

# Shade Verifications Using Tonal Histogram Analyses

by

Tim Lyerla

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1. The purpose of this work is to find objective methods to verify or determine the shade of given stamp based on its catalog description.
2. The study presented here looks at two stamps from the German Offices in Turkey cataloged as shade variants under ultraviolet light: Michel Germany Specialized numbers 34a and 34b, considered “dark vermillion” and “red orange”, respectively. Both have the same shade under visible light: “black (brown) violet”
3. Methods for taking UV photographs and deriving tonal histograms from selected areas of stamps using Adobe Photoshop software are reviewed briefly.
4. The results of an investigation of some 18 stamps gave a definitive tonal histogram for the 34b, red orange in UV shade variety, but not for the 34a so-called “dark vermillion” variety, leaving doubt as to its descriptor. It may be simply non-reactive to UV.
5. Tonal histograms allow for ease of analysis and greater confidence of identifying shades of stamps than comparisons with known varieties alone can provide, and with a little practice, can be an effective tool for any serious collector.

## The Stamp Analyzed in This Investigation



3 Mark large format stamp from the Germany Offices in Turkey, Michel Deutschland-Spezial-Katalog 2014 number 34b, black (brown) violet (left) in visible light and red orange in UV shades (right).

The vignette shows the unveiling of the monument of Kaiser Wilhelm I in Berlin, 1897.

(Note the blue cast seen in the stamp photographed under UV light despite the use of a UV filter. The filter mitigates but does not eliminate the consequence of using a high energy blue light for taking photographs.)

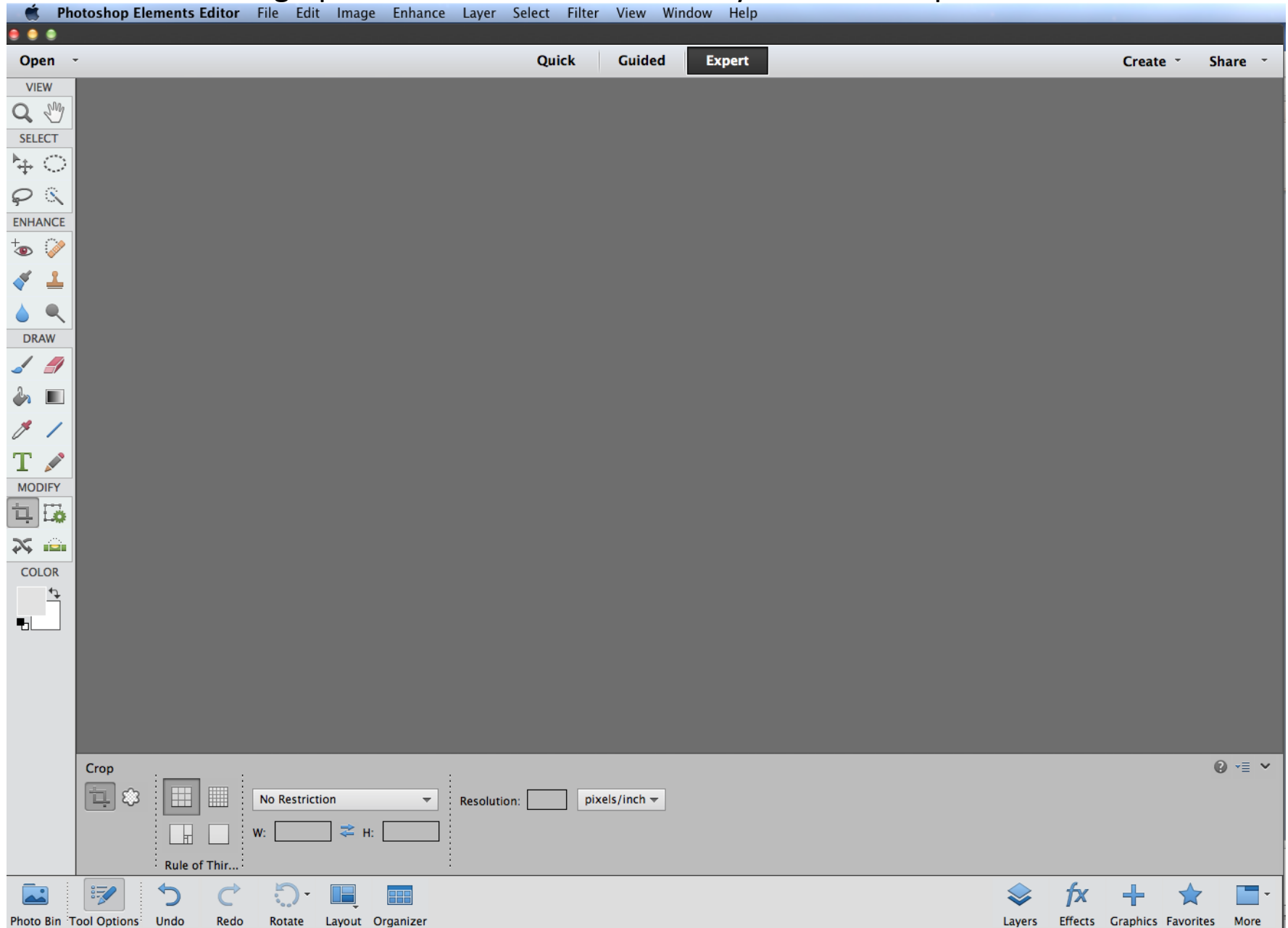
## Photography Equipment for Taking Photographs Using Ultraviolet Light Sources



The camera, a Lumix DMC G5, is equipped with a 100mm close-up lens, UV filter and remote shutter release, and on a tripod that allows for its removal and replacement without changing focus. The camera is set in Aperture mode (automatic exposure time and ISO), 10000 K color temperature with an f11 aperture. A single item is placed between two 40 watt UV lamps (365nm) against a black background for consistent illumination. All photographs are taken in a completely darkened room.

# A Blank Screen in Adobe Photoshop.

## A Photograph is Placed into the Screen by Use of the Open Command.



# A Stamp of Interest Opened in the Photoshop Page at 19.3% Actual Size

The screenshot displays the Adobe Photoshop interface with a postage stamp from the German Empire. The stamp is a 15 Piaster (3 Mark) issue, dated 1797-1897, featuring a central illustration of a public square with a monument and a crowd. The Photoshop window title bar shows the file name "P1050277.JPG @ 19,3% (RGB/8) \*". The top menu bar includes "Open", "Quick", "Guided", "Expert", "Create", and "Share". The left toolbar is visible with categories: VIEW, SELECT, ENHANCE, DRAW, MODIFY, and COLOR. The bottom status bar shows a zoom of 19.27% and document size of 29.5M/29.5M. The Crop tool is active, showing a "No Restriction" dropdown, a resolution of "pixels/inch", and input fields for width (W) and height (H). The stamp itself is printed in brown ink on a light-colored paper with a perforated edge. The text "15 Piaster" is prominently displayed in the center, and "DEUTSCHES REICH" is at the bottom. The numbers "1797" and "1897" are at the top, and "3 MARK" is at the bottom corners.



# The Stamp Magnified to 50% Actual Size for Analysis

The image shows a screenshot of a photo editing application interface. At the top, there are menu options: "Open", "Quick", "Guided", "Expert", "Create", and "Share". The main window displays a postage stamp magnified to 50% of its actual size. The stamp features a decorative archway at the top with the date "1797" on the left and "1897" on the right, and "22. MARZ" in the center. Below the archway, the word "Piaster" is written in large, ornate, red Gothic script. The background of the stamp is a detailed illustration of a cityscape with various buildings, a flagpole, and figures. The application's toolbar on the left includes sections for "VIEW", "SELECT", "ENHANCE", "DRAW", "MODIFY", and "COLOR". At the bottom, there is a "Zoom" panel with a slider set to 50%, a "1:1" button, and other options like "Fit Screen", "Fill Screen", and "Print Size".

Open Quick Guided Expert Create Share

VIEW x P1050277.JPG @ 50% (RGB/8) \*

1797 22. MARZ 1897

Piaster

50% Doc: 29,5M/29,5M

Zoom

Zoom: 50%

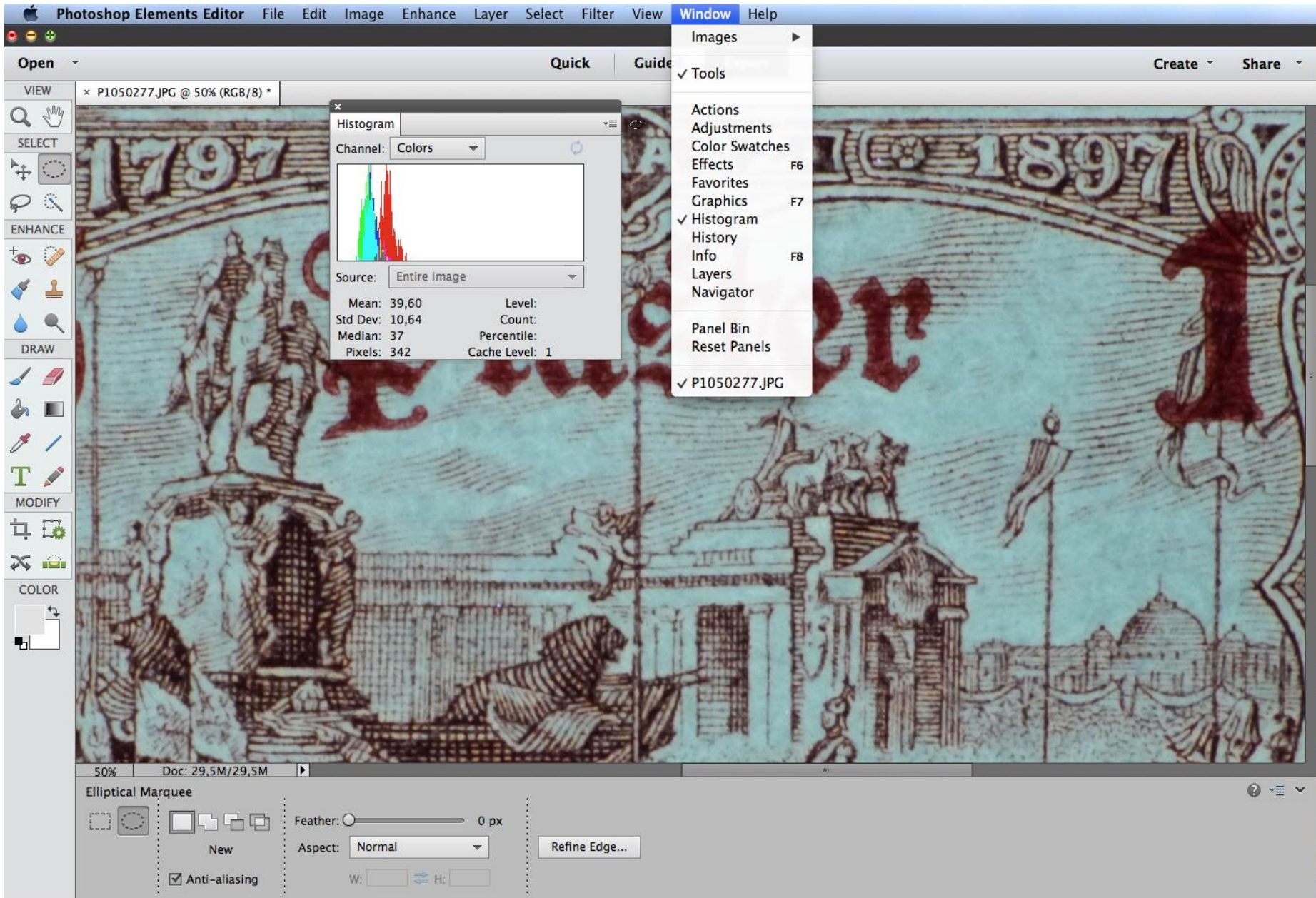
Resize Windows To Fit

Zoom All Windows

1:1 Fit Screen Fill Screen Print Size

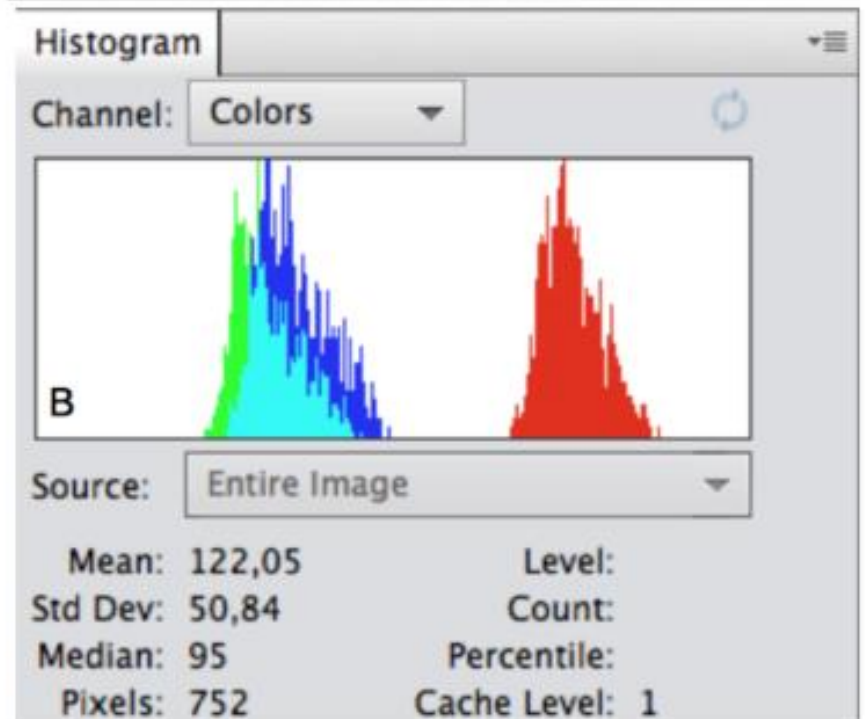
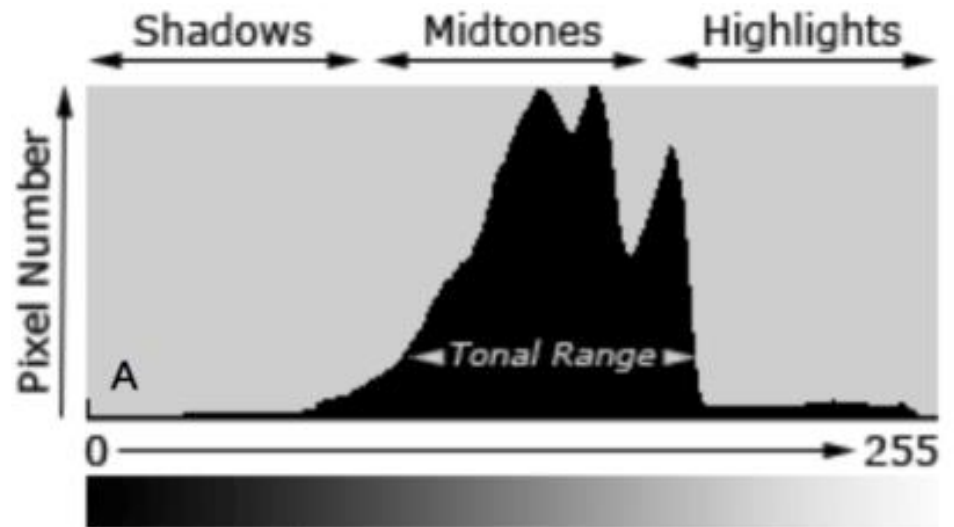


# A Sample of the Shade of Interest is Made with the Selection Tool and the Tonal Histogram Seen as an Item from the Window Option



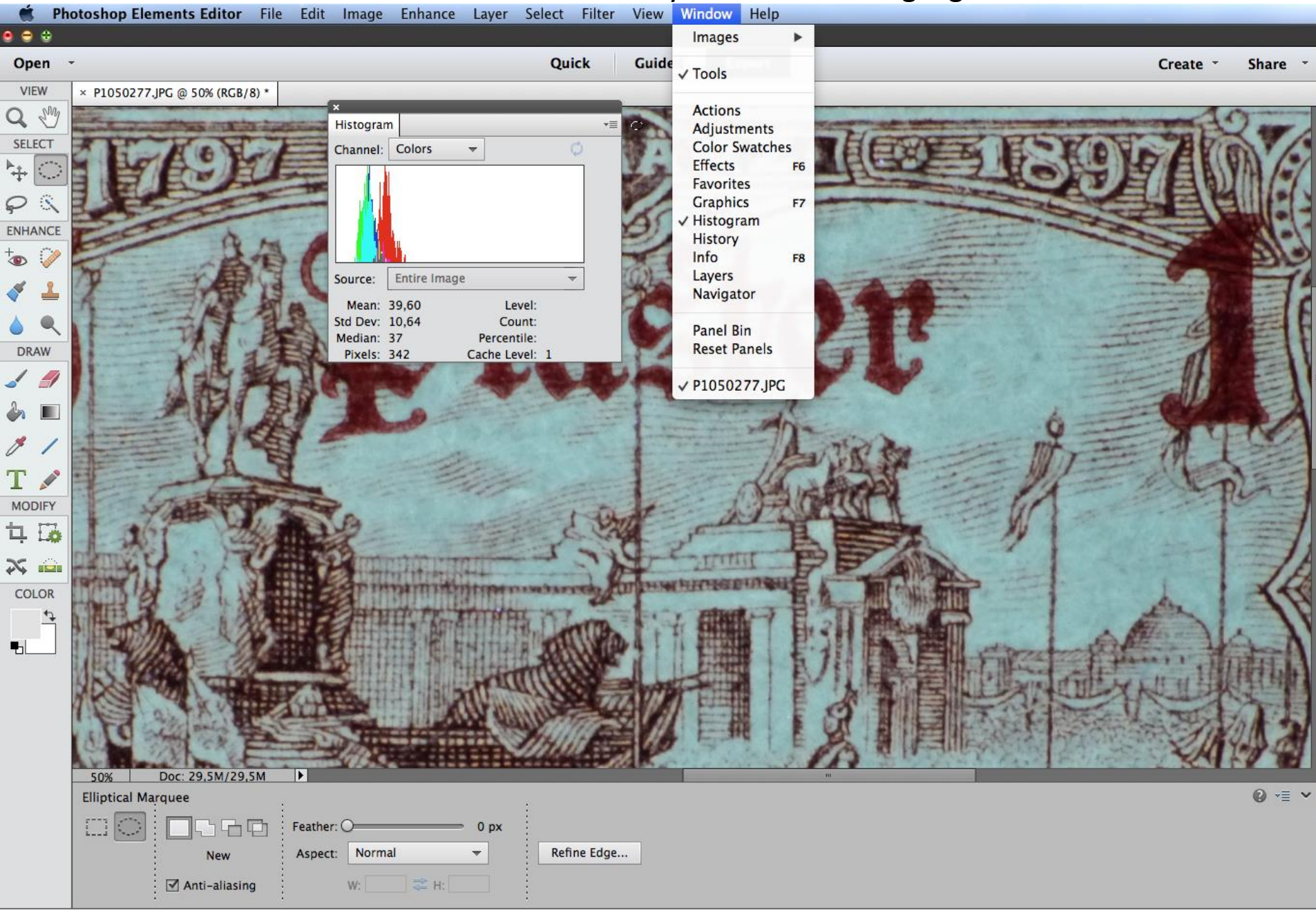
Tonal histograms for 8-bit digital photographs are made of 256 bins (2<sup>8</sup> bits). They are arranged as on an x-y graph with “luminance” bits along the x-axis (from 0 on the left with no color pixels [black] to 255 on the right with all color pixels [white]) and pixel number for each unit along the y-axis.

The Colors channel of tonal histograms for shade analysis is chosen to display the RGB channels in their respective colors. The “Entire image” in this case was the area chosen with the selection tool.





# Another Look at the Area Chosen With the Use of the Selection Tool. The Square Selection Tool is Used Mostly for the Following Figure



An Array of Tonal Histograms Selected from Various Regions of the Same Stamp.  
The Upper Left and Lower Right Histograms Are Considered Most Representative of the  
Shade for Red Orange in UV.

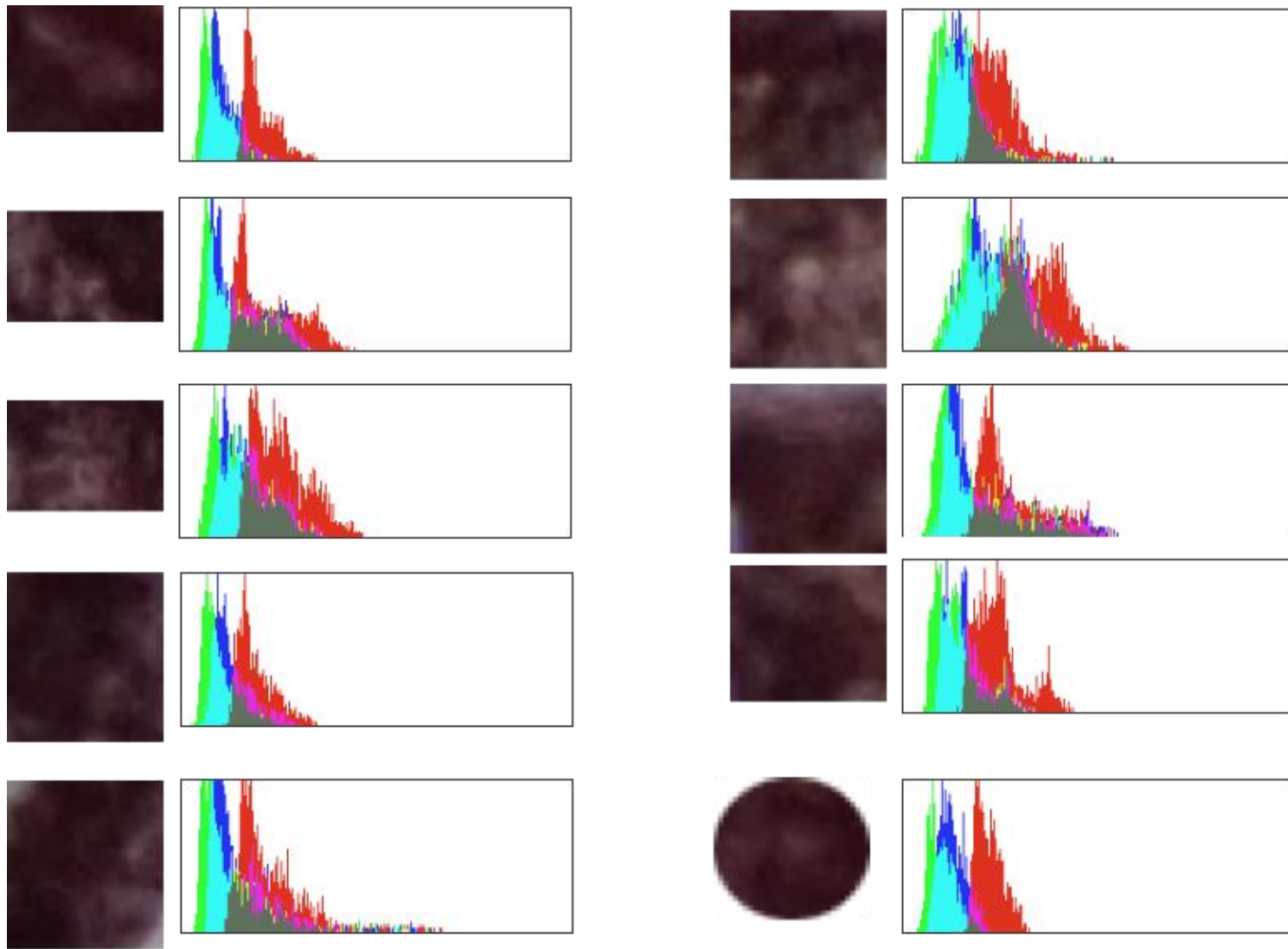


Fig. 8. Tonal histogram patterns from various regions selected in the stamp shown in Fig. 5.



# Four Stamps Exhibiting the Red Orange Shade Tonal Histogram



Fig. 9. 34b Red orange in UV



# Four Stamps Exhibiting the Red Orange Shade Tonal Histogram



Fig. 10. 34b Red orange in UV



# Four Stamps Exhibiting the Red Orange Shade Tonal Histogram



34b Red orange in UV



# Three Stamps Exhibiting the Red Orange Shade Tonal Histogram (A Total of 15 Stamps Considered Red Orange by Their Tonal Histograms)

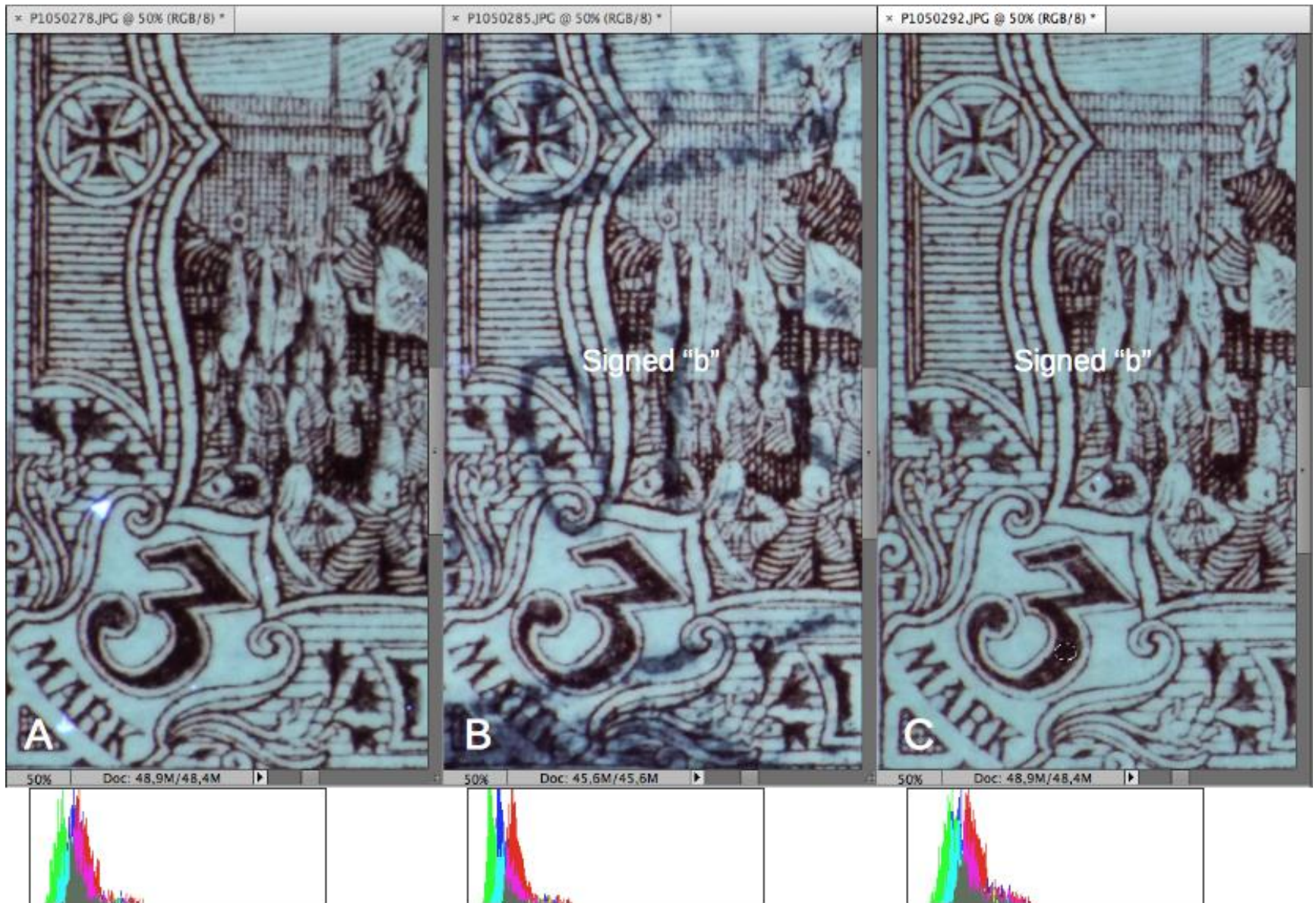


Fig. 12. 34b Red orange in UV



Three Stamps of Michel Offices in Turkey Catalog Number NOT Exhibiting the Red Orange Shade in  
UV Tonal Histograms.

Total Michel Number 34 Stamps Analyzed—18.

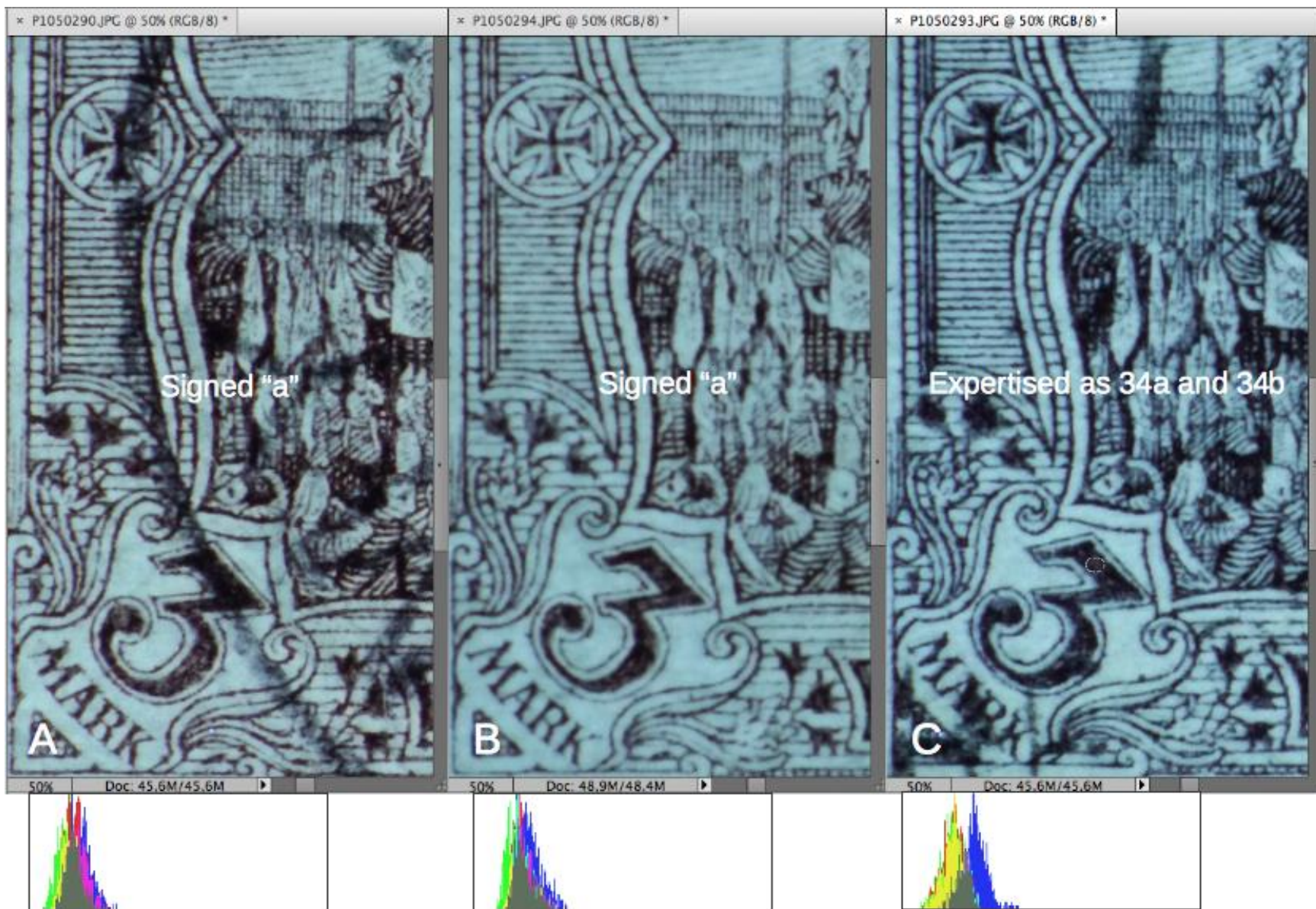


Fig. 13. 34a Dark vermilion in UV



The Last Issue of the Stamp for Offices in Turkey—Watermarked and Listed Only as Red Orange in UV and Non-Reactive in UV.

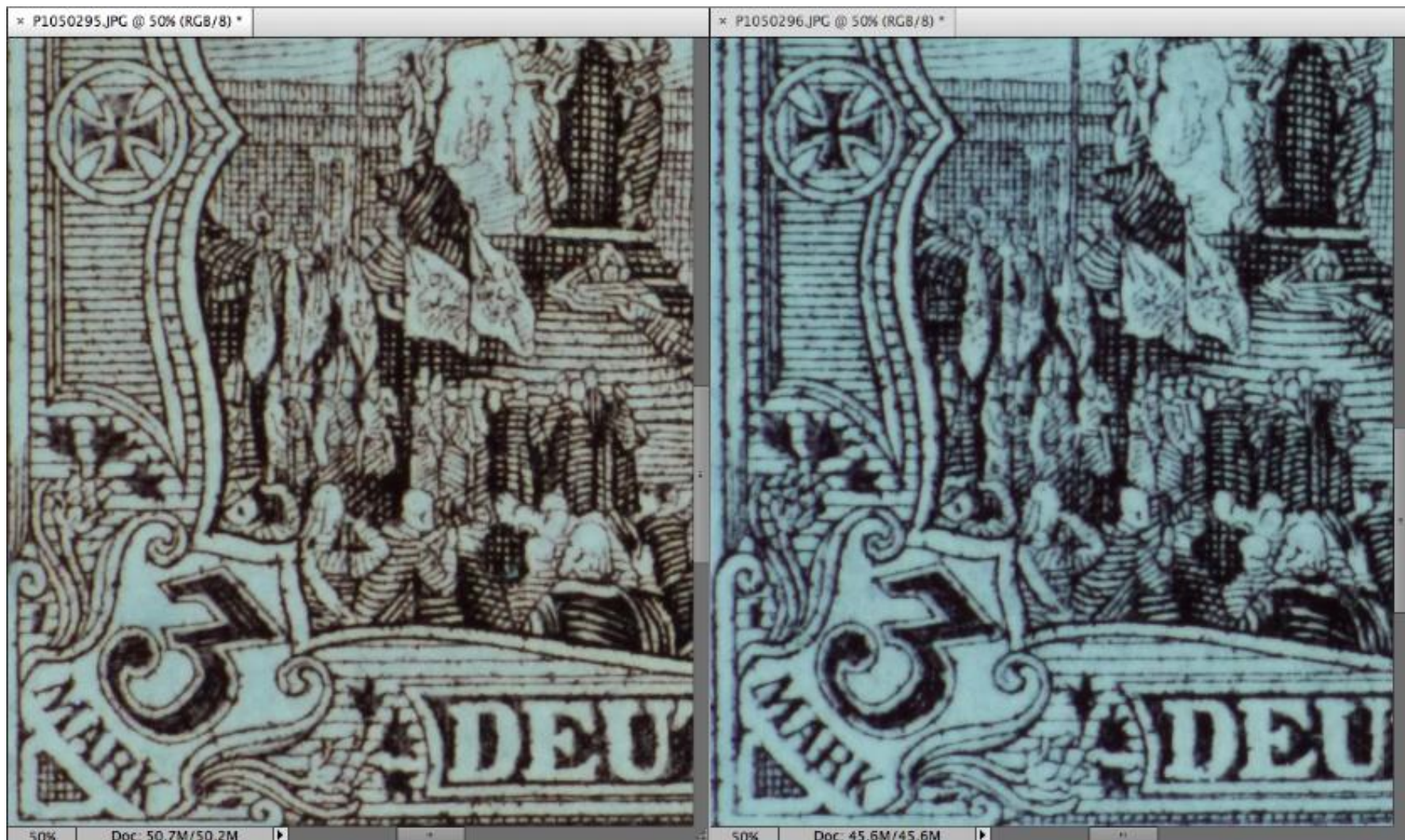


Fig. 14A. 46a Red orange in UV

Fig. 14B. 46b Non-reactive in UV



Some Examples of This Stamp Issued for Use in the Empire.  
Note There Were None Considered in Michel Catalog as Dark Vermillion in UV.

### EMPIRE ISSUE

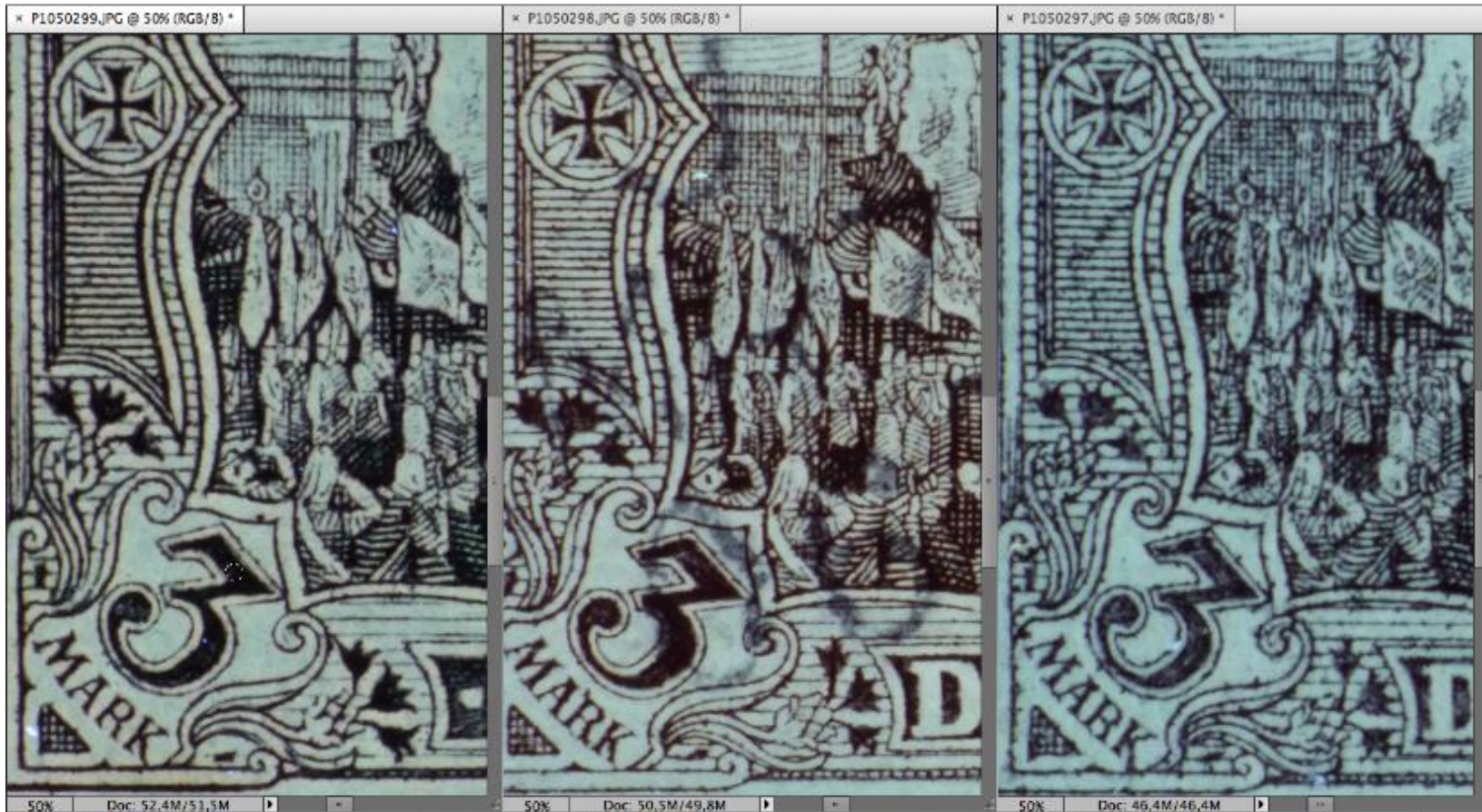


Fig.15A. 66I Non-reactive in UV



Fig. 15B. 96Aa Red orange in UV

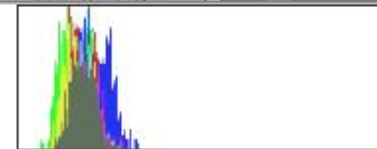


Fig. 15C. 96BII Non-reactive in UV



# A Summary Look at the Stamps in This Investigation That Did NOT Exhibit the Red Orange in UV Tonal Histogram

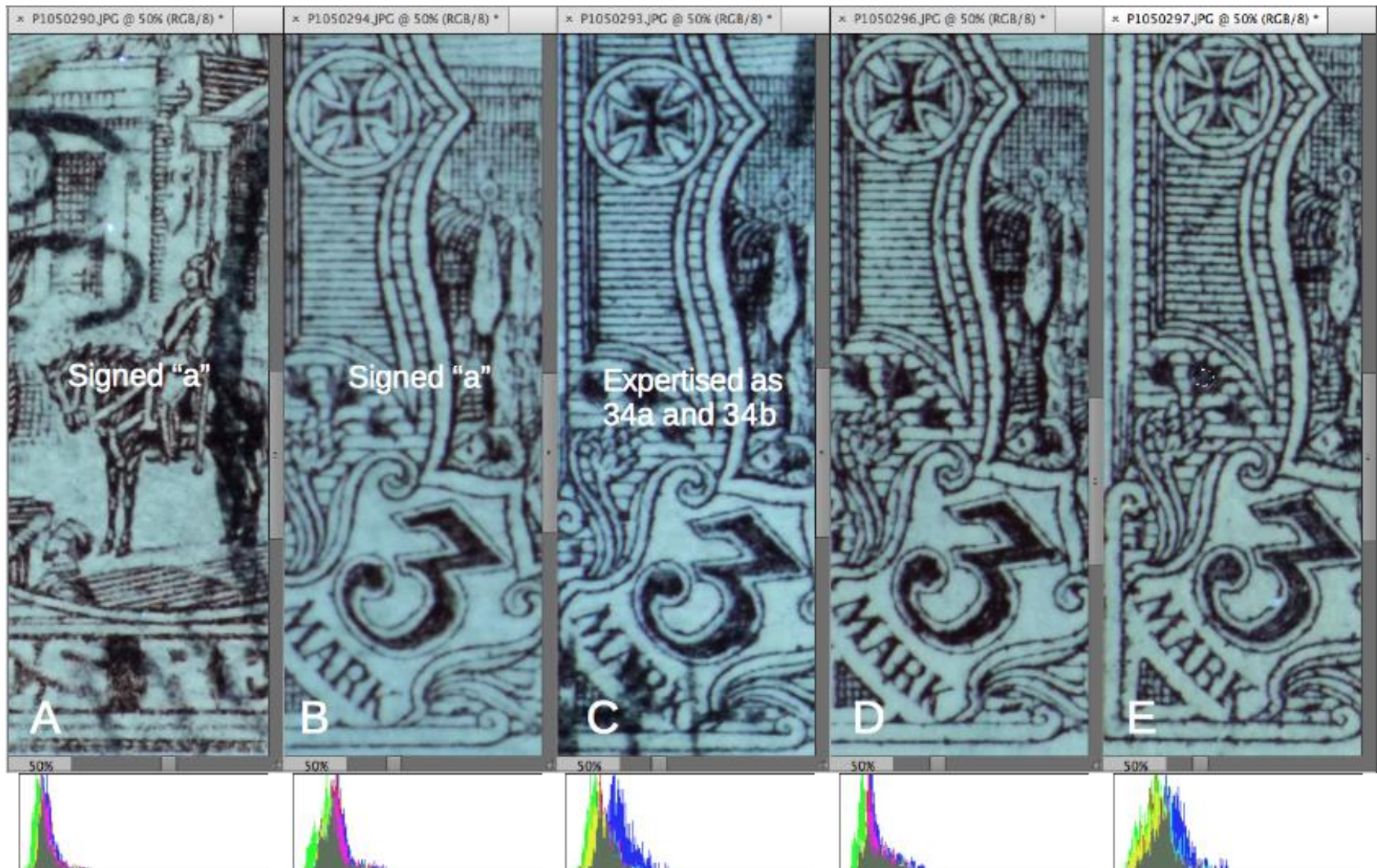


Fig. 16. A-C: 34a-Dark vermilion in UV

Fig. 16. D & E: 46b and 96BII-Non-reactive in UV

# CONCLUSIONS

1. There is a single, typical tonal histogram that can be used to verify the red orange shade in UV of the Michel Germany Specialized catalog number 34b from the Offices in Turkey. This, in spite of variation in the appearance of this shade under casual examination.
2. Any Offices in Turkey Michel catalog number 34 exhibiting this tonal histogram then, and identified as 34a, or “dark vermillion” shade in UV, would be in error.
3. The error rate found in this study was about 13% (2 out of 15). In addition, one stamp in the study was expertized as 34a by one expert, and 34b by another, indicating the difficulty in identifying either shade in the apparent absence of tonal histogram analyses.
4. No “signature” tonal histogram was found for the so-called “dark vermillion” shade. The tonal histograms for the Michel catalog number 34 items not exhibiting the red orange type were much the same as those seen for stamps of this issue (celebrating the unveiling of the monument for Kaiser Wilhelm I in Berlin) listed as not having a particular shade in UV—considered as non-reactive in UV.
5. For this reason, and because the Offices in Turkey Michel number 34a listing as “dark vermillion” in UV is unique to this issue, there is doubt that this unique identification is valid.
6. Nevertheless, the rarity of the not-red-orange-in-UV stamps of this issue seen in this study, about 17% (3 out of 18), is somewhat in keeping with its greater catalog value—approximately nine-fold for all modes (MNH, M, U) and essentially unknown on cover—providing some independent evidence for the validity of the method used to distinguish the red orange shade under UV from its negative counterpart.