



THIRD INTERNATIONAL SYMPOSIUM ON ANALYTICAL METHODS IN PHILATELY
13-15 OCTOBER 2017
THE ROYAL PHILATELIC SOCIETY LONDON



DAY	HOURS	ACTIVITY	WHERE	RESPONSIBLE
Thursday	1.00 p.m.	RPSL Meeting: Group Display <i>Deutscher Altbriefsammler-Verein</i>	41, Devonshire Place	
12 OCTOBER	7.00 p.m.	Dinner on Invitation by RPSL President Patrick Maselis	Restaurant Orrery	
		Formal Opening of the IAP Symposium and Activities	Restaurant Orrery	RPSL President IAP President John Barwis FRPSL
DAY	HOURS	ACTIVITY	WHERE	RESPONSIBLE
Friday		Open house at The Royal Philatelic Society London	41, Devonshire Place	
13 OCTOBER	10.00 a.m.	Open House at Expert Committee	Expert Committee	
	11.00 a.m.	Presentation The Work of the RPSL Ltd Expert Committee	Large Meeting Room	Christopher G. Harman RDP HonFRPSL
	10.00 a.m.	Demonstrations of Technical Equipment	Large Meeting Room	Invited exhibitors
	4.00 p.m.	Afternoon Tea	Large Library	
	3.00 p.m.	Presentation Software for the Color Analysis and Classification of Postage Stamps	Large Meeting Room	John Cibulskis
DAY	HOURS	ACTIVITY	WHERE	RESPONSIBLE
Saturday				
14 OCTOBER	09.00 a.m.	Symposium Proceedings	41, Devonshire Place	Christopher G. Harman
		Introduction	Large Meeting Room	IAP President John Barwis FRPSL
	09.00 a.m.	Symposium Concept and Technical Information	Large Meeting Room	Jonas Hällström RDP FRPSL
	5.00 p.m.	Key Note Speech Beware the certainties of science	Large Meeting Room	Christopher G. Harman
		<p><i>Whilst I speak as a non-scientist, I can understand and am fascinated by the allure of science. Science exerts a powerful hold over most observers and is therefore precious. A scientific opinion has a level of credibility above mere casual opinion.</i></p> <p><i>However, science can mislead and does not always produce the correct answers, as I will show on some examples.</i></p> <p><i>At best science is a most useful assistant to the knowledgeable; at worst it can be extremely deceptive. The scientist must know the boundaries in order to retain credibility.</i></p>		
	10.00 a.m.	Coffee Break	Large Library	
	10.20 a.m.	Impact of Technical Analyses on Greene Foundation Expertising	Large Meeting Room	Ted Nixon
		<p><i>The acquisition of the Foster Freeman VSC 6000 video spectral comparator machine by the Greene Foundation in early 2012 has had a significant impact on the expertising service provided by the Greene Foundation. After 5 years of use it is important to review and analyse the result of its use as well as the indirect impact it has had on our operation.</i></p> <p><i>This project will compare many aspects of the expertising function 5 years ago to the current state. Some of this will be the direct result of the VSC 6000 and some will be the result of general changes in our hobby. The project will review the volume and sources of expert submissions, the proportion of genuine vs false certificates issued and the allocation of reasons for providing the false certificates. It will examine the introduction of more analytical thinking into the expertising process and the ability to provide more information to submitters.</i></p> <p><i>The presentation will illustrate how analytical thinking requires the Expert Committee to be able to support technically or rationally why and how we reached a positive or negative conclusion about a submitted item. By contrast, in the past, sometimes a conclusion was reached because it "felt correct".</i></p> <p><i>The presentation will show how the use of the VSC can help focus the visual examination of an item by first applying a series of tests involving the invisible light processes to highlight potential irregularities. Sometimes we miss visible problems by not being sure what we are looking for.</i></p> <p><i>The conclusion will be that the VSC provides very valuable assistance to the expertising process but does not replace knowledge, experience and solid thinking.</i></p>		
	11.10 a.m.	Break		
	11.20 a.m.	A Versatile Comparison of Stamps by High Resolution Image Differencing	Large Meeting Room	Bob Mustacich

		<p>Previous developments to determine the distortions in plate impressions using image differences relied on the analysis of large multiples of stamps. The inability to compare individual stamps from different sheets combined with the expense and scarcity of large multiples greatly limited this capability. This limitation of analysis to single sheets is primarily the result of large differences in the shrinkage of sheets of stamps after wet printing processes. Various approaches to compensate for size differences between individual stamps were incorporated into the image subtraction methods for evaluation. These included approaches for proportional scaling and bilinear mappings between four-sided shapes. It was possible to obtain comparable or better results than the previous, same-sheet method using the bilinear modifications, but now comparing single stamps. This method can be used to group single stamps from unknown plates and positions based on small differences in the distortions of their plate impressions. This was demonstrated with a large set of similar stamps having weak re-entry features. This additional information was used to re-examine and revise stamp groupings based on comparisons of both visual features and differences in plate impressions.</p>		
	12.00 p.m.	Lunch Break		
	1.00 p.m.	Forensic Philately in 2020 ~ Challenges & Opportunities'	Large Meeting Room	Paul Leonard
		<p>The expertising of philatelic items is aided by reference material, personal knowledge and as appropriate, the use of science - based evidence. Such approaches can include forensic analysis of stamps that may include established methods such as the use of ultra-violet light, determination of watermarks and perforations as well as magnification of the image, typically 10 times to determine e.g. printing flaws.</p> <p>More specialised equipment may be needed when philatelic items are of potential national or international importance, especially when reassurance is sought that the item is genuine. Such equipment needs to provide non- destructive and auditable results. The aim of this approach is to build up a breadth and depth of knowledge to support a concluding opinion. Microscopic examination can include scanning and 3D microscopes. Analysis can include e-based initiatives such as 'Retro – Reveal' www.http://retroreveal.org where colours, cancellations and overprints may be assessed. A video spectrometer comparator, http://www.fosterfreeman.com , can be helpful to determine fraudulent manipulation. Further equipment may be required for elemental analysis, e.g. by X-ray fluorescent (XRF) analysers and / or Raman spectrometry.</p> <p>There remain many challenges that could be helped with further science – based evidence on a wide range of philatelic issues. This may include e.g. detection of colour differences, identification of watermarks of stamps attached to documents and assessment of organic contaminants, as well as paper and adhesive analysis. This may be aided by better engagement with academic institutions and equipment manufacturers on an international basis. The exchange of material between philatelic specialists and expertising committees may aid the transparency of the opinion making process.</p>		
	1.50 p.m.	Break		
	2.00 p.m.	The Use of Tonal Histograms for the Study of Stamp Shades	Large Meeting Room	Tim Lyerla
		<p>According to the Michel® Germany Specialized catalog, there are 11 different shades of the 10 Pfennig value for the 1899 "crown and eagle" issue of the German Empire recognizable under UV illumination. Distinguishing this number of different shades presents a daunting task for the average collector. The goal of this study is to find a way to objectively determine this quality using readily available and relatively inexpensive methods.</p> <p>Digital photography provides a rationale for this purpose, although it requires some outlay of capital and practice with its use. The technology involves the accompaniment of tonal histograms that are used by the photographer to adjust the shades for the resulting pictures. A simple logical reversal of the process is the determination of the shade of a photo from its tonal histogram. A sub-group of shades of the 10 Pfennig value, the "d" group, serves as a test of this hypothesis.</p> <p>A Panasonic™ DMC- G5 Lumix digital single lens reflex camera and Adobe® Photoshop® Elements 12 software were used for this study. The camera was equipped with a 100mm Canon telephoto lens, a Kenko 52mm UV filter cover lens, and an automatic shutter release. Shutter speed and sensitivity were set at Aperture Mode (automatic) using f11 for focus. A pair of UVP® UV-L ultraviolet lamps was placed for maximum illumination onto the items, and intensity kept constant with the use of a portable spectrophotometer calibrated at 365nm. Pictures were taken as RAW files at 6000 to 10,000K color temperature, and compression to JPEG files done on Photoshop® Elements for the production of tonal histograms.</p> <p>The results show that the three more common shades listed as the "d" types--Michel® numbers 47d (red shades in UV), 47da (dark red in UV), and 47db (pale vermilion in UV) which can be difficult to distinguish with confidence by eye, possess tonal histograms that allow this distinction both qualitatively and quantitatively. In addition, three of the stamps used for this investigation show small regions that exhibit one of the other these shades, indicating that some common components of the dyes or inks were likely involved in the production of these "d"-shade types.</p>		
	2.50 p.m.	Break		
	3.00 p.m.	Non-destructive Analyses: Creating Standards for Imperial Brazilian Stamps from a Case Study of Cottens Essays	Large Meeting Room	Fernando M. Santos

		<p>The purpose of this study was to lay the groundwork for analyses of the Imperial Brazilian postal stamps via a case study of the Cottens Essays. The Dom Pedro II white-beard Brazilian postal essays were not issued and became known as "Cottens essays". The stamps might have been issued should the Empire have continued and had the Republic not been proclaimed in 1889. These essays have a nebulous history replete with myths about their origin. Their history was elucidated by means of comparison of these essays with Imperial Brazilian stamps, issued in the period by "Casa da Moeda do Brasil" – the Brazilian Mint. Further insights were gained by comparisons to U.S. stamps (most of the Imperial Brazilian postal stamps were made by the American and Continental Bank Note Companies), and to French stamps (considering myths of a possible French origin).</p> <p>Non-destructive analytical methods were used to create a database of chemical and physical characteristics of inks and papers of the relevant Brazilian, American and French stamps. X-ray fluorescence (XRF) was done using an Amptek® X-ray tube with Silver filament (voltage 30 kV, current of 10 µA and 200 seconds), with a Si-Drift detector also from Amptek®. We also used a National Electronic Corporation electrostatic Pelletron-tandem particle accelerator type 55DH with a gaseous stripper (N₂) for beam-load exchange integrated with a external multi-use analyses station. This allowed analyses in air by characteristic X-ray spectroscopy (PIXE). These techniques allowed the identification and quantification of chemical elements in different materials, identifying residual metals present in the sample. The optical microscope was used to identify the paper fibers.</p> <p>With these studies, differences were observed in the proportions of the chemical elements present in Brazilian stamps, issued by Brazilian Mint, ABN Co. and Continental Bank Note Co., and French stamps, but also differences in the elements used in its composition, as well as physical differences in the papers and manufacturing process.</p>		
	3.50 p.m.	Break		
	4.00 p.m.	Symposium Brainstorming: Panel facilitators with the Symposium open for discussion	Large Meeting Room	Christopher G. Harman Ted Nixon Larry Lyons
		<p>What do those who expertise philatelic materials think is missing from their technical tool boxes? How could we better facilitate the use of technology by collectors who want to know more about their Philatelic materials?</p>		
	4.50 p.m.	Symposium to be adjourned until Sunday	Large Meeting Room	Christopher G. Harman
	5.00 p.m.	Wine and Nibbles	Large Library	
		Evening free - no specific arrangements		
DAY	HOURS	ACTIVITY	WHERE	RESPONSIBLE
Sunday				
15 OCTOBER	09.00 a.m.	Symposium Proceedings	41, Devonshire Place	Christopher G. Harman
		U.S. 24¢ Purple: Progress Report on a Philatelic Enigma	Large Library	John Barwis & Harry Brittain
		<p>The twenty-four-cent purple stamps printed by the Continental Bank Note Company (Scott 164) cannot be identified based solely on the design, since Continental used a single, unaltered printing plate created by the National Bank Note Company, printer of the 1870 issue. Only one 24¢ stamp has been certified by The Philatelic Foundation as having been printed by Continental, an opinion based solely on the basis of its having been printed on ribbed paper – on which no National Bank Note Company stamp has ever been observed.</p> <p>This study seeks to discriminate between National and Continental 24¢ stamps by identifying chemical differences in the printing inks used by the two companies, using X-ray fluorescence (XRF) and Fourier-transform infrared (FTIR) spectroscopic analysis. Seven dated covers were examined, as well as 24 stamps bearing New York foreign-mail cancels, for which usage ranges had been established.</p> <p>The FTIR spectra of the studied stamps indicated that one of the coloring agents in the ink was ultramarine, and so the purple color was attained through the addition of a red pigment (probably carmine). The amount of ultramarine in the FTIR served to differentiate the stamp into two categories, which will be denoted as low and high ultramarine. Elemental analyses by XRF enabled a further differentiation of the stamps into three discrete classes based on the relative abundance of phosphorus (high, medium or low). Although we have not yet identified the compound containing phosphorus, we note that all the high ultramarine stamps contain medium levels of phosphorus. Work is still in progress.</p>		
09.00 a.m.	09.50 a.m.	Coffee Break	Large Library	
3.00 p.m.	10.10 a.m.	Chemistry of Aniline inks, 2-cent Admiral Issues of Canada	Large Meeting Room	Richard Judge

		<p>The 2-cent carmine Admiral issue of Canada had a long production period that overlapped the First World War. This investigation documents the changes in ink formulations that resulted from the unavailability of key ingredients during the war and the subsequent shade variations and a production flaw. The major challenge of correlating any changes in ink chemistry with the extensive production time frame from late 1911 to late 1920 was achieved by analyzing a substantial fraction of plate blocks from the 188 plates of that period, all of known approval dates.</p> <p>Shade variations were investigated from the reflectance spectra of unused plate blocks of both regular and war-tax stamps. The variation in elemental composition of the inks was studied using X-ray Fluorescence (XRF) spectroscopy. The change in molecular or ionic compounds within the ink was followed using Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy.</p> <p>Analysis of the reflectance spectra shows a partitioning of the reflectance curves into two main types and correlates with the change of shade from pre-war rose carmine to post-war carmine. The war years represented the transition period and gave rise to several shade variations of which the aniline ink pink shade is the most striking. XRF analysis shows that the element Zn disappears just before the start of the war and never substantially returns. The other major change is the appearance, only during the war, of Cr but at concentrations that are quite variable. Analysis of ATR-FTIR spectra has shown that the use of the common printing ink vehicle, linseed oil, (a mixture of the triglycerides of oleic, linolic, and linolenic acids) disappears at the start of WW1. Additional changes in the ATR-FTIR spectra parallel that seen in the reflectance spectra, namely changes over the three time periods of pre-, during and post- WWI. However, the actual compounds in flux are not identified in this study only the appearance and disappearance of spectral features are documented. A discussion of the steps used in formulating an ink, as gleaned from the literature of the early 1900's, is presented and focuses on the appearance of various elements and compounds in each step of the ink making process. The paper also focuses on the aniline ink variety, i.e. stamps that show significant bleed through of the ink to the gum side of the stamp. It is shown that a pre-WWI aniline ink plate block has no discernable spectral differences from normal stamps of similar or identical plates numbers. However, the aniline ink stamps produced during the war show major differences in Cr levels and are lower than normal stamps of that period. Visually, the bleed through of the WW1 aniline ink stamps is approximately inversely proportional to the Cr level.</p> <p>The primary conclusion from this paper is that the major changes in ink formulations necessitated by WWI shortages resulted in production difficulties that gave rise to the aniline ink variety and the aniline pink shade. It is uncertain if the absence of Cr in this bleed through variety is due to the inability to properly fix the dye into a pigment early in the process or whether Cr compounds become unavailable during the later part of the ink making process and their absence caused the bleed through.</p>		
	11.00 a.m.	Break		
	11.10 a.m.	The Colors of the Germany Crown and Eagle Series	Large Meeting Room	John Cibulskis
		<p>The Germany Crown and Eagle series of 1889 – 1900 contains stamps with color varieties that are notoriously difficult to distinguish. At the current time many of the varieties are commonly only distinguished by their uv characteristics. Some reliance is also placed on their dates of cancellation. It is the goal of this study to add some light to their characterization by carefully analyzing the colors of the stamps and grouping them based entirely upon their visible colors. I am hoping that in this way one could avoid the need for subjective uv interpretation. To this end I obtained approximately 5000 copies of the stamps in this series. Most of these are canceled and needed to have their cancellations (electronically) removed after scanning and before analysis. New techniques and software capabilities were needed to be developed in order to make the processing of this large number of stamps feasible. Several changes in the existing software were needed in order to increase the precision of the color determination and decrease the sensitivity to the cancellation removal process. As the study proceeds I am still adding improvements to the programs.</p> <p>To add confusion to this story, Scott, Gibbons and Michel all define different "color" varieties for these stamps and produce their own color guides. Reliance on these color guides is misplaced. As an example, with regards to the "red" 10pf stamps in the series, almost all of them match (are electronically closest in color) to the Gibbons "Venetian Red" whereas the two color varieties mentioned by Gibbons are "rose-carmine" and "carmine". Similar issues prevail with the Michel Color Guide. This led to an investigation and digitization of the Gibbons color guide as had already been performed for the Michel Color Guide. In order to begin to make sense of this whole thing a comparison of these two color guides was performed. I also produced a cross-listing of the two color guides based on their best electronic matches.</p>		
	12.00 p.m.	Lunch Break		
	1.00 p.m.	Using the Bruker XRF to distinguish the six different printings of the U.S. Newspaper Stamp Design N4	Large Meeting Room	Larry Lyons

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	<p>The N4 Newspaper stamp design which depicts the Statue of Freedom on the Capital Dome was used at different times and by different printing companies to print stamps used to pay a tax on newspapers and periodicals. The six printings using the N4 design took place as follows:</p> <ol style="list-style-type: none"> 1. January 1, 1875 by the Continental Bank Note Co. 2. A Special Printing of 1875 by the Continental Bank Note Co. 3. An 1879 printing by the American Bank Note Co. 4. A Special printing of the 1879 issue printed in 1883 by the American Bank Note Co. 5. A July 1, 1885 printing by the American Bank Note Co. 6. An 1894 printing by the Bureau of Engraving and Printing <p>The values under ten cents were produced in black and the values from 12 cents to 96 cents were done in shades of red, all using the same design. All of the printed stamps are perforate 12. The difficult question which has baffled advanced philatelists for over a century is how to tell the different printings apart. The purpose of this paper is to show that the different printings can be distinguished from each other by using X-ray Fluorescence.</p> <p>The challenge to telling these stamps apart is increased by the fact that the types of paper on which the various stamps were printed can differ within the same printing. The various shades of color can also differ. The conclusion is that the physical examination of the paper types and ink colors are unreliable or of limited or no use in helping to distinguish the stamps from the six various printings from each other.</p> <p>The Bruker XRF tells us the elements present in the ink of each of the printings and an analysis of the results of testing all of the various printings conclusively provides a means of telling the printings apart from each other. The same spot on each stamp was tested and examples were chosen without cancellations in the test area to avoid corrupting the data. Also all of the stamps tested were off cover examples with clean backs, again to avoid corrupting of the data. The focus is on the quantitative values of the metals contained in the inks or the absence thereof. The comparison is made by looking at iron, nickel, copper, zinc, lead, and magnesium in the various ink compositions. The inks used by the different printing companies and at different periods of time contained some of the same elements but the proportions differed widely between the different printings. It was also found that certain elements were absent in some of the printings. A starting point was with values only printed at a certain date and not at any other time. Trends emerged by testing lower value stamps and these were verified in high value stamps of the same printings. The critical data results were clearly conclusive and have become the means of identification for these enormously difficult stamps to identify.</p>		
1.50 p.m.	Break		
2.00 p.m.	<p>Exploring Color Mysteries in the U.S. Large and Small Numeral Postage Due Stamps Using X-ray Fluorescence Spectrometry</p>	Large Meeting Room	Harry K. Charles
	<p>The United States large and small numeral postage due stamps were produced in at least 19 colors plus various shades and sub-shades; this range of colors led to many color anomalies and stamp misidentifications over the ensuing years. X-ray fluorescence spectroscopy (XFR) coupled with simple UV fluorescence was used to examine these color differences and thus distinguish stamps and explain various postage due color mysteries. Color timelines were developed with dated covers.</p> <p>Postage due stamps, with a common large numeral vignette, were produced by the American Bank Note Company from 1879 through 1893, in three distinct series. The 1879 series (Scott J1 to J7) was issued in a brown color rather than the specified red-brown. The next series (Scott J15 to J21) was produced in shades of red-brown. The red-browns were officially issued in 1884, but stamps with distinctly reddish tones began appearing years earlier on cover. In 1891, a third series (Scott J22 to J28) was issued in bright claret and is easily identified by its orange fluorescence under ultraviolet illumination (long wavelength).</p> <p>In 1894, the color situation was further complicated, as the Bureau of Engraving and Printing (BEP) took over the production of all United States stamps. The BEP redesigned the postage due stamps (making them smaller and more easily produced while retaining the central numeral vignette, hence the small numeral nomenclature) and the color was changed from red to claret (Scott J31 to J37). As the BEP took over, some postage due denominations were in short supply and the Post Office Department pressured the BEP to complete the new designs and ramp up production. This pressure coupled with poor quality control and inadequate pigment storage and ink mixing facilities gave rise to many additional anomalies in stamp color and fluorescence.</p> <p>Ultraviolet fluorescence observations and elemental ink spectra have been collected from various large numeral and small numeral postage due stamps (mint and used on cover), essays, and proofs. The results indicate marked differences between elemental ink compositions of fluorescent and non-fluorescent stamps. For example, the J32P4 plate proof on card is claret in color and has long been regarded as a plate proof of the J32 claret postage due stamp, despite the fact that the proof has plate no. 34. Plate no. 34 is only associated with the J30 vermilion color stamp. The J32P4 card proof and the J30 vermilion stamp both fluoresce and the XFR elemental ink spectra are essentially identical. The J32P4 has somewhat larger Fe and Pb peaks which probably account for its darker color; although J30 is known in a dark vermilion. The spectra for the J32 claret stamps are distinctly different (containing extremely large Ca peaks). A J30 on cover in July of 1894 further confirms that the J32P4 and the J30 vermilion stamps are linked.</p> <p>As another example, it appears that the high value (10c, 30c, and 50c) Roosevelt proofs (1903) of the 1879 postage due series are a slightly different color than the lower values, indicating that the high value stamps were issued months later. X-ray analysis has shown there is significant difference between the ink on the high and low values. While the same 10 elemental peaks are present in both proofs, the low values have significantly more Pb (factor of 2.5) and significantly less Fe and Ca than their high value counterparts, thus indicating a different ink composition. The 10c stamp was printed on the same day as its 1c and 3c counterparts while the 30c, and 50c stamps were printed on the following day along with their 2c and 5c counterparts. Thus, it appears that the change in ink was purposeful and not due to random mixing</p>		
2.50 p.m.	Symposium to be closed	Large Meeting Room	Christopher G. Harman and John Barwis
3.00 p.m.	End		