

THE WORLD'S MOST FORENSICALLY TESTED PHILATELIC GEM: "THE ICONIC VICTOR HUGO PLATE 77 COVER"

ABED H. NAJJAR



Introduction

With only eight examples known to still exist, the Great Britain 1858-79 1d rose-red showing a plate number 77 must be one of the world's greatest philatelic rarities. A cover addressed in the hand of the famous author Victor Hugo franked with three newly discovered used examples of this stamp can only be regarded as a "World-Class Philatelic Gem" (Figure 1).

The Victor Hugo cover which was mailed from Guernsey to Brussels on Monday 27th November 1865 was franked at the correct 3d rate for mail from the United Kingdom to Belgium by using 3x 1d values from the 1858-79 issue. The cover was carried by Steam Ship 'Brittany' under its Captain Goodridge which sailed from Guernsey to Southampton. It was then carried by rail to London, then by rail to Dover and then by steam ship to Ostend. The cover made its final destination to Brussels by train. It carries all the correct transit and arrival markings.



Figure 1 & 1a. The Victor Hugo cover franked with three examples of the 1858-79 1d with a plate number 77 all cancelled with the Guernsey 324 duplex dated Nov 27 1865. The cover carries a 'PD' mark in red the Ostend-Brussels TPO transit d.s. and the Brussels arrival c.d.s. The famous French author Victor Hugo lived in Guernsey between 1855 and 1870. Inset is stamp SK from the cover clearly showing the plate number '77' on either side of the stamp.

The cover, which remained undiscovered until recently, lied dormant on an annotated page which formed a part of a major Channel Islands postal history collection that originated from Brussels, the city to which it was sent some 150 years ago. The Belgian postal historian who formed the collection, like many other postal historians, clearly focused his attention in this case only on the route and the various postal markings on the cover and not on the stamps themselves.

The Victor Hugo cover is the most forensically tested philatelic item known. Scientific examinations by internationally recognised bodies using 21st century state of the art analytical equipment unprecedented in philatelic history have unequivocally demonstrated that the stamps are completely genuine.

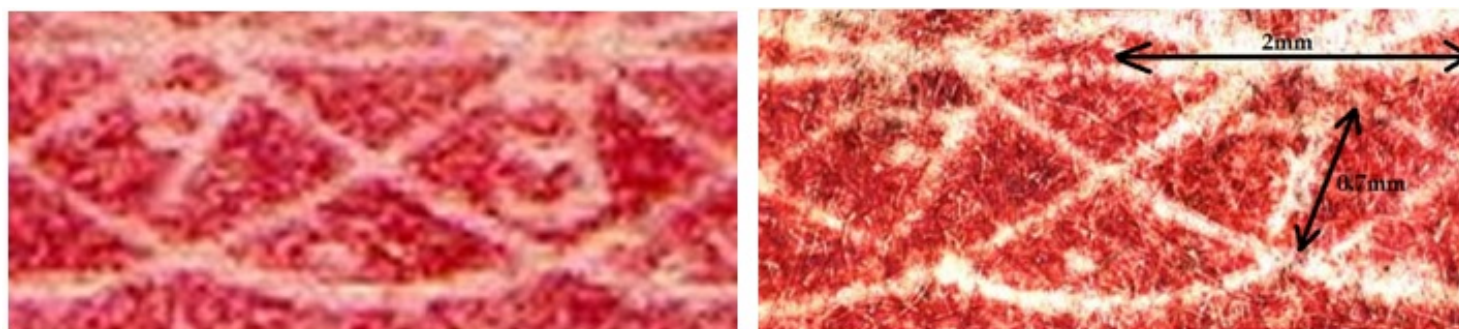


Figure 2: Left is an image of the figure 73 from a plate 73 stamp and the figure 77 from stamp SK on the Victor Hugo cover (right). Note the clearly undisturbed paper fibres in the right-hand '7' which run in and out of the diamond.

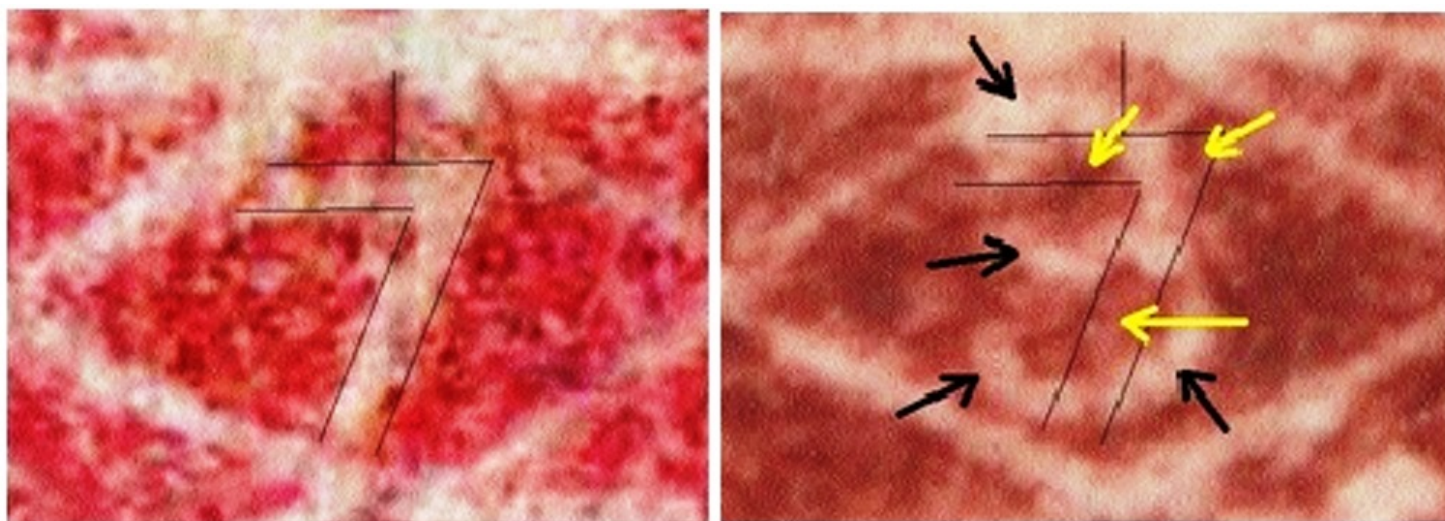


Figure 3: Image of the figure '3' from a plate '73' stamp and the figure '7' from stamp SK on the cover. A black outline has been drawn around the '7' and superimposed in the same location in the figure '3' diamond in order to show what areas need alteration and painting. It is clearly evident that the whole area needs to be completely altered in color with some red areas needing to become 'colorless' indicated by the yellow arrows and others 'red' indicated by the black arrows.

The major task that lay ahead

Plating marks on the three stamps show that they are identical with their counterparts on plate 73. In view of the fact that the stamps have undoubtedly originated from plate 73 the major question of whether the five visible right hand '7's of the figure '77' on the three stamps are original '7's or '7's that have been fraudulently produced from an existing figure '3' had to be fully addressed.

It is worthwhile mentioning that the alleged alteration would have to have been carried out five times on the five visible 7s on three stamps, on most of which the cancel falls over the second '7'. This faking would need to have been done on an area that does not exceed 2 mm in width, with the down stroke of the number 7 measuring 0.6-0.8 mm.

This is a very small area indeed for such complicated faking work to be carried out and any complex faking of this nature would undoubtedly be detected by even the most basic of examinations. A simple look at the images below will clearly show how practically impossible a successful faking task is. (Figure 2a-b & 3)

There is no doubt that in this case we are not looking at authenticating a cancel, postmark, overprint, surcharge, colour or perforations. What we are trying to authenticate is whether the right-hand number '7' has been fraudulently altered and whether the paper fibres have been disturbed and an offending pigment applied. Such an authentication is not one that is exclusive to philatelic experts. Forensic scientists with experience in the field of paper tampering are far better equipped at providing a definitive opinion on this matter. This is because fully substantiated opinions from such experts specialising in this field can be relied on and can be fully defended in a Court of Law.

Subjective philatelic expert opinion as to whether the stamps are genuine or have been faked, while useful, cannot always be relied on to be correct. It is an accepted and a widely known fact that two different expert bodies can give two completely different opinions on the same item, and it is to eliminate this very reason that the scientific route was taken in this case in order to authenticate the item. In the case of the Victor Hugo cover a vast barrage of definitive scientific work was carried out on these stamps by internationally recognised scientific experts.

Modification Type	Analytical Method						
	Microscopy		Near-Visible Light		Spectroscopy		Profilometry (Digital microscopy)
	Optical	Scanning Electron	Ultraviolet	Infrared	EDXRF	Raman	
Inlaying	✓	✓	✓		✓		✓
Scraping	✓	✓					✓
Powder Blasting or Laser Obliteration	✓	✓					✓
Chemical Erasure			✓	✓	✓	✓	✓
Retouching small areas	✓	✓	✓	✓	✓	✓	✓
Retouching the entire 'diamond'	✓	✓			✓	✓	✓

Figure 4: Table summarizing the various possible methods by which the stamps could have been altered and the various scientific examinations that were used in order to determine their validity.

Y Souren, in *Philately of Tomorrow*, New York, Philatelic Research Laboratories, Inc. 1939 made this astounding prophetic statement over seventy years ago:

It is safe to say that the time is not far distant when no philatelist, whether collector or dealer, will purchase or sell an important stamp unless it has been subjected to scientific examination. The documentary proof that accompanies such examination is a positive guarantee for the stamp and is something that stays with the stamp irrespective of the number of times it may change hands.

Scientific proof eliminates the personal element from expert opinion. It either proves or disproves a contention based on experience alone. It has been proven repeatedly that opinion based on word of mouth is not sufficient to establish proof.

In order to establish that the stamps have not been tampered with, the Victor Hugo cover and the three 'plate 77' stamps were subjected to a wide variety of scientific examinations by renowned organizations which, between them used a wide range of state-of-the-art scientific equipment. No other philatelic item has been subjected to such in-depth scientific examinations in order to prove that the stamps have not been tampered with.

The services of two independent forensic scientists, Mr. Robert Radley, who specialises in the field of

document tampering, and Professor Allan Jamieson of The Forensic Institute were also employed. Both Mr. Robert Radley and Professor Jamieson are 'Expert Witnesses' who have given evidence in cases worldwide.

Not one scientific examination or scientific report has found any element of doubt as to the status of the stamps. Every scientific test and report confirmed that the stamps are completely untampered with.

The following possible methods of alteration were investigated (Figure 4):

Removing stamp design elements

- Inlaying (i.e. cut and paste)
- Scraping
- Powder blasting or laser obliteration
- Chemical erasure- partial or complete

Adding stamp design elements

- Retouching small areas
- Retouching the whole "diamond"

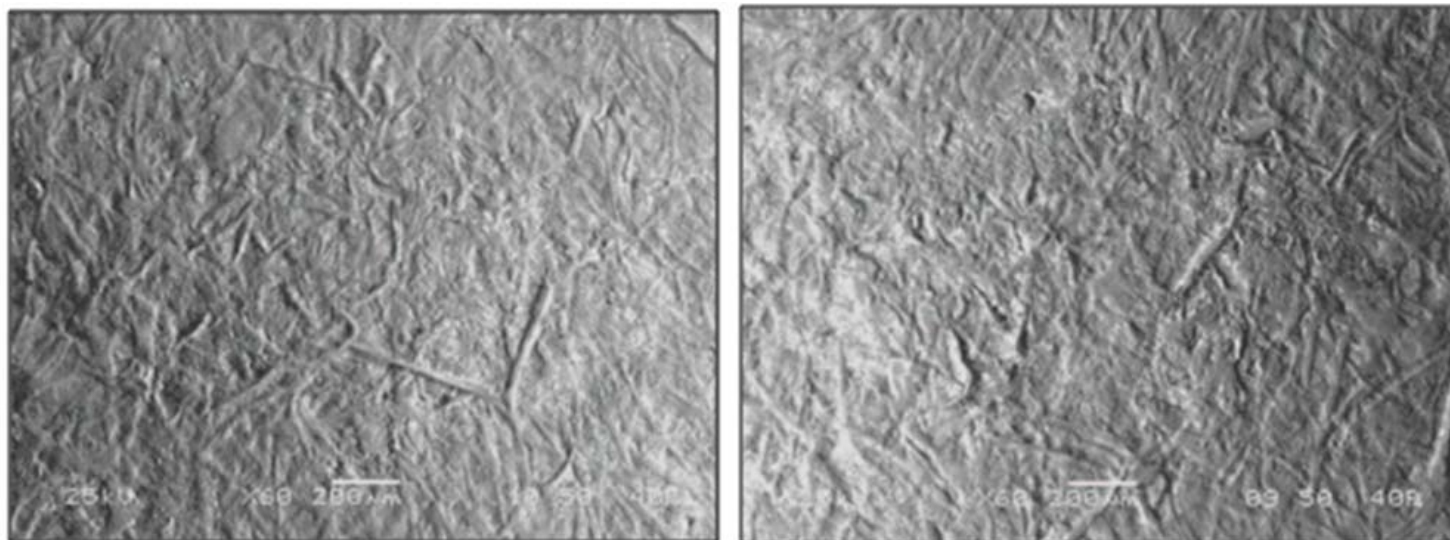


Figure 5: SEM images of the paper fibers of stamp RL from the Victor Hugo cover in the vicinity of the 7s.

The scientific methods used to establish non-tampering

Scanning electron microscopy

– Surface analysis of the paper fibers

Scanning electron microscopy (SEM) is a form of microscopy that allows for the large magnification of an area providing an almost three dimensional image, making the analysis of an image a much easier task. SEM uses an electron beam to trace over the surface of an object, dislodging electrons from the surface which are in turn attracted by a secondary electron detector. This produces an image by registering different levels of brightness on a monitor. SEM provided by the Reading Scientific Services Limited (RSSL)[i] was used to study the surface of the right hand '7's to see if there was any fiber disruption or the

addition of foreign paper fibers, and as can be seen from the image below, the surface is completely untouched. The two SEM images below are from stamp SL on the Victor Hugo cover. These clearly show the paper fibers are matted together and completely intact and undisturbed. (Figure 5).

The SEM image below (Figure 6) is the left hand '77' on stamp SK, shown in back-scattered mode. The heavy elements forming the printing ink show up brightly within the diamond. It is important to note that both '7's show similar 'dark' features. If the right-hand figure '7' originated from a cleaned or a bleached figure '3', then the figure '7' would not have been as clear and definitive as it appears as existing elements from the ink would still be present. Furthermore there is no indication of any previous number being present.

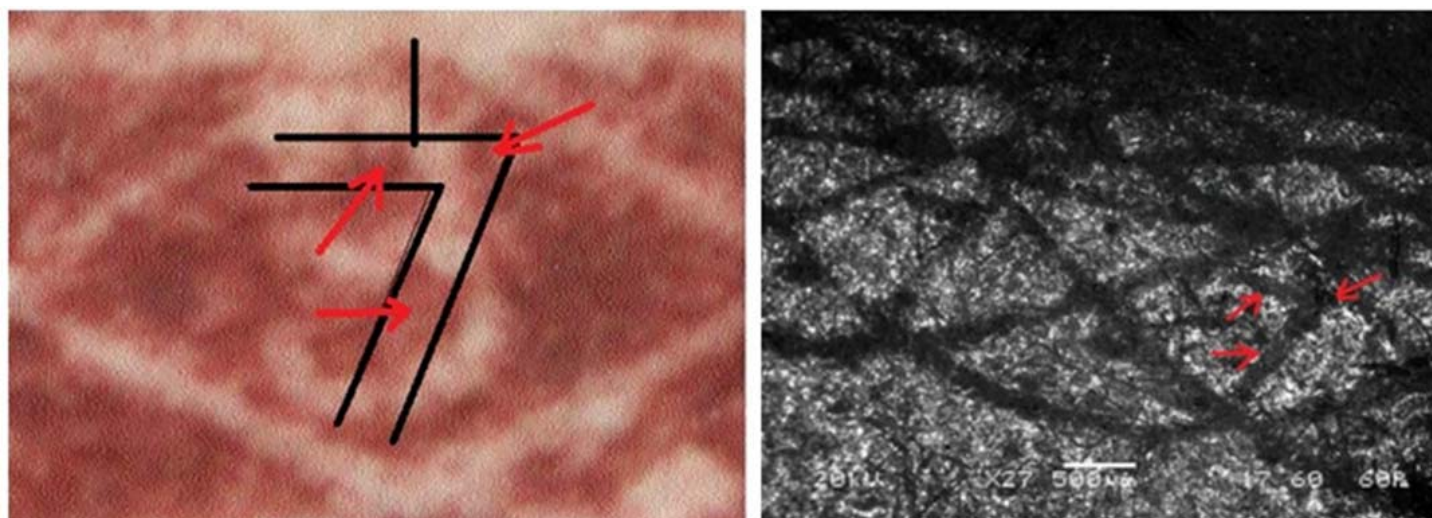


Figure 6: Right- Back scattered SEM image of stamp SK from the Victor Hugo Cover. Note that all the un-inked colourless areas appear dark on the image. The red arrows on the left hand image indicate the area where the existing red ink would have to been altered/removed in order to produce a colourless figure '7' from the existing figure '3'. Had the figure '7' been derived from a figure '3' as shown on the left, then the areas marked with arrows on the SEM image would appear as bright spots where the ink from the figure '3' would have been. This is a definitive image which confirms that the number "7" has not been altered from a previously existing number.

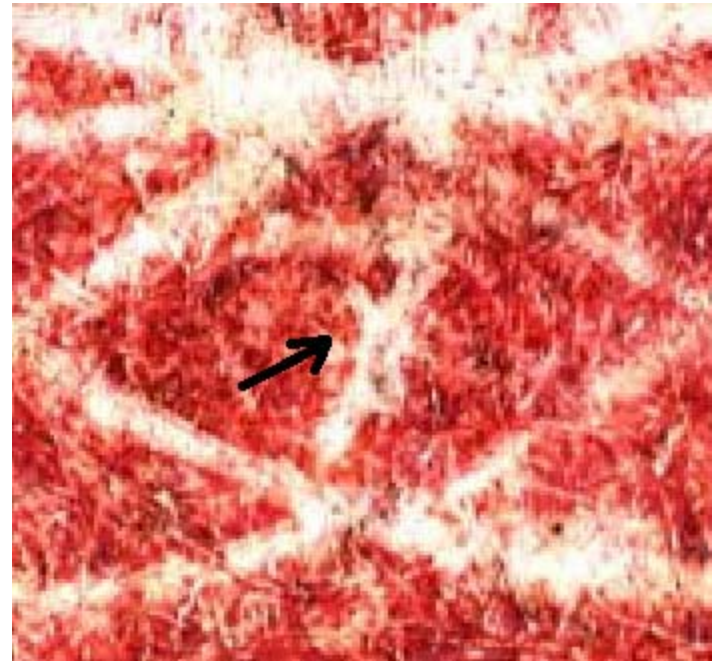
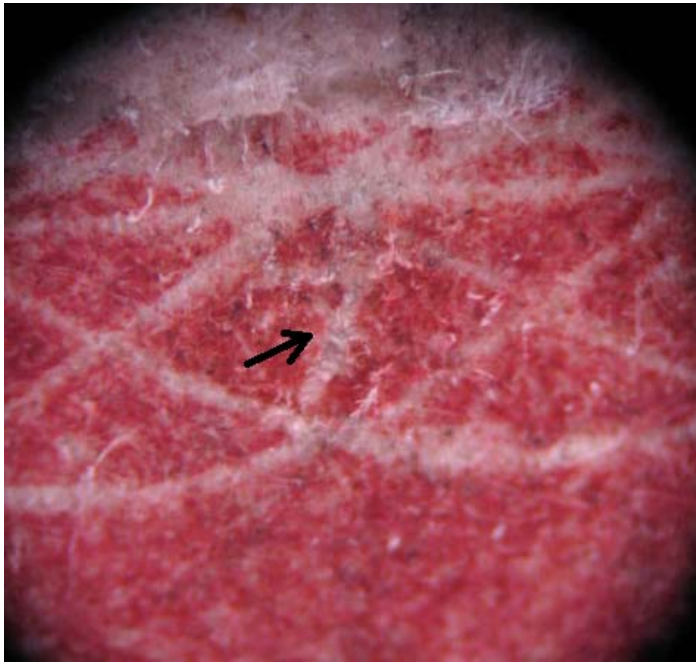


Figure 7 & 7a: Photomicrographs of the stamp SK on the Victor Hugo Cover. The black arrows indicate the area of the minute paper disturbance.

The two images (Figures 7 & 7a) show two photomicrographs of the right hand figure '7' from the right panel from stamp SK. The image on the left was taken by Professor Gene Hall at Rutgers University and that on the right by the RSSL. Note the identical features of the left hand '7's between both images. It is also interesting to note the small area of disturbed fibers in the center of the diagonal of the figure '7' clearly illustrates the fact that had the area been disturbed in order to alter the number, then such a feature would be prevalent throughout the diamond area.

EDXRF- X-ray micro fluorescence

EDXRF (X-ray micro fluorescence) is a non-destructive method for detecting and analyzing the elements in inorganic substances. The XRF spectrometer measures the individual component energies of the X-rays emitted when the sample is irradiated with an X-ray beam. A spectrum is produced which depicts those elements found in a specific area.

EDXRF was used by both Professor Gene Hall (Figure 8) and the RSSL in order to analyze the elemental components of the ink used to print the stamps. Both the right hand and left hand '7's were analyzed in order to look for similarities or differences together with a normal plate 73 stamp for comparison. Both findings complemented each other.

Above is a plot from an EDAX International (Mahwah, NJ) micro EDXRF Eagle II Spectrometer used by Professor Gene Hall. EDXRF revealed the diamond inked area around the second "7" in plate number "77" contained the same elements (Hg, S, Pb, Ca, K, Al, Si) as in the diamond

inked area around the first "7" with additional elements of Ba (barium) and Cr (chromium) in a spot location and was not homogenously distributed around this diamond inked area. The elements Ba, and Cr were not found in the diamond area around the first "7" in the plate numbers "77" and "73" examined.

Both '7's showed that identical elements were used for the printing ink. In addition the right hand '7' showed extra trace elements of chromium, barium and phosphorus which can only be regarded as plate contaminants originating from the plate-making process.

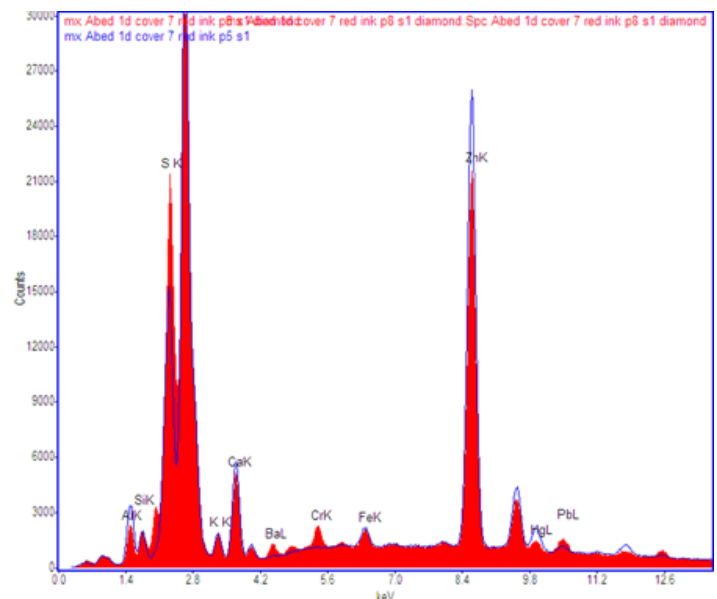


Figure 8: EDXRF comparison of red ink around first (blue trace) "7" and around second (red trace) "7" in the plate number "77". Notice the appearance of Phosphorus, Barium and Chromium in the second "7".

Raman spectroscopy

Raman spectroscopy is another non-destructive method of analyzing the inorganic components in the printing ink. The difference between this and EDXRF is that Raman excites molecules rather than atoms. It works by irradiating molecules using light from a laser beam. The irradiated molecules will produce Raman scattering which is measured and identified. Raman can determine the chemical compound that these elements belong to. This is only possible if the chemical compound is in a reasonable concentration and the compound is a high Raman scatterer. Raman spectroscopy was used by Professor Gene Hall to analyze the molecular components of the ink used to print the stamps. Both the right hand and left hand '7's were to characterize similarities and/or differences.

A Renishaw (Hoffman Estates, IL) system 1000 Raman microscope equipped with a Leica microscope was used to analyze the chemical composition of the pigments in the printing inks used on the stamps. Raman scattering in the stamps was produced by excitation with a 785 nm diode laser. The beam size of the laser was 2 microns, using 50x objective lens, and the laser power at the sample surface was reduced to 15mW to prevent any damage due to burning of the stamps. Emphasis was focused on areas around the second "7" diamond area, which showed the presence of additional elements of Ba, and Cr from the EDXRF analyses.

Raman analyses revealed the red pigment in the printing ink was composed of HgS (vermilion) and red lead (Pb₂O₃). Unfortunately, the chemical compound associated with Ba that was determined by EDXRF could not be identified. Chromium, the trace element also found using EDXRF was identified as lead chromate; this was not homogenous or part of a faking ink, according to Professor Gene Hall. (Figures 9 & 10).

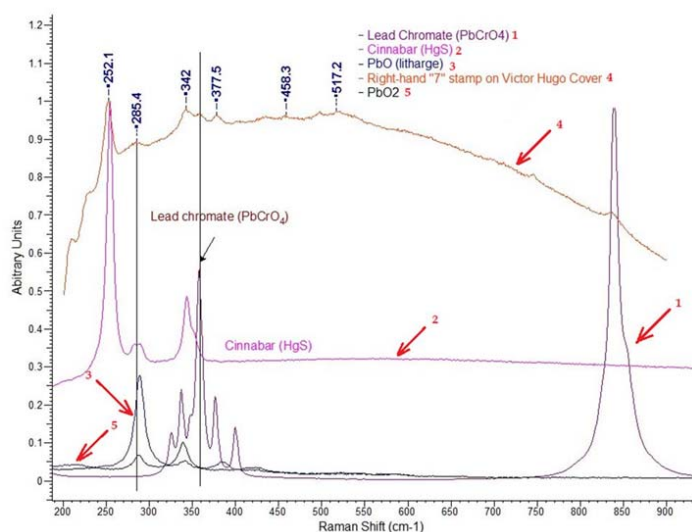


Figure 9: Raman spectra comparison diamond area around second "7" in plate "77".

The Raman scan above shows the presence of lead chromate in the sample point on the second "7" from a stamp on the Victor Hugo cover. The red/orange trace shows the sample point from the stamp on the cover. The blue trace shows the Iconofile cinnabar cold and the black trace, the lead chromate (Aldrich) standard. Since the sample point has only traces of lead chromate, they show only as small, but significant, "bands" in the scan. The band at 842cm⁻¹ of the lead chromate which must be very strong is particularly weak in this case, as can be seen in the trace above indicating that this compound is present in minute trace quantities.

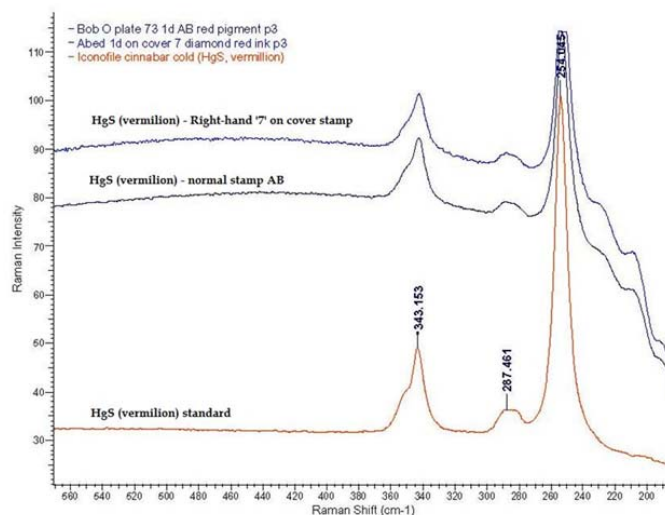


Figure 10: Raman spectra comparison of red ink on the diamond area around the second "7" and "3" in plate numbers "77" and "73".

The Raman plot above expands the right-hand side of the sample shown in the scan above it. The red/orange trace shows the standard for vermilion (HgS), while the two blue traces show the red color in a plate 73 stamp AB reference copy (upper trace) and the a plate 77 stamp on the Victor Hugo cover (lower blue trace). Vermilion was used to print both reference stamp AB and the diamond area of the second '7' from the Victor Hugo cover.

Profilometry / Surface topography

This technique was used to study the topography of the surface and to look at the figure '7' in three dimensions. In this way one can eliminate the possibility that faking has taken place, through paper fiber disruption and painting. Furthermore a recessed '7', if seen, could only be produced via impact, as with a surface-relief printing process.

The work was carried out at the RSSL using a Keyence VHX-600E digital microscope. The resulting images are astounding. Not only can one see the right hand figure '7' as recessed, but enlargements show the paper fibers totally untampered and as can be seen from the images run in and out of the figure '7' changing in color as they do. "

Furthermore, even bigger enlargements show the white fibers of the '7' totally devoid of any ink particles, colored or 'bleached'. (Figures 11 & 12).

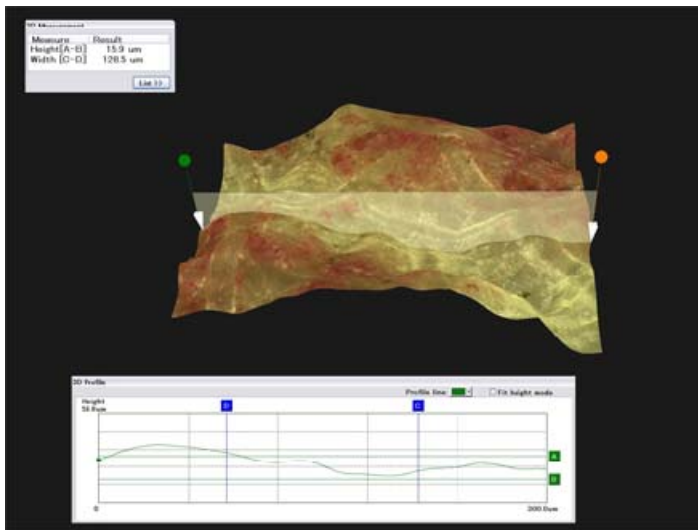


Figure 11: Depth composition analysis of the top of the right-hand '7' from stamp SL from the Victor Hugo cover. Such a recess of a colorless area can only be produced through impact between the plate and the paper at the time of printing and cannot be produced through faking.

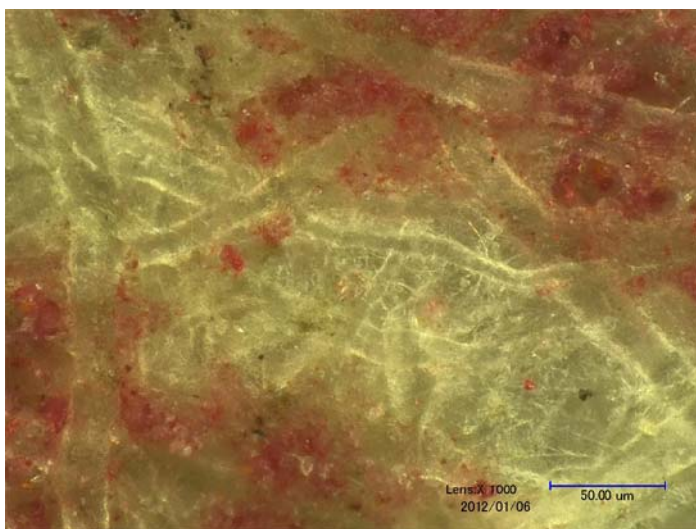


Figure 12: Micrograph showing top section of magnified '7' on RHS of stamp SL from the Victor Hugo cover.

The conclusion of the RSSL report was as follows; "In conclusion, no evidence was found of the addition or bleaching away of additional layers of pigment in order to change a '3' into a '7', or any fiber disruption (e.g. through deliberate tamper by scraping, cutting or the addition of fibers) during depth composition examination of the second '7 diamond' regions on any of the stamps examined. Again, there is no evidence that extra layers of pigment have been added in order to convert a '3' to a '7'. Individual fibers from the paper can be traced, again showing no evidence of tamper."

Confocal Microscopy

Stamp SK was examined using confocal microscopy at Reading Scientific Services Laboratories. This form of examination has not been used before now to examine the surface of a stamp. (Figure 13).

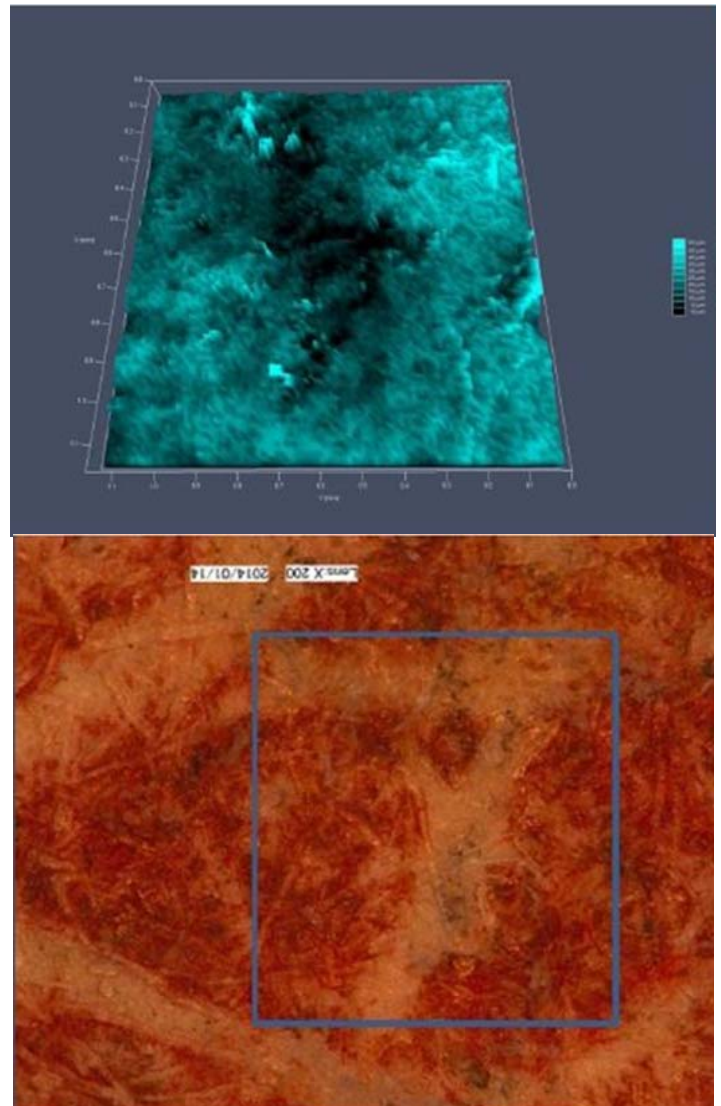


Figure 13: Confocal Microscopy Image of the right-hand '7' on the right-hand panel of stamp SK.

The trough making up the right hand '7' is evidently clear in this image and what is also definitive is the absence of any pre-existing figure '3'. A feature that must be seen if this stamp was indeed faked from a plate 73 stamp.

Ultraviolet light

High and low intensity ultraviolet light was also used to examine the stamps. Such a process may show if the areas under question have been chemically treated or have been retouched. (Figure 14).



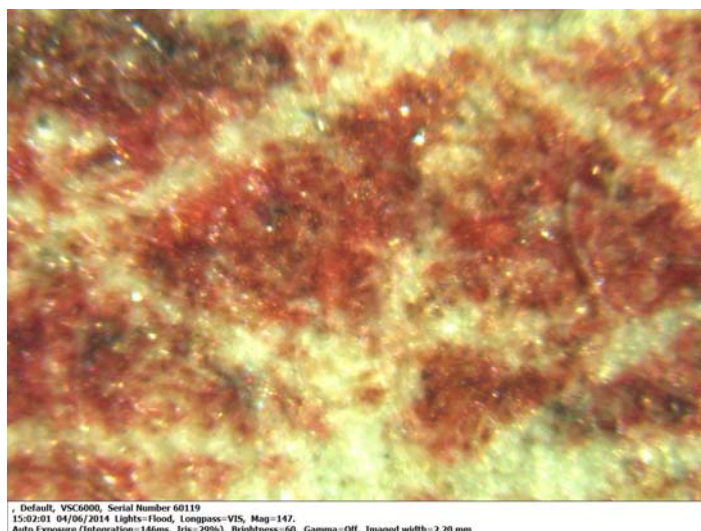
Figure 14: Ultraviolet image of stamps SK and SL from the Victor Hugo cover.

It is evidently clear that there are no differences between the two '7's under UV light. The image above was viewed at a wavelength of 365nm using an ACO Electronics QDX-630BE-2 Questioned Document Examination System.

Infrared light

Using a Foster Freeman VSC6000 (Video Spectral Comparator) Robert Radley, M.Sc., C.Chem., F.R.S.C., F.S.Soc. Dip., F.A.E., R.F.P. of The Radley Forensic Document Laboratory, examined the stamps under IR light. Under this light and under high magnification he clearly related any reflectance to the clear or smudged carbon (from the ink) deposits.

An enlarged photograph using a VSC6000 of the right-hand 7 on stamp LS showing the ink deposits is illustrated below (upside down). (Figure 15).



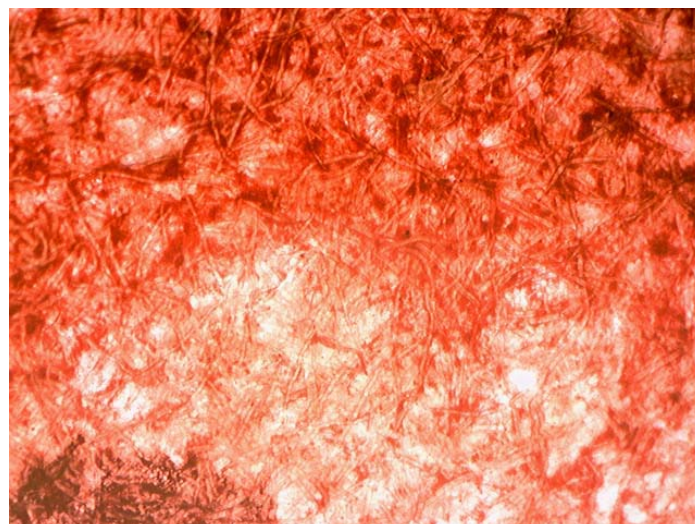
Light Microscopy

Optical microscopy is another useful way of examining these stamps, bearing in mind the far more elaborate methods that were used. Using light microscopy at magnifications of up to x140 no fiber disturbance was

noticed. As we can see from the image below, which was obtained from a printed area of stamp SK at a magnification of x100, the paper fibers are matted and very much interwoven and any tampering, abrasion, scraping or removal of these fibers would undoubtedly be clearly seen under this magnification. (Figures 16 & 17).



Figures 16 & 17: The image below is a 100x enlargement of a small area (circled in black) from the top of the right hand '7' of the SK stamp from the Victor Hugo cover. The general matted appearance of the paper fibers at this magnification is clearly visible and any fiber disturbance would also be visible under this magnification.



Modification Type	Analytical Method						
	Microscopy		Near-Visible Light		Spectroscopy		Profilometry (Digital microscopy)
	Optical	Scanning Electron	Ultraviolet	Infrared	EDXRF	Raman	
Inlaying	No Fiber Disruption	No Fiber Disruption	N/A	N/A	No Chemical Difference	N/A	No Fiber Disruption
Scraping	No Fiber Disruption	No Fiber Disruption	N/A	N/A		N/A	No Abrasion or Fiber Disruption
Powder Blasting or Laser Obliteration	No Fiber Disruption	No Fiber Disruption	N/A	N/A	N/A	N/A	No Abrasion or Fiber Disruption
Chemical Erasure	N/A	N/A	No Visible Difference	No Visible Difference	No Chemical Difference	No Chemical Difference	No Fiber Disruption
Retouching small areas	No Visible Difference No Feathering	No Visible Difference No Feathering	No Visible Difference	Note 1	Note 1	Note 1	No Visible Difference No Feathering
Retouching the entire 'diamond'	No Visible Difference	No Visible Difference	N/A	N/A	No Chemical Difference	No Chemical Difference	No Visible Difference
Note 1: The fluorescence noted under infrared light was confirmed by EDXRF and Raman spectroscopy to be from Chromium found near the second 7s of all three Hugo Cover stamps. As discussed in the text, this is believed to have been a contaminant introduced during the printing process.							

Figure 18. Table outlining the various methods of faking that could be used and the results from the various forms of investigation used. EDXRF and Raman detected trace elements of barium, chromium and phosphorus. These elements did not form a part of any offending ink but were present as trace contaminants in the re-engraved area of the right-hand '7'.

Conclusions

The following conclusions, summarized in the table above, have been extracted from the five reports obtained from the five scientific experts and expert groups who have examined the stamps first hand. (Figure 18).

It is very clear that the experts are unanimous in their conclusions in that the three stamps have not been tampered with and as such are completely genuine.

Testimonials from the Scientific Experts

Illustrated below are two testimonials from the scientific experts who have examined the Hugo cover and which

clearly confirm that the stamps on the Victor Hugo cover have not been tampered with in any way. (Appendix I, II & III).

Could such opinions from qualified and an internationally recognised forensic/scientific experts using state of the art scientific equipment become the 21st century way of authenticating philatelic Gems whereby we can be assured that the subjective element which forms, at most times, a major part in the decision has been eliminated?

It is perfectly clear that the results and findings from the extensive examinations that were carried out on the Victor Hugo cover have provided the concrete results required that would enable us to reach a substantiated and fully founded opinion.

THE AUTHOR

ABED H. NAJJAR

Abed H. Najjar holds a degree in Pharmacy. He embarked on a working career that has spanned over four decades with interests ranging from the pharmaceutical industry to publishing for the trade and healthcare sectors. His main fields of interest are the stamps and postal history of Jordan, the British Commonwealth, the Middle East and the early line-engraved issues of Great Britain. He has published several books and articles on these subjects. Abed is a member of the Institute for Analytical Philately and is a strong advocate of the use of extensive analytical science in the authentication of rare philatelic items.

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The Radley Forensic Document Laboratory

Forensic Document & Handwriting Expertise

Practice Senior Consultant: **Robert Radley** MSc, C Chem, FRSC, FCSFS, FSSoc Dip, FAE, RFP

Please quote our reference on all communications

19th December 2014

Our Ref: RWR/kas/9915

Your Ref: AB

TO WHOM IT MAY CONCERN

Re: 1865 Victor Hugo letter franked with three Queen Victoria 1d red stamps showing a plate number '77'

I, Robert Radley, specialise in the forensic examination of questioned documents and my Curriculum Vitae is attached.

I was instructed to examine the stamps in question to determine whether there had been any alterations, inlaying or tampering in any way with the second '7' of the plate number shown on the stamps in question.

I have examined the abovementioned three stamps on the Victor Hugo letter, shown on the attached illustration, using the following techniques and can confirm the following:

1- Light Microscopy

I have examined the document under various magnifications from x7 to x140. There is clearly no evidence of inlaying which, under such magnifications, would be very easily visible. Consequently, the possibility of such a process can be eliminated.

I have also found no evidence whatsoever to suggest that the paper fibres in the area of the right-hand '7' have been manipulated, altered, scraped, removed or otherwise in order to facilitate an alteration of them.

2- Ultraviolet light

High and low intensity ultraviolet light has been used to examine the document. Such processes may show areas which have been chemically treated or have been tampered with or retouched. The results of my examination show that whilst there are a number of fluorescent areas on the stamp, and indeed on the whole envelope, this is not unexpected as the technique tends to often pick up minute contamination very easily and with great sensitivity. What is clear, is that there is no localised

significant fluorescent/quenching in the areas of the '7' diamonds in question suggestive of any particular attention having been paid to these areas or chemicals applied which are detectable under ultraviolet, in order to facilitate an alteration of the second '7's concerned.

Consequently, I find no evidence whatsoever to suggest any form of solvent or chemical has been applied in an effort to remove the original colouring material and consider such a possibility to be so unlikely that, in my opinion, such a process may be realistically disregarded.

3- Infrared Luminescence and Infrared Reflectance

Using a VSC6000, I have similarly examined the stamps utilising the techniques of infrared luminescence and reflectance. These can also be used to show the effects of chemical treatment or different composition inks. Again, I found no evidence to support any proposition that the areas concerned have been systematically treated in any way with a chemical, albeit there are various spotted contaminants over the stamps and envelope generally.

I can confirm that any absorption patterns observed under Infrared light in some areas of the right-hand '7's are directly associated with the black cancellation ink. No consistent or significant luminescence was detected in the area of the right hand '7's.

4- General Consideration

I have found no evidence to suggest that the stamps have been removed from the cover and later replaced.

Conclusion

I conclude from my extensive examinations of the stamps that I have found no evidence whatsoever to suggest that the numbers '77' on either panel on the five visible panels on the three stamps has been systematically altered from a previous number.

Yours faithfully



Robert Radley
Forensic Handwriting & Document Examiner



Reading Scientific Services Ltd
Reading Science Centre,
Whiteknights Campus,
Pepper Lane, Reading,
Berkshire RG6 6LA, UK

Date: 17 November 2014

Dear Mr Najjar

Re: 1865 Victor Hugo cover; three stamps showing plate number '77'

We can confirm that the stamps have been analysed by RSSL on a number of occasions. The principal techniques used were:

- 1-Scanning electron microscopy in both topographic and back scattered modes
- 2-EDXRF
- 3-Profilometry/topography
- 4-Confocal microscopy

From the analysis performed, we can confirm the following:

- i. We have found no evidence that would support the opinion that a previous number '3' was altered into a number '7'.
- ii. We have found no evidence to suggest that a previous figure '3', in five locations, has been erased through scraping, bleaching, fibre disturbance or otherwise.
- iii. We have found no evidence of any out-of-the-ordinary fibre disturbance in the area of the right hand '7' in all five locations.
- iv. We have observed troughs, using profilometry (depth analysis), in the shape of a '7' indicating that this number was consistent with having been indented/printed on the stamp.
- v. Using profilometry. We have found no evidence of the existence of a (previous) figure '3', e.g. no indentation outlining a 3

Fully illustrated reports containing the analytical data and conclusions to all the points made above are available on request.

Yours Sincerely

R T Ray
Senior Group Leader, RSSL