independently when establishing a method for determining proper registration. Here, Scott #s 294 and 295 have been selected as examples of how proper registration may be calculated.

If the registration marks shown in Figures 8A-B were properly aligned, then the position of the vignette in the frame for Scott # 295 would appear to be that shown in Figure 12A. However, while the registration in Figure 12A appears to be what was intended, there is also the option of a perfectly centered vignette (*i.e.*, shifted slightly

⁷ https://en.wikipedia.org/wiki/Pan-American_invert.

⁸ <https://www.usphila.com/us/stamp/price/scott-295-page-1>.

⁹ <https://www.usphila.com/us/stamp/price/scott-296-page-2>.

higher in the frame) as shown in Figure 12B. The presence of two desirable orientations can be explained because the vignette is oval, but the frame is not. Therefore, if these two stamps were graded based on proper registration, then only the stamp in Figure 12A could receive a grade of 100. However, because these two configurations are desirable, it may be beneficial to grade them the same but designate on the grading certificate that the grade is based either on registration or centering of the vignette within the frame.

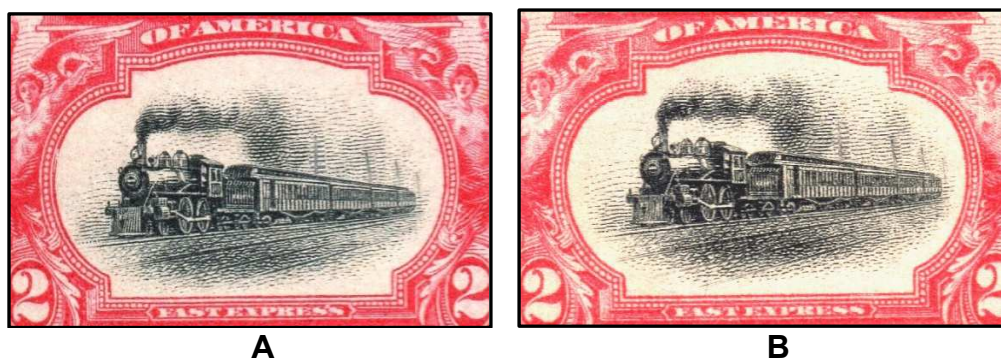


Figure 12: **A)** shows what would appear to be the proper positioning of the vignette in the frame based on the registration marks as seen in Figure 8 above, slightly lower than in Figure 9B and **B)** shows the vignette almost perfectly centered in the frame. Both of these stamps are from the Author's collection.

So, if a stamp does not have the benefit of registration marks, how can one determine if the centering is proper? As suggested above, calculations to establish standard distances can be obtained from die proofs or from a grouping of stamps having salvage containing registration marks. The values calculated for a given stamp can then be compared to these standard distances. However, calculating becomes difficult when the vignette touches or extends over the frame (*i.e.*, no space is available for measuring), the vignette image is not clear, or all the engraved markings of the vignette are not present (*i.e.*, extended use of the plate can compromise the integrity of the engraved image). While some of these vignette shifts may be desirable, the focus of this discussion will be on those stamps that do not have these characteristics.

One possible method to calculate the quality of the registration for Scott no. 295 would be to create an enlarged image of the stamp so that physical measurements of distances between the vignette and the inside of the frame for each of the four sides can be determined. To make these calculations, two diagonal lines from the vertices of the interior of the frame are drawn, then a vertical and horizontal centerline is drawn from where the two diagonal lines intersect. Calculations of the distance from the vignette that falls on these centerlines to the inside of the frame are measured for all four sides (Figure 13). Since there are two potentially desirable configurations, there are two distance normalization ratio configurations, one in which the vignette is visually centered (ratio, 1:1:1:1) and one in which the vignette and frame are in proper registration (ratio, 1:00 (top):0.63 (left side):0.25 (bottom):0.63 (right side)).

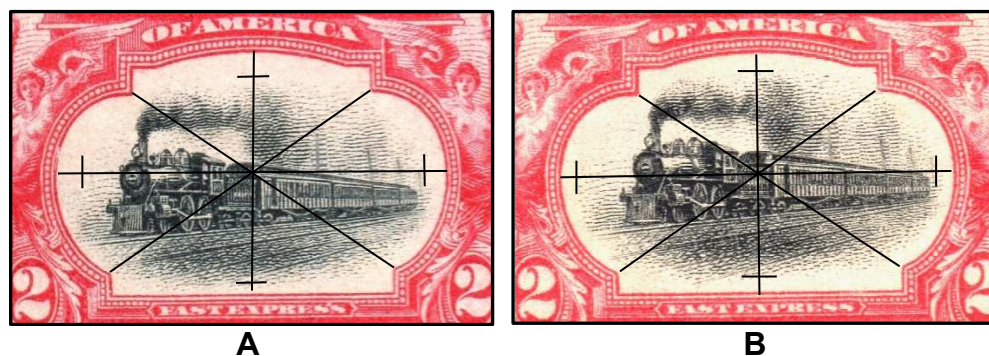


Figure 13: **A)** shows diagonals and centerlines for a properly registered specimen of Scott no. 295 with the hash marks on these centerlines where the vignette falls for making distance determinations and **B)** shows diagonals and centerlines for a perfectly centered vignette of Scott no. 295 with the hash marks on these centerlines where the vignette falls for making distance determinations. These stamps are from the Author's collection.

The normalization ratio obtained in Figure 13A is used to determine the values of the top, bottom, left side, and right side margins between the vignette and frame of the stamp to be graded. This is accomplished by preparing an enlarged image of the stamp, physically measuring the four distances, multiplying the normalization ratio by the highest value measured, dividing each of the measured values by their corresponding normalized ratio value, multiplying these values by 100, adding the four values together, dividing by four and rounding up to obtain a two-digit registration grade. For example, a hypothetical stamp has the measurements 7.0mm (top), 3.5mm (left side), 1.5mm (bottom), and 4.0mm (right-side). The normalization ratio is multiplied by the largest distance to obtain a normalized ratio of 7.0 (top):4.4 (left side):1.75 (bottom):4.4 (right side). Each of the measured distances is divided by its corresponding normalized ratio value (*i.e.*, 1.000:0.794:0.857:0.907). Each of these values is multiplied by 100 (*i.e.*, 100:79.4:85.7:90.7), they are added together, divided by four, and rounded up to give the registration grade of 89 for our hypothetical stamp.

Scott no. 294 has a vignette that can fit nicely within its frame, providing distances that can be easily measured. Since both the vignette and interior of the frame are oval there is only one centered configuration unlike Scott no. 295. The method used to calculate the quality of the registration for this issue could be like that used for Scott no. 295. Create an enlarged image of the stamp, then draw a vertical and horizontal centerline at the greatest distance from the interior of the frame from top to bottom and side to side. Calculate the distance from the vignette that falls on these centerlines to the inside of the frame for all four sides. The normalization ratio of these measurements is 0.49 (top):1.00 (right side):0.49 (bottom):1.00 (left side) (Figure 14). The calculations described above for Scott no. 295 can then be performed to determine the registration grade of any relatively well-centered Scott no. 294 specimen.

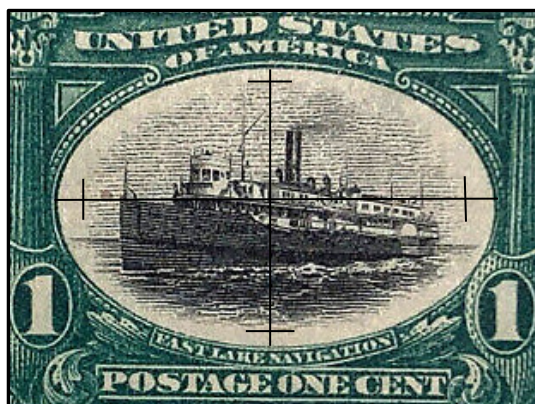


Figure 14: shows centerlines for a properly registered specimen of Scott no. 294 with the hash marks on these centerlines are where the vignette falls for making distance determinations. This stamp is from the Author's collection.

Similar types of calculations may be made for the other early issue bicolored stamps, particularly those of higher value (*i.e.*, Pictorial Issues, Scott nos. 118-122, 129-132, 1917 regular issues, Scott Nos. 523, 524, 1920 regular issue Scott No. 547 and 1922-25 regular issue, Scott no. 573). If these or similar methods are embraced, then the grading certificates should also contain the measurements, margin ratios, and enlargement scale. It would also be helpful to provide an image of the stamp showing the centerlines and other markings, to avoid confusion and allow future experts to confirm previous calculations.

So then how do we grade those stamps in which the vignette touches or overlaps the frame? Many of the Pan-American Exposition issue stamps have vignettes that overlap the frame. For Scott no. 295, there are two centering positions in which there is no overlap. However, the vignettes of the 5-cent and 8-cent denominations barely fit within the area provided in the frame, and the 4-cent and 10-cent denomination vignettes exceed the area provided. Therefore, a different method will have to be used for these denominations.

One alternate method that may be used for stamps in which the vignette touches or overlaps the frame is to make an enlarged photographic image of the bicolored stamp and draw a box and/or rectangle around the vignette making sure that each side of the box just touches the vignette. Do the same for the exterior of the frame. In the final drawing, the distances between the sides of the box of the vignette and the sides of the frame should be equivalent. Figure 15 demonstrates this concept.

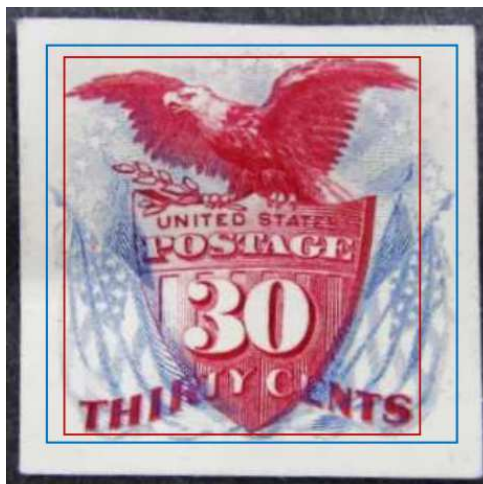


Figure 15: shows an enlarged image of Scott #121 proof (NYStamps listed on ebay no.: 315838335737) The interior box encompasses the vignette in red and the exterior box encompasses the frame in blue. The orientation of these two boxes shows that the vignette is positioned a little to the left and slightly lower than intended.

When the vignette is properly centered in the frame the central box will sit evenly within the outer box. Here the vignette is positioned to the left of the center and slightly lower than intended.

When a stamp is graded using these methods, it would be beneficial to provide an image (*i.e.*, actual size or enlarged image with magnification value) of the specimen with the reference lines and calculations noted. This system creates a more accurate, consistent, and reproducible determination of a stamp's registration for an appropriate valuation.



—❁— GUM —❁—

(Published in the Poway Stamp Club Newsletter October 15, 2023, pgs. 33-39)

In the late 19th and early 20th centuries, gum was applied to postage stamps by hand, using a brush or roller after printing and before perforation. However, this method tended to make the stamps curl because of the varying moisture levels of the gum and its interaction with the paper. In extreme cases, the stamp sheets would spontaneously curl into a tube. To correct this problem, De La Rue (*i.e.*, a British company headquartered in Basingstoke, England, which is still in business today) developed a gumming machine in 1880 utilizing an existing printing press.

The type of adhesive used most often was gum Arabic, also referred to as gum acacia, gum sudani, and Senegal gum. It is a natural adhesive comprising a mixture of the hardened sap of two species of the *Acacia* tree. Its chemical structure is a complex mixture of glycoproteins and polysaccharides, predominantly polymers of arabinose and galactose that is soluble in water and edible. Figure 16 shows images of powdered gum Arabic being rehydrated to form a paste for application to stamps.

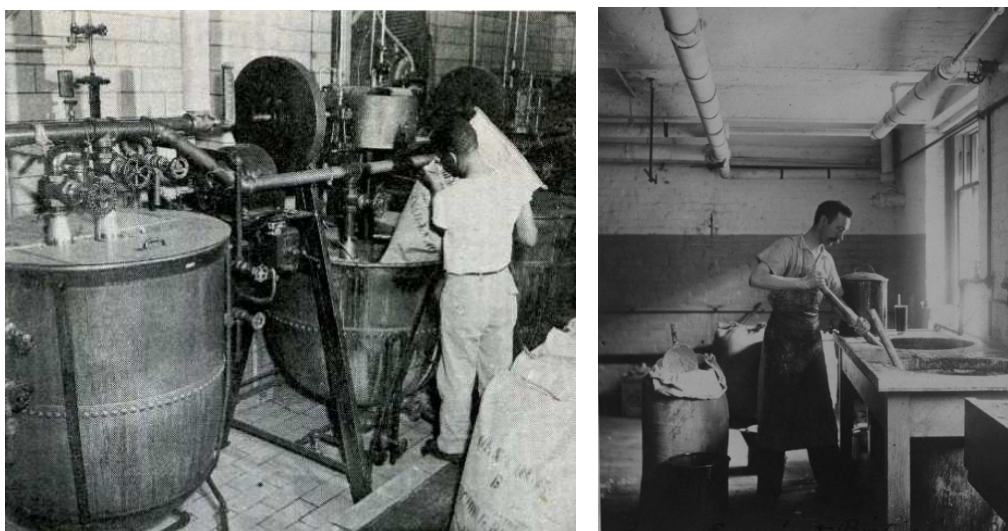


Figure 16. Gum Arabic being mixed by hand at the Bureau of Engraving and Printing before being applied to stamps¹⁰.

Another common adhesive used was dextrin produced by heating starch. Dextrins are a group of low-molecular-weight carbohydrates produced by hydrolysis of starch and glycogen that may be white, yellow, or brown and are partially or fully water-soluble. Because of their chemical structures, they form optically active solutions that may be identified by the color produced when mixed with an iodine solution; erythrodextrin producing a red color and achrodextrin producing no color.

¹⁰ www.stampcommunity.org 2/10/2010 by rod222 and www.gettyimages.com.

Today an early issue United States stamp in mint (unused) condition, without a hinge or hinge mark and pristine gum will command a premium price. That same stamp with gum imperfections can reduce the value by a factor of ten. So, what can affect the gum? Heat can cause minute cracking, or discoloration of the gum (Figure 17A). Moisture can disrupt the even distribution of the gum on the stamp (Figure 17B) or cause the gum to have a glazed appearance. It can also cause the stamp to adhere to its mount causing dull spots (Figure 17C) or loss of the gum resulting in a “thin” (Figure 17D). Touching the gum with moist fingers can result in a permanent fingerprint. High-intensity light or illumination over time can cause the gum to discolor or become brittle. Removal of a hinge can leave a hinge mark (Figure 17E) or create a thin. Most of these imperfections are easily detectable by the naked eye or with a 10X magnification loop.

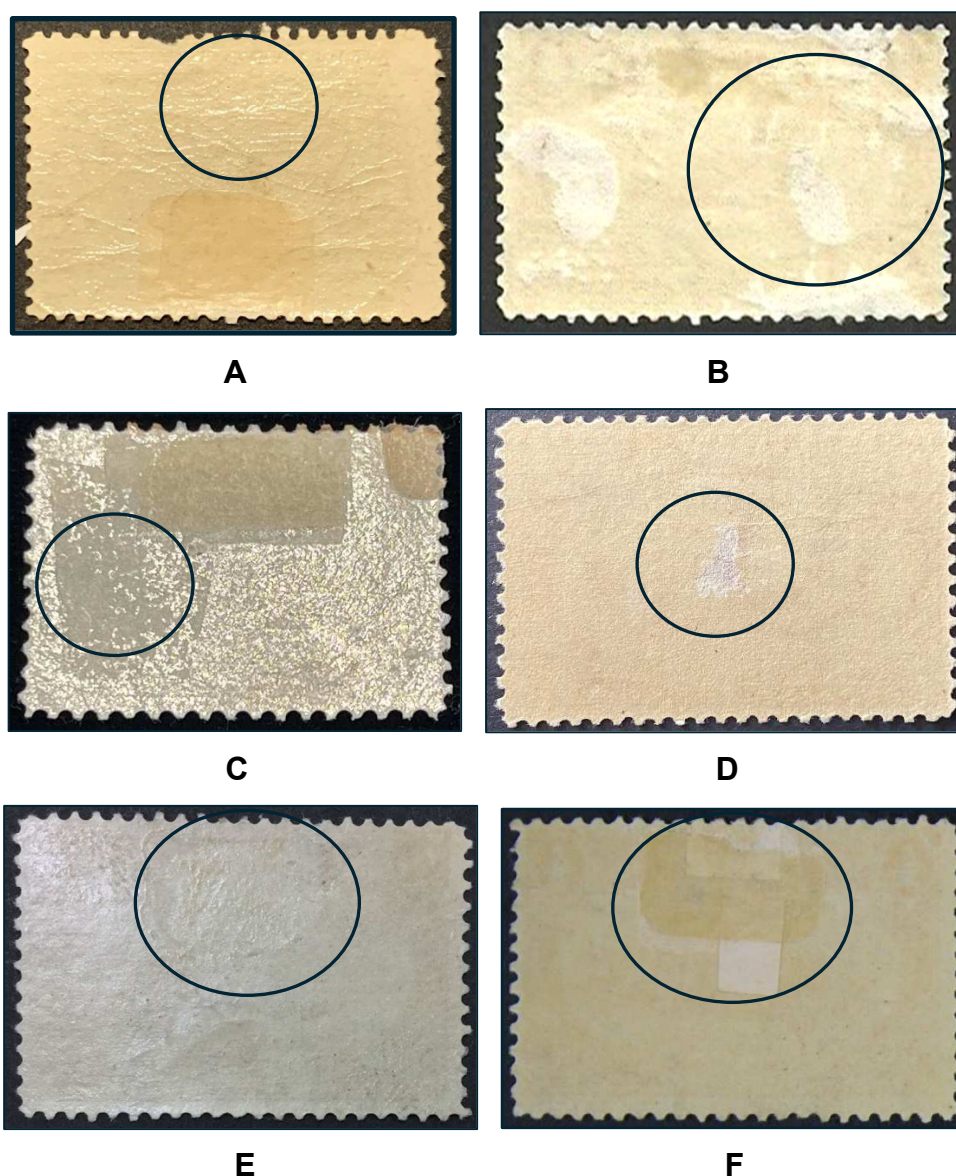


Figure 17: Damage to the gum on stamps: **A)** cracking, **B)** disturbed gum, **C)** dull spots, **D)** thin, **E)** hinge mark and **F)** hinge remnants (images from stamps in Author’s collection).

In some cases, high-value stamps with disturbed or damaged gum have had their gum removed so that they could be regummed. The purpose is to entice the buyer to pay a higher price for an otherwise less expensive stamp. Many of these stamps have been expertly altered and are difficult to identify without knowing some key indicators inherent in this process. One of the more noticeable indicators is the presence of glue on the stamp perforations. When stamps are torn from their sheets, paper fibers extending from the ends of the remaining perforations are created (Figure 18A). During the regumming process, these fibers become inundated with glue and become shiny and semi-translucent (Figure 18B). In some cases, the ends of the perforations are trimmed to remove the glue. However, removal of all the excess glue from the perforations after drying is tedious and is seldom perfect. The process of trimming often causes short perforation making this an additional indicator of regumming.

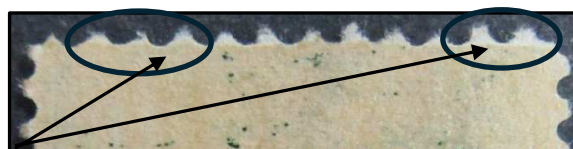
To avoid these two noticeable indicators, some individuals regum the back of the stamp without allowing the gum to reach the perforations. In this circumstance, viewing the perforation with a 10X loop can show a color distinction between the presence of the gum and its absence (Figure 18C).



A



B



C

Figure 18: **A)** shows the freely extending paper fibers from the perforations of a stamp that has not been regummed, **B)** shows a stamp that has been regummed where the perforations absorbed the newly applied gum giving them a translucent appearance, **C)** shows a stamp that has been regummed, with a visible line where the gum was applied up to but does not include the perforations (images of stamps from the Author's collection).



Figure 19: **A)** shows a stamp that has not been regummed and **B)** shows a stamp that has been regummed. Notice that the gum is slightly grainier compared to the gum on the stamp in A (images of stamps from the Author's collection).

Another visible indicator of regumming is the unusual texture of the newly applied gum (Figure 19). Often the gum used in the regumming process is relatively thick, in an attempt, to limit the amount of absorption into the perforations. Further, this process can produce more texture than desired and makes the gum appear grainier (Figure 19B) than the originally applied gum (Figure 19A).

In some cases, regumming is used to cover a thin and the original gum may not have been removed (Figure 20). If a stamp is suspected of being regummed to cover a thin, then back lighting the stamp can often illuminate the thin because the area will be much brighter than the unaffected surrounding portions of the stamp.

Other gum abnormalities include what collectors call “gum skips”. This occurs when bubbles form during the adhesive application process. When these bubbles pop they leave areas that do not contain gum. They are often easily identified because of the color difference, usually lighter color than areas containing gum, and they are often dull, not possessing the shiny characteristics of the adhesive.

While these abnormalities, imperfections and/or alterations of the gum are not listed by philatelists based on severity, the author recommends the following order of “least-to-most” (*i.e.*, 1 being the least affected to 7 being most affected) invasive impact on the affected stamp (see Table 1).

Table 1:

Alteration	Figure	Comments	Severity (Subjective)
Hinge impression	17E	A hinge mark is present, but no hinge or portion of a hinge remains.	Disturbed gum at the location of the previous attachment of a hinge. Original gum is present. 1
Gun skips	None	Areas on the back of the stamp appear to be missing gum and likely occurred during gum application.	These areas are easily observed as missing the color and shine of the adhesive used. This condition likely resulted from bubble formation in the gum application process. Underlying paper is smooth. 2
Glazed	None	Gum appears to have been remelted and is significantly glossier than when the gum was originally applied.	Can be difficult to assess, minimal impact on appearance of the back of the stamp if the glaze is uniform. When glazing is not uniform it creates shiny spots (see below). 2
Disturbed gum	17B	Overall disturbance results in a texture of the gum that is significantly different than the texture when the gum was originally applied.	Easily identified and can significantly affect appearance of the back of the stamp. However, the original gum is still present. 3 (Depending on size of area affected)
Cracked gum	17A	Visibly cracked.	Easily identified and can significantly affect appearance of the back of the stamp. However, the original gum is still present. 3 (Depending on size of area affected)

Alteration	Figure	Comments	Severity (Subjective)
Dull and/or shiny spots	17C	Gum not removed but was adhered to something then unstuck leaving a dull mark.	Often easily identified if viewed with light reflecting off the surface of the gum. However, the original gum is still present. 3 (Depending on the size of the area affected)
Gum missing	None	When backlit there is no obvious thinning.	Observable by a change in color, shine, or texture. The gum is missing but there is little or no damage to the underlying paper. 4
Hinge remnant	17F	A hinge or portion of a hinge remains on the back of the stamp.	When a portion of the hinge remains, it means that there was an unsuccessful attempt to remove it. This could have caused additional damage under or next to the remaining portion of the hinge. 5
Thin	17D & 20	When backlit the affected area is lighter than the surrounding area.	This damage removes not only the gum but also a portion of the paper underlying the hinge. Underlying paper may not be smooth. 6
Regummed	18B, 18C & 19B	Original gum removed from the stamp and new gum applied or new gum applied over original gum.	Most or all of the original gum has been removed. 7

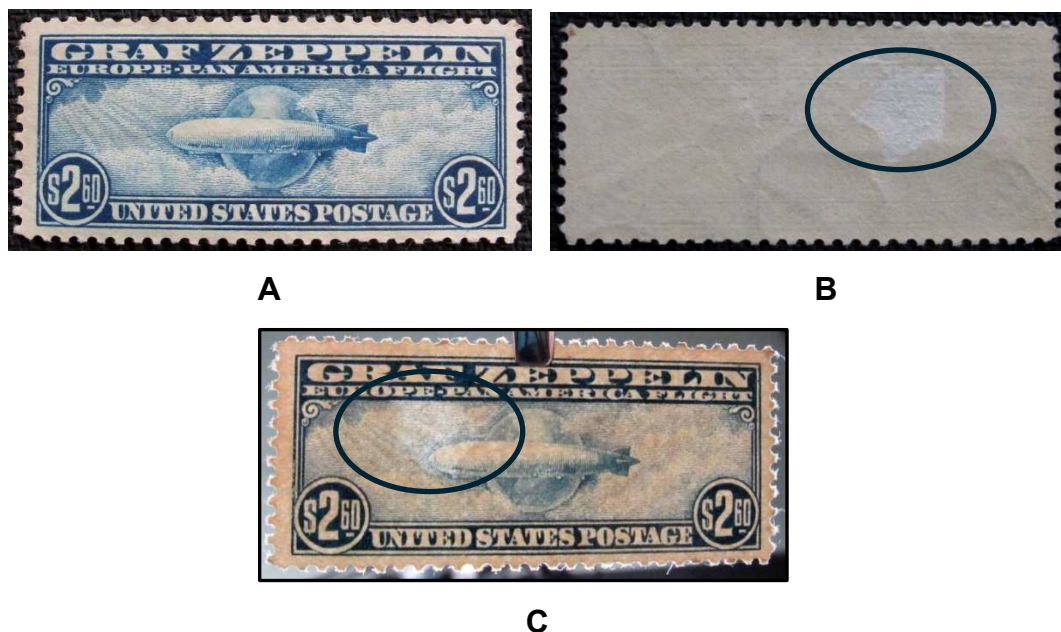


Figure 20: shows one way to determine if there is a thin on a stamp, **A)** the face of stamp Scott no. C18¹¹ with no visible signs of a thin, **B)** the back of the same stamp with a circled area showing where the gum is missing and which appears to be a thin and **C)** the same stamp backlit showing the circled area in B as lighter than the surrounding area of the stamp indicating that this is a thin.

When grading, these conditions should be noted on the grading certificate as well as a description of the breadth and scope of the gum disruption. If the extent of the disruption is significant, then an image of the back of the stamp with circles and/or arrows identifying the affected areas should also be provided. In this article, grading is described for stamps that are free from damage and in a condition that was intended when produced. Stamps with missing gum, containing a hinge or hinge remnant, a thin or that have been regummed are not the subject of this article.

To establish a grade for stamps with severity ratings of 1 through 3 in Table 1, the author proposes that a stamp which retains full gum but where the gum is disturbed be given a base grade of 50. More specifically, a grade of 50 is given for any stamp that has imperfections to the gum but where the original gum is still present over the entire back of the stamp. Therefore, when grading stamps with imperfections consisting of a hinge impression, glazed areas, cracked gum, dull or shiny spots, gum skips, and generally disturbed gum such as a fingerprint, the author proposes the following: stamps so affected begin with a base grade of 50, the surface area of the disturbance (*i.e.*, a hinge mark, glazed areas, cracking, dull or shiny spots, gum skips, fingerprints, etc.) is determined as a percentage of the total area of the back of the stamp. That value, representing the percentage of the surface area affected, is subtracted from 50 (*i.e.*, the remaining portion of the stamp grade that can be awarded when the base grade is 50) and that remaining number is added to the base grade. For example, if a stamp has gum cracking on 10% of the surface area of the back of the stamp, then the 50 minus 10 equals 40 (*e.g.*, $50 - 10 = 40$). Forty is then added to the base grade of 50 and the grade becomes 90.

¹¹ ebay no. 386101393110 by NobleSpirit.

If approximately 37% of the surface area of the gum on the back of the stamp is disturbed, then 50 minus 37 equals 13, and the grade becomes 63. Correspondingly, if a hinge mark encompasses 12% of the surface area of the gum on the back of the stamp, then 50 minus 12 equals 38 and the grade becomes 88.

It is important to note that this grade is specifically for the condition of the gum and must be added to the other grades recorded for the stamp (*i.e.*, centering, perforations, color, engraving, registration, etc.) and divided by the number of grades given (*i.e.*, 3, 4, 5, or 6).

If this or a similar method is accepted, then the grading certificate should list the determined percentage disturbance used to obtain the final grade for the gum condition. An image may be provided highlighting the affected area(s). This system creates a more accurate, consistent, and reproducible determination of a stamp's gum condition for an appropriate valuation.



—❁— PERFORATIONS —❁—

(Published in the Poway Stamp Club Newsletter July 12, 2023, pgs. 26-30)

The first stamps issued by the United States were unperforated and were cut from sheets with scissors before use (*i.e.*, Scott nos. 1-17, regular issues from 1847 through 1857). This proved to be inconvenient and time-consuming for postal clerks, so in 1857 stamps were perforated so they could be separated more easily. Toppan & Carpenter of Philadelphia, the company that printed all U.S. stamps for the U.S. Postal Service during the 1850s, purchased a rotary perforation machine from Bemrose & Co. in 1855. The machine used rotating wheels with matching sets of pins and holes to create the perforations between the stamps (Figure 21)¹².

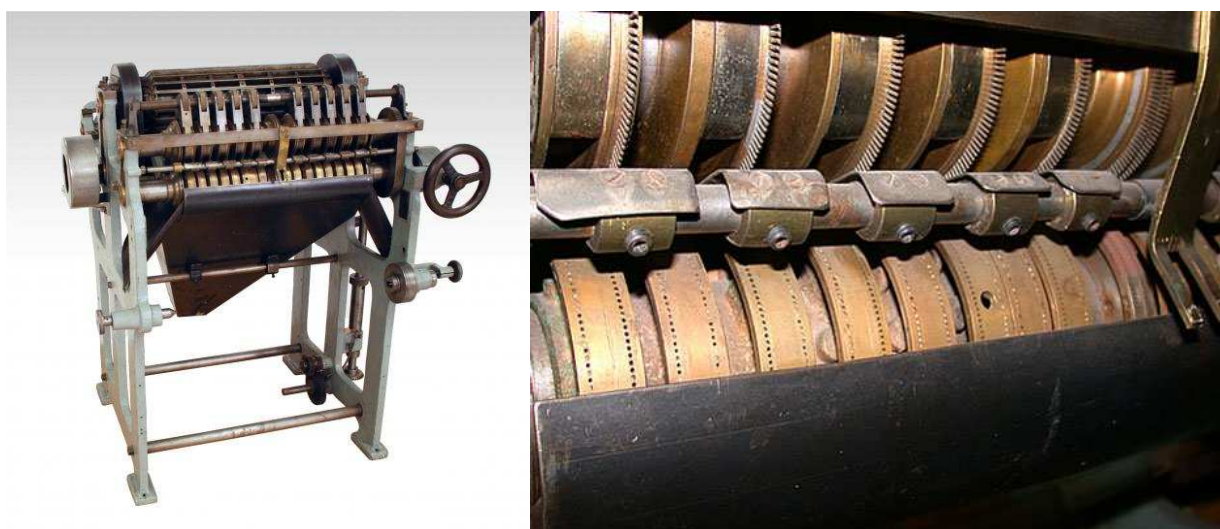


Figure 21: A rotary perforation machine used by the Bureau of Engraving and Printing¹⁰.

Stamp perforations are measured by the number of holes or teeth within a two-centimeter distance and tend to range from 11 to 14 for most U.S. stamps. Some stamps have compound perforations (*i.e.*, vertical and horizontal perforations of different gauges). For example, some U. S. stamps are perforated 10½ x 11.

The rotary perforation machines required the user to feed sheets of stamps into the machine. Improperly fed sheets resulted in poorly centered stamps. Further complications arose over time as the pins became worn and no longer meshed properly due to wearing. This often resulted in the paper being torn more than cut leaving ragged edges (Figure 22A-B). In some cases, the pins broke off resulting in stamps with one or more missing perforations (Figure 22A). In addition, if the perforations did not tear evenly when the stamps were separated, then the result was a shorter (Figures 22B-C) or longer tooth than the others. For particularly valuable stamps, collectors have attempted to tease

¹² <https://postalmuseum.si.edu/collections/object-spotlight/early-rotary-perforation-machine>.

the shorter perforations to give the impression that all the perforations are of the same length. This teasing can be spotted by the excessively ragged edges on the ends of the teeth. In some instances, stamps have been reperfected to create better centering, correct a damaged edge or replace a missing perforation (Figure 24A-B).



Figure 22: Scott no. 185 **A)** shows a missing perforation (Hipstamp No. 50662341, momen stamps, **B)** shows short perforations with about 50% of the teeth missing (ebay no. 404095085637, momen stamps) and **C)** shows short perforations with about 75% of the teeth missing (ebay no. 385421958648, garyposner).

So how should a short perforation be defined for grading purposes? These perforations often stand out when compared to other adjacent perforations. However, how do we objectively establish a short perforation so that the stamp's overall perforations can be graded?

An even perforation tear should leave about 50% of the interior circumference of the hole intact. If 25% remains after tearing, the perforation appears shorter than the others but is still present. However, if less than 20% remains then the appearance is affected often reducing the esthetic value to the collector. Therefore, a perforation in which less than 20% of the interior circumference of the hole remains should constitute a short perforation and effect the grade of the stamp.

So how should a stamp's perforation grade be calculated? One option is to add the number of short or missing perforations, multiply this number by 2 (*i.e.*, a random normalization multiplier for smaller-sized stamps) or 3 (*i.e.*, a random normalization multiplier for larger-sized stamps), minus the total number of perforation then divide this value by the total number of perforations the stamp should have if no perforations were missing or short. Multiply this value by 100 to obtain the grade. For example, if a stamp has one missing perforation and two short perforations with 56 total perforations, then the perforation grade is calculated as $[(56 - (3 \text{ short or missing perfs} \times 2 \text{ random normalization multiplier for a smaller stamp size})) / 56 \text{ total number of perfs}] \times 100 = 89$ (rounded up). Figure 23 provides examples of a stamp's perforation grade showing how the random

multiplier normalizes the calculations so that the grade becomes essentially the same for a given number of missing or short perforations for both small and large stamps (Figure 23A-B).



Figure 23: **A)** Scott no. 367 with a short perforation indicated by the arrow, the calculation for the perforation grade is 14 (left side perfs) + 14 (right side perfs) + 13 (top perfs) + 13 (bottom perfs) = 54 - $(1$ (short perf) $\times 2$ (small stamp multiplier)) = $52/54 \times 100$ gives a grade of 96 , (ebay no. 204082001652, momen stamps) **B)** Scott no. 372 with a missing perforation shown by the arrow, the calculation for the perforation grade is 14 (left side perfs) + 14 (right side perfs) + 21 (top perfs) + 21 (bottom perfs) = 70 - $(1$ (missing perf) $\times 3$ (large stamp multiplier)) = $67/70 \times 100 = 96$ rounded up (ebay no. 356062831933, Accent Art Glass).

So how should perforations that are not completely cut or cut poorly be graded (*i.e.*, defective perforations)? Since they are not in the condition intended, they should be treated similarly to short or missing perforations during counting. Under this circumstance, the number of defective perforations in Figure 24A would be 12 (*i.e.*, these occur on the left side of the stamp) giving a grade of 47 . The number of defective perforations in Figure 24B would be 6 , possibly 7 (*i.e.*, these occur on the top of the stamp) giving a grade of 65 . While these grades may seem low for an otherwise nice specimen, it accounts for only a portion of the overall grade which takes into account the other four or five grading categories for the stamp.



Figure 24: **A)** Scott no. 372 with perforations on the left side which did not cut through (ebay no. 266256771704, Southwest Florida Stamps), **B)** Scott no 328 showing ragged perforation on top (ebay no. 204801934942, Steve Malack Quality US Stamps).

Perforation repair, reperforation, and teasing are alterations intended to change the stamp's original condition. Because this grading system is meant to qualify the condition of a stamp as originally intended, a grade for stamps with these types of alterations cannot be assigned. These stamps fall outside the scope of this grading system. More importantly, grading stamps with intentional alterations that attempt to increase the value of a stamp would promote an activity that should be discouraged. This author does not recommend providing a grade for stamps that are so altered.

Figure 25 shows two stamps that have been reperforated. While it may not be easily identified, reperforations often have a crisp clean-cut appearance, which alerts the trained eye to look for this alteration. Scott no. 77 has been reperforated on the right side and Scott no. 619 has been reperforated on both the right side and bottom.



Figure 25: A) Scott no. 77 showing an example of reperforations on the right side of the stamp (ebay no. 365043893710, City Stamp Montreal), **B)** Scott no.: 619 (ebay no. 314337674380 mostamps) shows reperforations on both the right side and bottom of the stamp.

The author has only seen a few stamps with teased perforations, and they were associated with higher-value stamps. They are easily recognizable because the teased perforations are extremely ragged compared to the other perforations on the stamp and generally occur on the shorter perforations. A couple of stamps listed for sale on ebay were selected as examples of what teasing could look like (note: the certifications of these stamps do not report teased perforations). The first is Scott no. 85E with a PSAG certification listed with a starting bid of \$7,500 (Figure 26A) and the other is Scott no. 193, NGAI (*i.e.*, No Gum As Issued), with a PF certification listed with a starting bid of \$7,800 (Figure 26B).



A



B

Figure 26: **A)** Top portion of Scott no. 85E (ebay no. 204305016448 momen stamps) showing ragged perforations at the top that are different in character from the perforations on the sides of the stamp, **B)** Top portion of Scott no.: 193 (ebay no. 384396707054 garyposner) NGAI showing extremely ragged perforation tips on the top, left and left side of the stamp.



A

B

C

D

Figure 27: Scott # 233 showing: **A)** short perforation; **B)** clean perforation; **C)** a missing perforation; and **D)** an uncut perforation. The red guidelines are provided to assist in assessing the condition of the perforations (ebay no. 267001658423 SouthwestFloridaStamps).

Alternatively, reference lines may be drawn at the edge of the perforations on each side of the stamp. In a dark field, each properly cut perforation will appear as a black filled

half circle, while short perforation will show a dark region between the peak of the perforation, and the reference line, an uncut perforation will show no darkness between this area and the reference line, and missing perforation will show an elongated dark oval instead of a circle, Figure 27.

If these or similar methods are accepted, then the grading certificate should contain an image of the stamp indicating the perforation(s) in question, to avoid confusion and allow future experts to confirm previous calculations. This system creates a more accurate, consistent, and reproducible determination of a stamp's perforation condition for an appropriate valuation.



—❁— **COLOR** ❁—

(Published in the Poway Stamp Club Newsletter August 9, 2023, pgs. 20-25)

In the early 1900s, inks were mixed by hand using proscribed recipes, so it is not surprising that this process often resulted in variations in tone, hue, and saturation (Figure 28).



Figure 28: Colorized image of workers mixing ink for the production of stamps at the United States Bureau of Engraving and Printing circa 1914¹³.

The 1901 Pan-American Exposition series was no exception. There are at least three colors identified with Scott no. 295, at least two colors identified with Scott no. 298 and two for Scott no. 299. The intended color for Scott no. 295 is carmen and black (Figure 29B), the others are a lighter shade of rose and black (Figure 29A) and a darker shade of deep red and black (Figure 29C).



Figure 29: Color variations for 1901 2-cent Pan-American Issue, Scott no. 295, **A**) rose and black from the D. Waller collection **B**) carmine and black from the D. Waller collection, and **C**) deep red and black from the D. Waller collection.

¹³ <https://unwritten-record.blogs.archives.gov/2016/06/21/engraving-inking-trimming-the-production-of-paper-currency-in-1914/>

The 1919 Victory issue also has several color varieties (Figure 30).



Figure 30: Color varieties of the 1919 victory issue, Scott no. 537, with the two red-violet colored stamps given variety status, 537a and 537c¹⁴.

Other anomalies affecting the color of a stamp include environmental conditions such as heat (*i.e.*, IR radiation) and/or sunlight (*i.e.*, UV radiation), printing the stamp in the wrong color, color plate inversion, and oxidation. Sunlight can fade the colors of stamps, Figure 31. Repeated exposure to room light can also affect the colors of many postage stamps, either by fading them or by changing their appearance. Stamps displayed in picture frames for any length of time are likely to show evidence of damage from light¹⁵.



Figure 31: Fading of the 1903 3-cent Jackson Regular Issue, Scott no. 302 **A)** offered by usastamps on ebay, no. 165923205320, **B)** offered by usastamps on ebay, no. 165381081416, and **C)** offered by droth on ebay, no. 393235515763.

In the 1893 Columbian commemorative series, the blue ink of the 1-cent, Scott no. 230 (Figure 32C), was substituted for the ultramarine ink used for the 4-cent, Scott no. 233 (Figure 32A), producing a blue 4-cent, Scott no. 233a (Figure 32B).

¹⁴ <https://www.linns.com/news/us-stamps-postal-history/expertizing-color-varieties-of-the-2-carmine-washington-stamps-and-the-1919-3-violet-victory-issue>

¹⁵ <https://www.linns.com/news/postal-updates-page/stamp-collecting-basics/2000/february/handle-and-store-your-collection-with-care.html>



Figure 32: Color varieties of the 1893 4-cent Columbian Issue, Scott no. 233. **A)** Scott no. 233 ultramarine color (Hipstamp ID 48395027), **B)** Scott no. 233a 4-cent denomination printed in the 1-cent denomination color¹⁶, and **C)** Scott no. 230 for color comparison to A from the D. Waller collection.

In the 1962 D. Hammarskjöld issue, Scott no. 1203 (Figure 33A), the yellow color plate was accidentally reversed before printing producing Scott no. 1204 (Figure 33B). To avoid collectors storming Post Offices around the country seeking this error, the United States Postal Service decided to print a comparable number of the reversed color stamp. This error is now one of the commemorative stamps issued in that year.



Figure 33: Color varieties of the 1962 4-cent D. Hammarskjöld, Scott no. 1203 and 1204. **A)** Scott no. 1203 with proper yellow color plate alignment and **B)** Scott no. 1204 yellow color plate reversed (Hipstamp ID 3715551).

With certain colors, oxidation becomes an issue when the stamp encounters sulfur containing compounds like sulfur oxide or hydrogen sulfide. This browning is a natural process that may be accelerated by moisture, heat and/or light.

The effect is most often seen on the early orange colored revenue stamps, the 1918 Curtiss Jenny 6-cent airmail stamp (Scott no. C1), 1898 Trans-Mississippi 4-cent (Scott no. 287, Figure 34), 1909 6-cent denomination Washington stamps of the Third Bureau Issue and 1922 6-cent denomination Garfield stamps of the Fourth Bureau Issue.

The affected stamp's original color can sometimes be restored, or partially restored, by exposure to a weak bleach solution or a weak solution of hydrogen peroxide¹⁴.

¹⁶ <https://stampauctionnetwork.com/Y/y118511.cfm>.



Figure 34: Oxidation of the 1898 4-cent Trans-Mississippi Exposition series, Scott no. 287 ebay no.387630047272, Momen Stamps Inc). **A)** unoxidized Scott no. 287 with bright orange color and **B)** oxidized Scott no. 287 with an “orange-brown” coloration¹⁷.

So how should color be graded? It is the author’s opinion that a stamp variety with ink color that is not recognized as damaged, be treated as an intended color. More specifically, the stamp’s grade would not be affected by its color and the color should be noted on the grading certificate (e.g., Scott no. 295 rose and black, or Scott no. 537c deep red-violet). Color differences or changes that may be considered damage should affect the grade of the stamp (e.g., fading or oxidation). In the case of oxidation, a condition that is purportedly “reversible”, it has not yet been determined whether treatment is permanent or whether exposure to compounds used to reverse this condition adversely affects the stamp. This raises the question as to whether oxidation constitutes damage.

However, if it is presumed that oxidation damages a stamp (e.g., orange pigment is chemically reduced to brown), then a reflectance spectral analysis could be used to determine the extent of oxidation. Figure 35 is a reflectance graph for mixing orange with black acrylic paints. The reflective wavelength of orange ranges from 590nm to 620nm. When the amount of black paint added to the orange is 1% (i.e., producing a noticeable brown coloration) it lowers the orange spectral peak by almost 70% and to about 85% when the black paint concentration is 10%. This difference is quantifiable and allows for the assignment of a grade.

So how can spectral peak reduction be used to determine a grade? In one method the peak reflectance of the color of interest is obtained from one or more unaffected stamps and set at 100 (e.g., Scott No. 302 in Figure 31A or Scott No. 287 in Figure 34A). To make the calculation, the amount the spectral peak is suppressed due to fading, or the oxidation process is divided by 2. This denominator reduces the slope of the curve and prevents the grade from dropping below 50 for a significantly faded or fully oxidized

¹⁷ <https://www.usphila.com/us/stamp/price/scott-287-page-3>.

stamp. This value is then subtracted from 100 to obtain a color grade (*i.e.*, $(100 - ((\text{suppressed reflectance})/2) = \text{grade})$). For example, if a stamp's reflectance spectral peak (dotted line) is calculated from its reflectance spectra (red line) in Figure 35, then the calculation would be as follows, $100 - (6/2) = 97$.

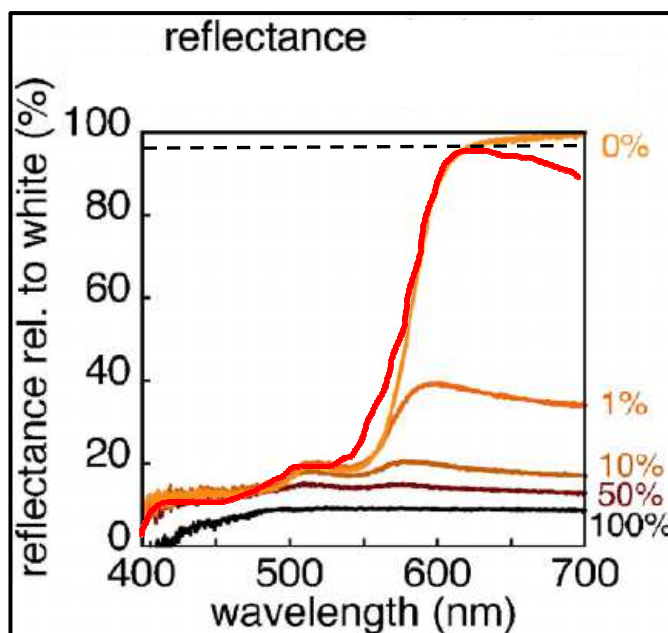


Figure 35: The reflectance curves of orange acrylic paint, black acrylic paint, and mixtures of the two in different proportions. The mixed volumes percentage of black paint is reported for each curve on the right axis¹⁸. The dashed line is the peak height of a hypothetical stamp spectrum (red line) for the example presented above.

If this or a similar method is accepted, then the grading certificate should contain the reflectance spectra and calculations used to obtain the final grade for color. This will avoid confusion and allow future experts to confirm previous calculations.

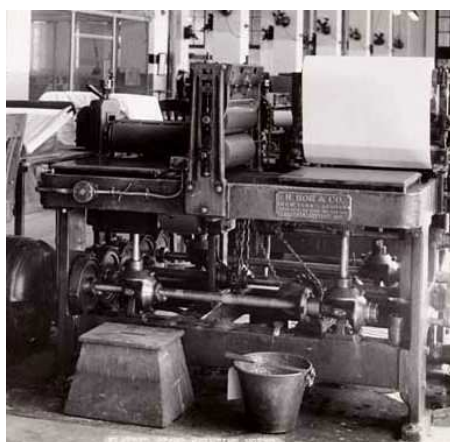


¹⁸ https://www.researchgate.net/figure/The-reflectance-curves-of-orange-acrylic-paint-black-acrylic-paint-and-mixtures-of-the_fig8_228851824.

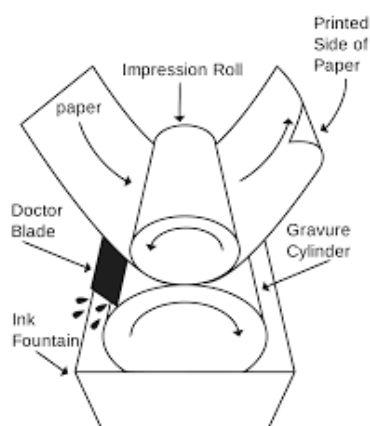
—❁❁— ENGRAVING —❁❁—

(Published in the Poway Stamp Club Newsletter September 13, 2023, pgs. 25-31)

The United States Bureau of Engraving and Printing utilized the Intaglio printing process for large-scale stamp production in the late 1800's. In this process, the lines to be printed are cut into a soft metal plate with a burin (*i.e.*, a handheld cutting tool) to produce a "die". The die is then pressed multiple times into a soft metal roller, called a "transfer roll" (*i.e.*, creating several positive images on the roll). These images are reproduced multiple times by mechanically rocking the transfer roll back and forth on a printing plate. The completed printing plate is then secured to a gravure cylinder for printing. During the printing process, ink is applied to the printing plate's surface filling the incised lines of the engravings. The plate is then scraped with a blade to remove excess ink. Paper is fed between the gravure cylinder and the impression roll, pressing the plate's ink-filled incisions onto the paper (Figure 36A-B).



A



B

Figure 36: A) Intaglio printing machine at the United States Bureau of Engraving and Printing¹⁹ and **B)** a diagrammatic representation of the Intaglio printing process showing the "Doctor Blade" that removes excess ink from the cylinder ("Gravure Cylinder", which contains the stamp printing plate) prior to pressing the ink-filled printing plate onto the paper²⁰.

So, what types of anomalies affect a stamp's engraved image? Some anomalies result during the impression process including paper creases, corner folds and objects falling between the printing plate and the paper during printing (Figure 37A-C). Other anomalies result from damage to the plate during use. These include breaking or cracking of the printing plate, impacts causing indentations in the printing plate that pick up additional ink, particulates that become stuck in the incisions of the plate eliminating ink from entering those areas before printing (Figures 38A-E) and general wearing of the printing plate often results from the ink scraping process (Figure 39A-C).

¹⁹ <https://www.bep.gov/currency/history/image-gallery/photographs#lightbox-5566>

²⁰ <https://www.lifewire.com/what-is-gravure-printing-1074611>

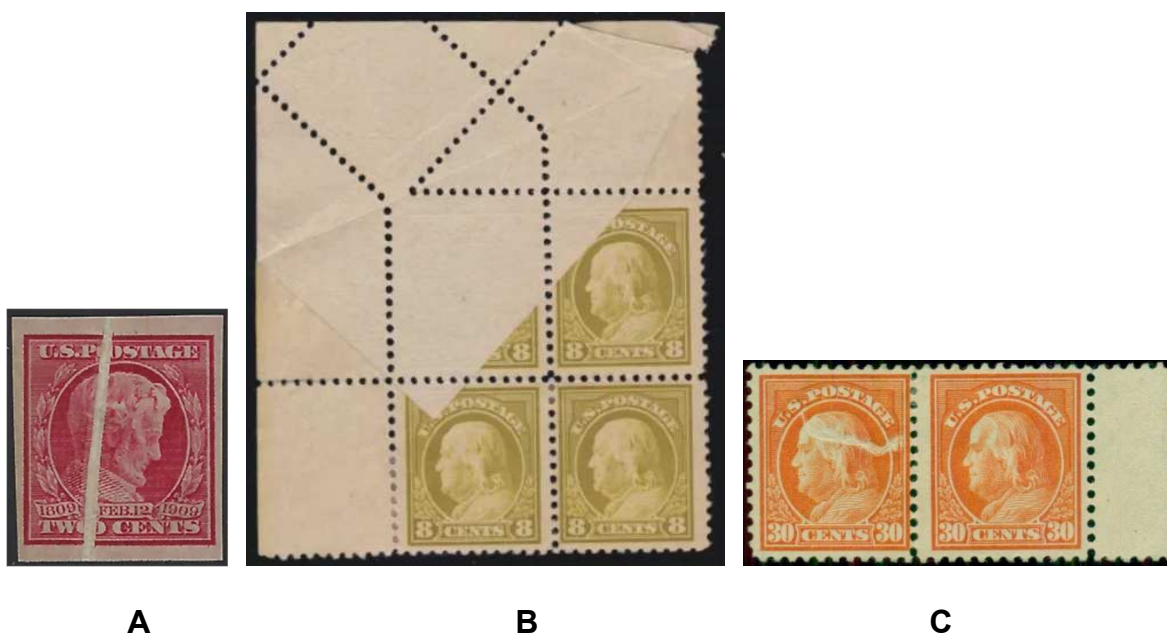


Figure 37: Printing anomalies; **A)** shows a crease in the paper Scott no. 368 (ebay no. 266259174074, swfl-stamps), **B)** shows where a corner of the paper is folded over Scott # 508 (ebay no. 401767416532, usstampshop), and **C)** Scott no. 516 shows what appears to be a string fiber that may have fallen into the printing press between the paper and the engraving plate during printing²¹.



B

²¹ <https://www.northstamp.com/RETAIL/US/USPICS/us516LH1.jpg>.

**C****D****E**

Figure 38: **A)** Scott no. 231 shows “broken frame” variety, D. Waller Collection, **B)** Scott no. 231c shows the “broken hat” variety, which may be due to something getting stuck in the engraved incision of Columbus’ hat, D. Waller Collection, **C)** Scott no. 616 shows a broken circle around the number “5” on the right side of the stamp, D. Waller Collection, **D)** Scott no. 230 shows an ink streak that may be due to a crack or indentation in the printing plate (ebay no. 133713612572, elpapy73998), and **E)** shows doctor blade cleaning flaw in Great Britain, 1911-1920 Edward VII SG 316 2/6²².

²² <https://www.stampboards.com/viewtopic.php?t=99653>.



A



B



C

Figure 39: Wearing of the printing plate for Scott no. 230; **A)** shows the edges of the letters and numbers are crisp and clear; the image color saturation is less than B or C, **B)** shows the edges of the letters and numbers beginning to become less clear; the color saturation is darker than the engraving in A, and **C)** shows the edges of the letters and numbers are distorted; the color saturation is much darker than A or B. Note, that because of the increased amount of ink being retained by the worn printing plate, the cleric, seen over the right shoulder of Columbus in the central image, looks to be sporting sunglasses. Deterioration of the engraved image produces stamps that were not intended, and therefore, should affect the grade of the stamp.

Some anomalies are classified as a “variety”. Varieties differ in certain details from properly printed stamps, have been identified as different, and sold with this designation. A specific variety known as “constant varieties” are stable and occur regularly at the same position on a sheet throughout one or more printings. In most cases, it is possible to determine the exact position of the variety on the sheet as well as the quantity printed. Constant varieties often result from plate flaws (*i.e.*, differences in impression originating from a defective, damaged, or worn printing plate), and because of this, are given a new catalog number. These designations usually consist of the number given the stamp from which the variety was generated followed by a lowercase letter (*e.g.*, the 2-cent Columbian Issue Scott no. 231 and its “broken hat” variety Scott no. 231c).

Another variety known as “coincidental varieties” are non-uniform and ephemeral appearing in countless shapes and forms. They occur at all stages of production and each case appears to be unique. Because of this, it is not possible to assess how many were produced or make a complete detailed listing. These varieties can occur from air bubbles on the printing plate causing un-inked areas on stamps, double impressions, over or under-inking, and smearing²³. Because coincidental varieties are inconsistent and occur infrequently, they do not rise to the level of constant varieties and are not assigned a specific catalog number.

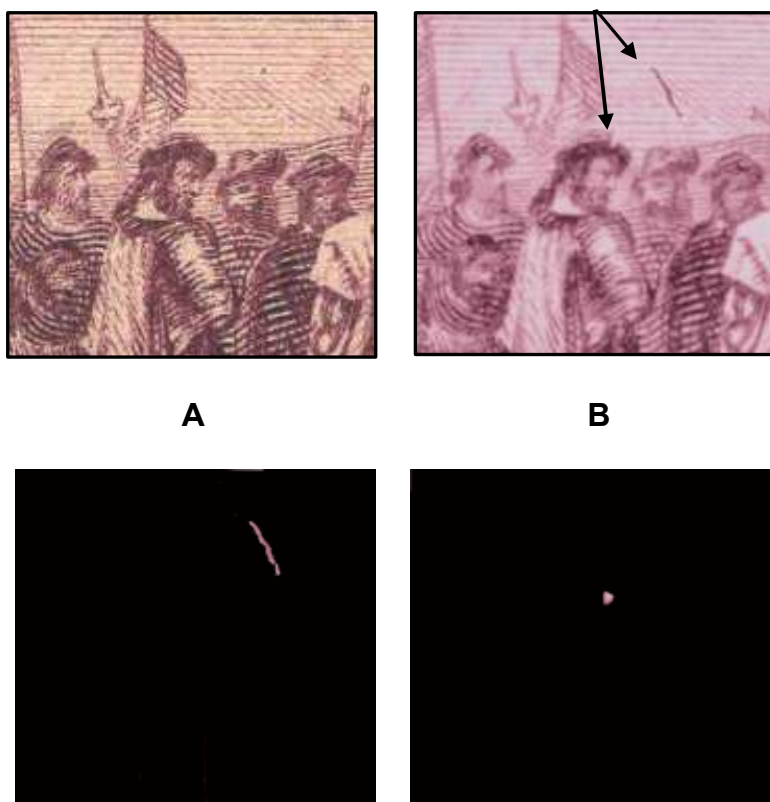
So how should “varieties” be graded? It is the author’s opinion that constant varieties be treated as intended and should not lower a stamp’s grade and coincidental varieties be treated as flaws that should lower a stamp’s grade. This decision is based on the fact that constant varieties are stable and occur regularly (*i.e.*, quantifiable) and coincidental varieties are non-uniform occurring in countless shapes and forms (*i.e.*, more difficult to quantify). A lower grade for coincidental varieties may or may not affect their value because they are often a one-of-a-kind anomaly and therefore rare. For example, Scott no. 231c in Figure 38B is a constant variety, while Scott no. 230 in Figure 38D is a coincidental variety.

So how can the quality of a stamp’s engraving be graded? One proposed method is to perform two image subtractions. The first removes the die proof engraving image from an image of the stamp being graded. The remaining image from this subtraction is often the result of damage to the printing plate, leaving indentations that collect ink adding to the engraved image during printing. The second removes the image of the stamp being graded from the die proof engraved image. The remaining image from this subtraction is the result of portions of the engraving that have been filled or clogged causing the ink to be removed from this area by the Doctor blade before the pressing process (Figure 40A-D).

²³ <https://worldstampsproject.org/catalog/#:~:text=Varieties%20are%20stamps%20that%20differ,to%20customers%20over%20m.>

Image subtraction can be performed quickly and efficiently with the assistance of a computer. However, this will require specific programming as well as creating a database of die-proof images of the stamps being graded. This process is still a work-in-progress.

The process, in general, would involve scanning an image of the stamp to be graded (*i.e.*, specimen stamp) into the computer. The computer adjusts the images so that the specimen stamp and die-proof of the stamp are the same size and orientation, and then performs the two subtraction functions by laying one image over the other. In the first subtraction, the computer removes the overlapping images common to the die proof on the specimen stamp. In the second subtraction, the computer removes the overlapping images common to the specimen stamp on the die proof. Each subtraction image is converted to a black field image where the background is black, and the areas left after subtraction are another color. A determination is then made as to the percentage of the remaining color in the black field for each subtraction, these two values are added together, multiplied by a random multiplier, and subtracted from 100 to give the final grade (Figure 40). Because engraved anomalies are relatively small compared to the remainder of the engraving, a random multiplier is utilized to adjust the combined percentage value to be commensurate with the grades obtained from the other categories. In this case, the random multiplier could be as high as 10 or more. For constant varieties, this same process is used but the anomalies that qualify the stamp as a variety are ignored.



C

D

Figure 40: **A)** shows a fictitious die proof, **B)** shows a fictitious stamp to be graded, **C)** shows the black field subtraction of die proof from stamp engraving leaving the scratch damage to the printing plate visible, and **D)** shows the black field subtraction of stamp engraving from die proof leaving the clogged engraved portion of Columbus' hat visible.

If this or a similar method is accepted, then the grading certificate should show the combined black field image and percentages used to obtain the final grade for the engraved image. This will avoid confusion and allow future experts to confirm previous calculations.



 METHOD AND EQUIPMENT

This exhibit was prepared on a Hewlett-Packard Spectre, Intel i5 evo laptop computer, photos were taken with a Samsung S22 cell phone (SMS901), measurements were performed with a Measy 2000 (Typ 5921, range: 0.1mm-150 mm) dial caliper, image processing was performed using GIMP 2.10, GNU Image Manipulation Program, and reflectance spectrographs may be obtained using a Qualtech Products Industry QPI-IRRM2800 spectrometer.



 CONCLUSION

Certifications have become important documentation for verifying a stamp's condition and relative value. Having a stamp certified is balanced against the anticipated grade as it affects the overall value of the stamp. Until now most philatelic grading confirmed whether a stamp was genuine and whether it was previously hinged. Establishing a new system that assigns a numerical grade based on multiple criteria in an objective manner will stabilize philatelic grading and provide certifications that can be relied upon to accurately value stamps.

The author began working on developing objective grading methods over 14 years ago. Since that time, grading has advanced and is now using a numerical system, but these assignments are often based on subjective determinations. Further, the certificates do not provide the data used in assigning those grades, thereby subjecting these determinations to scrutiny when considering a stamp's value.

The methods presented here have been established for six critical grading categories: 1) centering; 2) registration; 3) gum; 4) perforations; 5) color; and 6) engraving. Each of these methods provides physical data that may be incorporated into a comprehensive certification, and which can withstand future scrutiny. Three prototype philatelic certifications are presented that contain the data collected from these objective methodologies in three different formats. While some may be concerned about the finality of such grading and as such prefer a more subjective approach, these or similar methodologies will eventually be the gold standard for advanced philatelic collections in the future.

It is hoped that the information provided here will be used to develop a more reliable and uniform system for assessing the condition and therefore value of stamps. The author recognizes that these proposed objective methodologies may not be those selected for the future of philatelic grading but hopes that they will provide a foundation upon which a more consistent objective grading system may be developed.



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GRADING CERTIFICATES



EXAMPLE I



Scott #287 from the D. Waller Collection

Certificate Number: 000100

Scott Catalogue No.:
287

4-Cent Indian Hunting Buffalo
1898 Trans-Mississippi Series

Grade 98

Analysis:

Centering 98
Grade

Comments

Generally even centering. top margin slopes slightly downward on right.

Left: 6.5 upper and 6.5 lower

Right: 6.5 upper and 6.5 lower

Top: 6.5 left and 6.5 right

Bottom: 7.0 left and 7.0 right

(Units are arbitrary and are based on measurements of the photo above. Also see four corner display below)

Perforations 95
Grade

Comments

Perforation are in generally good condition.

C: short perforations

D: short perforation

E: short perforation

Left: No issues

Right: Perforations 6 from top is shorter than others

Top: Perforation 11 from left shorter than others

Bottom: Perforation 8 and 9 from left are short.

Engraving 98
Grade

Comments

Engraving is good with a few notable imperfections.

A: Outer border missing portions of its impression, some locations on the left are cited.

B: Transfer of ink incomplete in this region.

Registration N/A
Grade

Comments

Single color engraving. Not Applicable

Gum 100
Grade

Comments

Unremarkable

Color 100
Grade

Comments

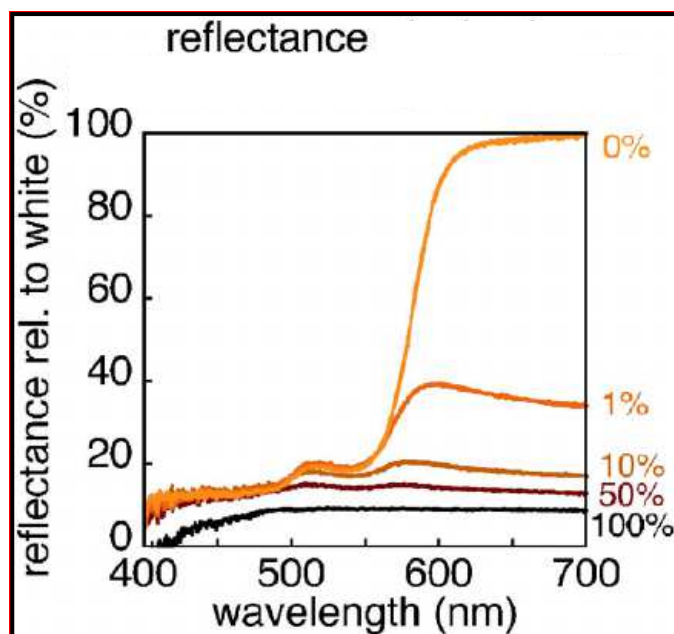
The color used for this issue was orange. The spectral analysis shows no oxidation, see spectrum below.

October 15, 2024
by
David B. Waller

Corners Display



Spectral Analysis



The red line is reflectance, relative to white, from the surface of the stamp in the image above.

EXAMPLE II

Scott # 749 from the D. Waller collection.

Certificate Number: 000101

**Scott Catalogue No.:
749**

10-Cent Smoky Mountains
1934 National Park Series

Grade 95

Analysis:

Centering 98
Grade

Comments

Generally even centering. Bottom margin
Slightly larger than the other three margins

Left: 6.5 upper and 6.5 lower
Right: 6.5 upper and 6.5 lower
Top: 6.5 left and 6.5 right
Bottom: 7.0 left and 7.0 right

(Units are arbitrary and are based on measurements of the photo
above. Also see four corner display below)

Engraving 95
Grade

Comments

Engraving is generally good with a few
Notable imperfections.

A: Outer border missing portions of
its impression, some locations on the left
are cited.

C: Pimple to the left and about the middle
of the number "1". Missing ink.

E: Possible smudge on outer frame
border above and between "Y" and "M".

F: The interior border on the right
side and upper left corner, not shown.

Gum 100
Grade

Comments

Unremarkable

Perforations 90
Grade

Comments

Perforation are in generally good
condition on top, bottom and right sides.
Left side possibly altered.

B: short perforation

D: short perforation

Left: Ragged possibly teased

Right: Perforations 4 and 5 from top
ragged

Top: Perforation 6 from left shorter
than others

Bottom: Perforation 3 from left is short

Registration N/A
Grade

Comments

Single color engraving. Not Applicable

Color _____

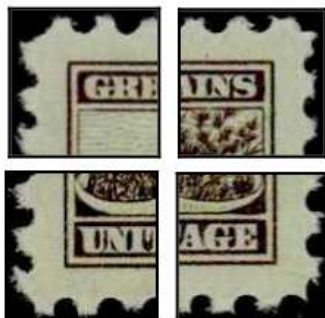
Comments

The color used for this issue was gray.

October 15, 2024

by
David B. Waller

Corners Display



EXAMPLE III

Scott #121 ebay item no.: 204296338481 Oceanview Stamp Company.

Certificate Number: 000101

**Scott Catalogue No.:
121**

**30-Cent Shield, Eagle and Flags
1869 Pictorial Issue**

Grade 70

Analysis:

Centering 61
Grade

Comments

Generally good centering for this issue.
Left margin considerably larger than the
other three margins. Measurements taken
in image below.

Left: 4.5 upper and 4.5 lower
Right: 1.0 upper and 1.0 lower
Top: 3.0 left and 3.0 right
Bottom: 2.4 left and 2.4 right

(Units are arbitrary and are based on measurements of the photo
above. Also see four corner display below)

Engraving 80
Grade

Comments

Engraving is generally good with a few
imperfections noted below.
B, G: Possible dirt smudge.
C, E: Stains

Gum 63
Grade

Comments

Light hinge, partial disturbed gum.

Perforations 83
Grade

Comments

Perforation are in generally good
condition on top, and bottom. Left and
right between green and blue reference.
lines sides have the issues noted below
A: four short perforations
D, F: short perforation and missing
perforation

Left: 4 short perforations, see A
Right: Perforations 3 and 4 from
bottom ragged
Top: Perforation 4 from left short and
perforation five from left missing

Bottom: Perforations clean

Registration 65
Grade

Comments

the vignette is shifted slightly down and
to the left.

Color N/A
Grade

Comments

Ultramarine and carmine.

October 15, 2024
by
David B. Waller

