Documenting Science in Philatelic Literature: A New Perspective

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ABSTRACT. This paper addresses how scientists in the philatelic community may best document highly technical work in a manner that is interesting and readable for laypersons—stamp collectors. After describing the different scientific aptitudes of philatelists, the paper suggests guidelines scientists might use to reduce complicated concepts to their essence. This is crucial if there is to be an efficient technology transfer of science into the mainstream hobby. Methods posed include a moderation in technical complexity and an increased use of visualization tools, including photos, charts, drawings, graphs, and more. The paper concludes with a discussion of publishing venues for scientific articles to reach the most appropriate audience.

AN UNUSUAL REQUIREMENT

For the past decade, the number of scientific research projects related to philately, and their attendant publications, has been growing steadily. The majority of this research has been focused on various uses of spectroscopy to analyze color, inks, cancels, and paper characteristics. Most of the researchers (e.g., Chaplin et al., 2004; Liston, 2005; Gill, 2007; Odenweller, 2009a; Herendeen et al., 2011; Caswell, 2012) are professors or other trained scientists. This is both good and bad. The good is that the quality of the research is high. The bad is that many of the articles were written by these scientists for scientists.

The transfer of technology into philately has an unusual requirement: the need to communicate highly technical information to laypersons so they understand the basic ideas, importance, and potential applications of scientific results. This paper poses a number of methods to facilitate this transfer.

DIFFERING SCIENTIFIC APTITUDES

The education, experience, and aptitude of each individual usually determine that person's level of interest in science. To set the stage for understanding how to document philatelic science, consider a simple model that includes three widely differing aptitudes for science.

High Aptitude for Pure Science

Naturally, those with the greatest aptitude for science often enter a scientific or engineering field. Scientific investigation is normally concerned with understanding natural

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phenomena, and it is performed by and for scientists. These scientists must often invent their own "language" to communicate previously unknown concepts. In its purest form, science is an intellectual pursuit. It is not even necessary that there be a practical application of the science. For example, this was initially true for such important discoveries as relativity, quantum mechanics, and string theory.

The pursuit of pure science requires years of study and training. Scientists are dedicated and highly focused. It is not reasonable to expect laypersons either to intuitively understand or to exert the kind of intellectual energy necessary to grasp complex scientific principles. It is therefore counterproductive to communicate with philatelists in "technospeak."

Aptitude for Technology and Engineering

Other individuals with a high aptitude for science study methods for applying pure science to solve "real world" problems. These are technologists and engineers. Once certain scientific principles are proven, they are often used to develop advanced technologies, for example, internal combustion engines, nuclear reactors, and supersonic aircraft. The technologist is not obligated to rederive basic scientific principles at each step but rather is obligated simply to apply them to solve specific problems, invent new devices, or improve upon other devices. This group is able to understand the pure science but always strives to apply it to solving specific problems.

Little Scientific Aptitude

Finally, technologies are transferred to the nonscientific population, those with little scientific interest or aptitude. Perhaps the most famous example of this is Teflon. A material designed for use in spacecraft became a part of the cookware in every kitchen. Users never asked how Teflon developed or why it works. They were simply happy to have nonstick cookware.

This is the most important group to reach if science is to become an accepted part of everyday philately.

Integrating these Groups

These different aptitudes are directly reflected in forensic philately. The First International Symposium on Analytical Methods in Philately (subsequently referred to as "Symposium") has shown that all of these aptitudes exist simultaneously in philatelic research.[1] Indeed, papers were presented representing all three. Most important for the future, several researchers were capable of being quickly trained in the use of forensic equipment. Only a few key concepts may be required to interpret simple results. It is the enumeration and transfer of these concepts that are required to make scientific philatelic analysis successful.

This is where organizations such as the Institute for Analytical Philately, Inc. (IAP) and the National Postal Museum (NPM) are crucial. By bringing together a multidisciplinary group of scientists, technologists, and managers, these nonprofit organizations can facilitate communication and technology transfer between scientists and philatelists.

The premier English-speaking expertizing agencies, the Expertizing Committee of the Royal Philatelic Society London, the Philatelic Foundation (New York), the American Philatelic Expert Committee (APEX), and the Vincent Graves Greene Foundation (Canada) have recently begun integrating forensic equipment into their procedures. This adds further impetus to the need for development of appropriate scientific procedures for philatelic forensics.

THE POTENTIAL AUDIENCE

What, then, is the target audience for scientific writing in philately? Is it the scientific peers of the writer, of which there are few? Or is it members of the entire stamp collecting community, of which there are many?

The answer to these questions should be clear. Unlike academia or industry, the application of science to problem solving is not an end. Instead, it is a beginning that allows new methods and tools to be developed for direct application to philately. As a simple example, consider the comparison of two stamps, nominally the same, that appear to be different colors, not shades. It is easily shown (Liston, 2012) using spectrographic methods that the elemental makeup of the inks is different. Therefore, the stamps are in fact different. That is all a philatelist needs to know. Neither detailed knowledge of the spectrograph, nor deep knowledge of chemistry, nor understanding of excitation of inner shell electrons is needed. If later a layperson wants to be involved in such analyses, then naturally some training will be required. But to benefit or learn from technology it should not be necessary to have a Ph.D. in chemistry or physics.

In summary, the scientist must convey the value of the philatelic component of the research in as direct a manner as possible, using plain English in a way that makes the utility of a technique come alive.

THE IMPORTANCE OF TECHNOLOGY TRANSFER

There are several reasons it is important to direct philatelic science to all philatelists. These are discussed in the following sections.

Philately is a Hobby

Scientists should always keep in mind that philately is, first and foremost, a hobby. For the vast majority of enthusiasts the hobby is about stamps. A smaller percentage of collectors focuses on the usage of the stamps. An even smaller percentage studies the development of other aspects of postal systems. While it is true some philatelists are very serious, not all collectors are. In fact, only a very small portion of the population will ever know or care about hard forensic science.

On the other hand, those who do care, including scholars, expertizers, specialists, and exhibitors, often have an insatiable need to know the truth. This may result from the need to know that a particular item is genuine; it may be to understand the history of stamp production—especially inks and papers—during a certain era; or it may be pure intellectual curiosity. There are perhaps 3,000–5,000 such philatelists around the world based on the numbers of authors and exhibitors. Of these, one estimates that fewer than 2,000 were ever involved in anything at an advanced scientific level either in a university or in industry. At the present time, IAP has about 100 members, slightly more than half of whom are scientists. Those remaining fall into the other categories but are still members of the 3,000–5,000.

The key point is probably 99% of all stamps collectors are not science buffs. Yet many have often wondered about colors, ink, papers, and gum. This group must not be forsaken if science is to play an important role in the future of philately.

Previous Attempts Failed

How many have ever heard of Philatelic Research Laboratories, Inc., Philatelic Research Ltd., or the Arthur Salm Foundation? Ostensibly, these were earlier attempts to bring science into philately. Without going deeply into their history, the first was the brain child of Y. Souren, a major New York stamp dealer from the 1920s until his death in 1949 (Souren, 1939). The second was the creation of another dealer, Roy H. White. It was used as a vehicle for publishing a number of studies during the 1970s and 1980s (White, 1983). The final one, the Arthur Salm Foundation, was created in 1991 by the Collectors Club of Chicago using a donation from the late Arthur Salm and additional funding from the club (Arthur Salm Foundation, 1991).

These three entities shared two traits. First, they were not scientific organizations. The first two appear to have been vehicles for the proprietors to generate business opportunities. This in no way diminishes the fact that their founders were extremely talented at forensic analysis. The third, the Salm Foundation, with an endowment of about $50,000, was formed to conduct research on philatelic products. They used outside laboratories to perform analyses with no apparent interest in developing such technical capabilities permanently for the hobby.

Second, none of these organizations attempted to be inclusive or to develop an ongoing organization that would survive either their creators or their endowments. In other words, they were doomed to expire from the beginning—and they did.

A New Beginning

Why did previous attempts fail? The answer lies with organizations such as IAP and the NPM.[2] IAP was formed in 2009 by a group of philatelists who were both scientifically trained and held senior management positions in industry. This nonprofit corporation is dedicated to funding scientific research in philately and developing new methods that will advance all areas of scientific philately. Equally important to both IAP and NPM is the dissemination of the results of this research.

The long-term goals of IAP also include forming a pool of human resources that can perform research and assist and train others in performing their own research. The NPM forensic laboratory is one place open to researchers.

It is also hoped that the expertizing bodies in the USA, Canada, and Europe will become resources for further research. Thus, it is anticipated that a synergistic relationship will develop that accelerates the integration of science into the hobby.

THE IMPEDIMENTS TO TECHNOLOGY TRANSFER

Exactly what are the impediments that prevent widespread assimilation of new scientific information by the philatelic public? Several of these are discussed in the following sections.

Impenetrable Language

The first potential problem is an article or paper simply contains too much science. Is this possible? Consider a few titles of scientific papers from major journals in other scientific domains:

Analytical Performance in Flow Injection–Simultaneous Multielement–Inductively Coupled Plasma–Optical Emission Spectrometry Employing a Cyclonic Spray Chamber (Hettipathirana and Davey, 1996).

The Notion of a Rational Convex Program, and an Algorithm for the Arrow-Debreu Nash Bargaining Game (Vazirani, 2012).

Only a very small percentage of the population (even of university postgraduates) has any idea what these papers may be about. This is not surprising because the research is published in specialized journals of record in the spectrographic and computing scientific disciplines.

Why would this observation not apply to stamp collectors as well? Consider these titles:

Characterization of Genuine Stamps, Reprints, and Forgeries of the 1867 and 1868 Issues of the Roman States by Diffuse Reflectance Spectroscopy (Tyler and Peck, 1978).

Fourier Transform Infrared Spectroscopy Applied to Ink Characterization of One-Penny Postage Stamps Printed 1841–1880 (Ferrer and Vila, 2006).

Do you think most philatelists will immediately read these papers? They would perhaps glance through the paper and look at the "pretty pictures." Just maybe, if the figures and graphics convey easily understandable information, rather than data, the reader might actually risk venturing into the text.

Why are titles like these effective?

The "China Clay" Varieties of the 1908–1910 Washington-Franklin Issues (Liston, 2005).

New Zealand: Inks Used for the Early Chalon Heads (Odenweller, 2009a).

They are short, do not try to explain in the title every technique used in the research, and give an easily understood overview of their contents. The author hopes casual readers would not be frightened away before even considering reading the articles.

Too Much Data

After getting past an overly complex title, some research papers proceed to have too much data. Pages full of equations or spectrographs quickly blur the philatelic reader's eye, causing loss of interest. Data should be reduced to the minimum necessary to prove the thesis of the paper. It is not unusual for a research project to generate many, many thousands of data items. But remember, data is not information. Information is the distillation of raw data into trends and conclusions that allow a phenomenon to be better understood and for observations to become knowledge.

As a very simple example, consider the curve shown in Figure 1. This curve represents a physical quantity sampled at more than 400 different conditions for a single stamp. Now, suppose there were a hundred such curves. Would it make sense to show all 100 data sets as separate plots? Of course not. They could all be plotted together, as shown for only 25 curves, in Figure 2. What a mess. Better yet, just the envelope (the upper and lower limits) of the data, and their average, could be shown, as seen in Figure 3. Thus, it has been possible to reduce tens of thousands of raw data items into three easy-to-understand curves showing us the limits and average of the data.

This shows how powerful graphical representation of data can be. This will be discussed in more detail later.

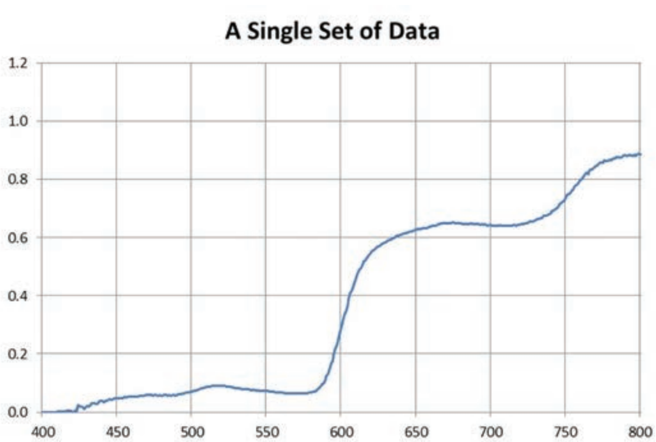

FIGURE 1. A simple curve representing more than 400 raw data points.

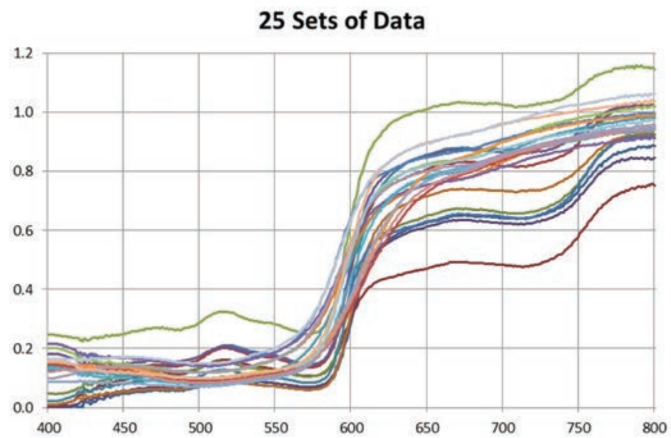

FIGURE 2. Data for 25 measurements on a single plot. Hopelessly useless: too much data, too little information.

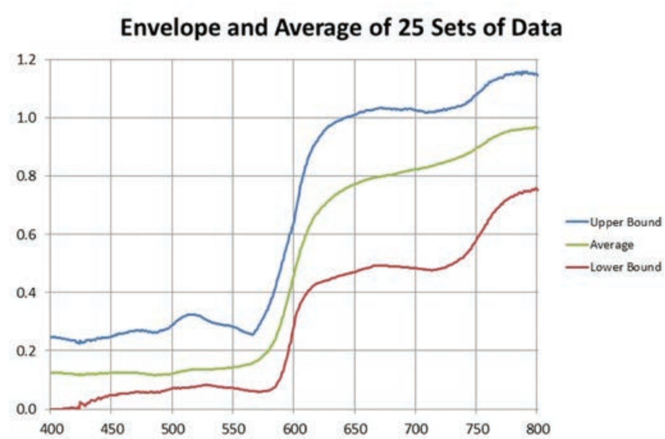

FIGURE 3. Tens of thousands of raw data points reduced to three easy-to-understand curves.

FIXING THE PROBLEMS

As introduced above, the easiest way to make scientific results more understandable is to improve data visualization. Specifically, this means only the data necessary to prove the thesis of the paper should be shown. That does not mean nonsupportive data should be omitted. The results should be understandable to any motivated philatelist. The optimal tools should be selected to present the data, as discussed in the following sections.

Organizing the Paper

One of the easiest ways to improve the readability of a scientific paper is by carefully organizing the presentation of the experiment, equipment, and results. Some ideas are presented in the following sections.

Isolating Ponderous Science

There are cases when a researcher has a great desire to add large amounts of scientific theory, equations, or other embellishments to a paper. Ask if the reader would be better served if this information appeared as appendices that can be skipped by readers who are neither domain experts nor interested. This same observation applies to explaining the type of hardware used to perform forensic analyses. While it is important to specify the equipment used, long lists of technical specifications from the manufacturers' catalog and manual should not overwhelm the thesis and results of the study.

This technique of isolation can greatly enhance the layperson's interest in a paper.

Simplifying Scientific Concepts

Whenever possible, consider simplifying complicated scientific concepts. Some of the current researchers do this successfully. Consider the following description presented by Liston (2012:163):

> The most important aspect of this technique [X-ray fluorescence] is that the elemental composition of the ink remains the same even if there has been a significant chemical change of the ink. For example, oxidation or sulfidization from contaminants in the air or reaction with chemicals in the paper of the album or even light can cause a "color changeling." This is true because the binder in the ink keeps the original layer of ink, with its elements, in place on the stamp even if the chemical nature of the ink has changed.

This description is as simple as it could possibly be. While there may be readers who don't even know what an element is, this still represents, in the author's opinion, an excellent explanation. Researchers should strive for this level of clarity of communication.

Data Visualization

In many technical papers, especially those in chemistry, spectroscopy, and physics, much of the data may be represented in figures. There are many different ways to represent data, some of which are described in this section. As seen earlier, the point of using such devices comes from the old maxim "a picture is worth a thousand words."

Photographs

Photographs are a wonderful way to convey knowledge to the reader in a nonthreatening manner. For example, Figure 4 shows a photo of a piece of analytical equipment. This gives

FIGURE 4. Photos of hardware help reduce the mystique of new technology for the uninitiated. From Herendeen et al. (2011, Fig. 9). Courtesy of *The London Philatelist* and the Royal Philatelic Society London.

FIGURE 5. Photos of actual experimentation help illustrate the detail required for high-fidelity results. From Herendeen et al. (2011, Fig. 11). Courtesy of *The London Philatelist* and the Royal Philatelic Society London.

the reader a chance to remove any prejudged mystique and fear of hardware. It is also useful to include one or more reference items so that the viewer gets a sense of the scale of the hardware. Figure 5 shows an experimenter actually dealing with samples during a testing procedure. This kind of photo helps convey the careful organization needed in detailed experimental work.

Drawings and Sketches

Drawings and sketches are often used to reduce complex ideas to a simplified and easily digested form. Consider Figure 6. This little sketch actually describes, in a very simple fashion, the energy dispersive X-ray fluorescence (EDXRF) spectrometer. Given the rather intimidating name of this equipment, the layperson would probably be surprised by the ease with which the principles of this device can be understood. One can trust the scientists who have developed the theory and the engineers who have designed and manufactured the equipment.

Graphs

Another way to make large amounts of data understandable in a single glance is the graph. With the advent of spreadsheet software, the creation of many styles of graphs has been greatly simplified. One use of graphs was previously shown in Figures 1, 2, and 3. Frequently encountered are the spectrographs that are, not surprisingly, the result of spectrographic analyses. A classic example is shown in Figure 7. This graph represents many thousands of samples taken by the EDXRF to determine the chemical elements in a sample.

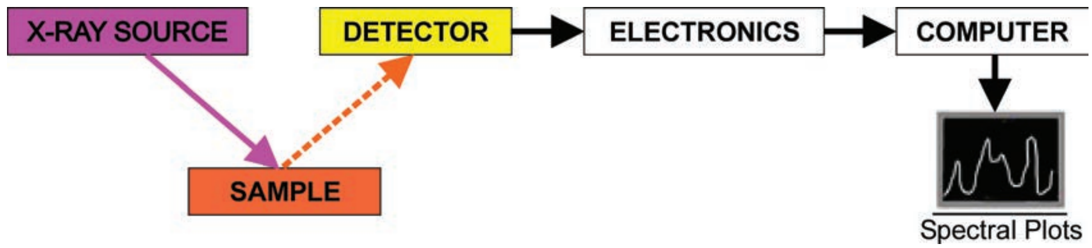

FIGURE 6. An example of a drawing or sketch used to provide a simple description of a possibly complex process. This is the logical design of an EDXRF spectrometer.

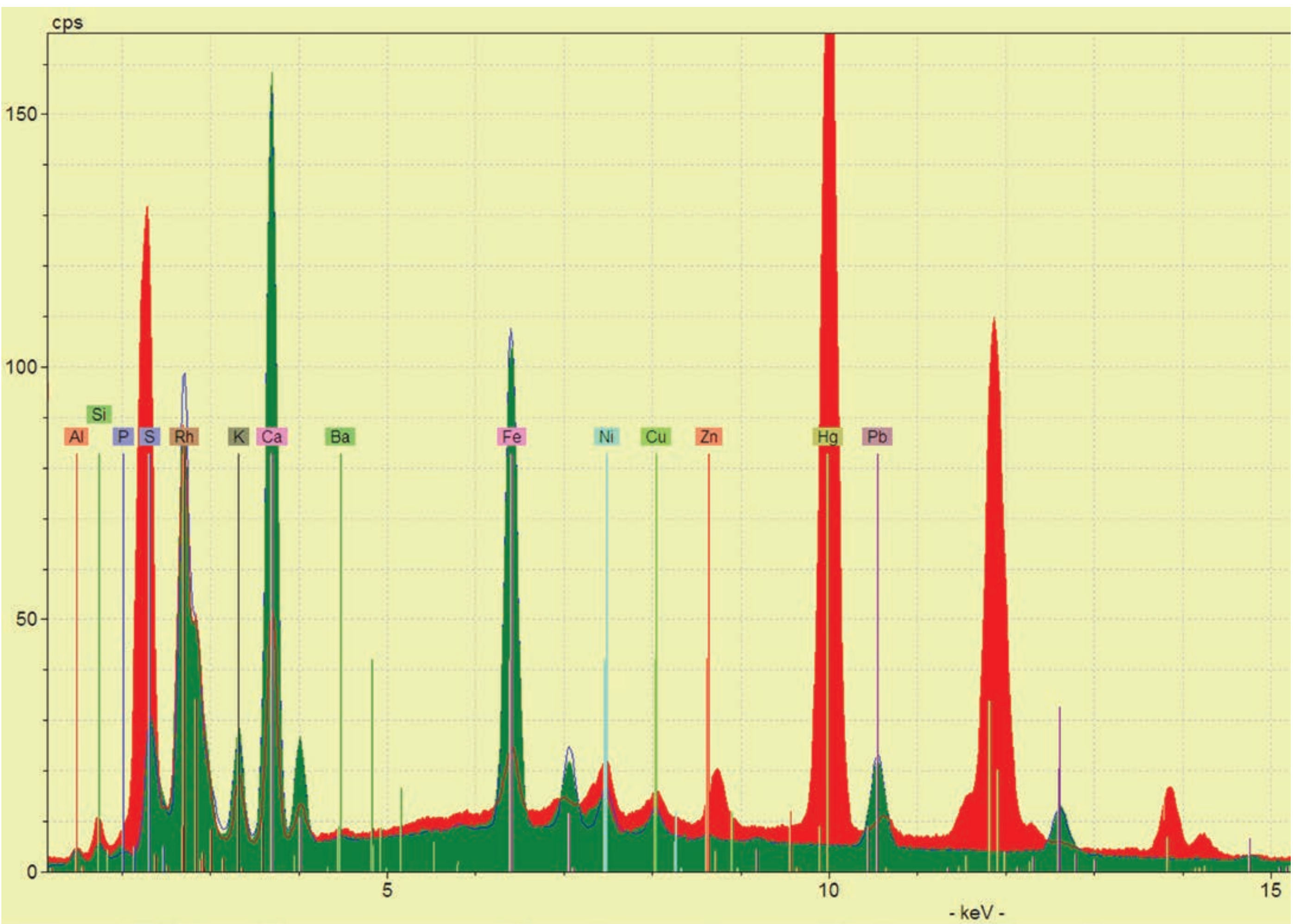

FIGURE 7. A typical spectrograph showing two different ink compositions (one in green, the other in red) based on simple elemental analysis using EDXRF. This allows the differences in ink composition to be easily discerned as the chemical elements are labeled.

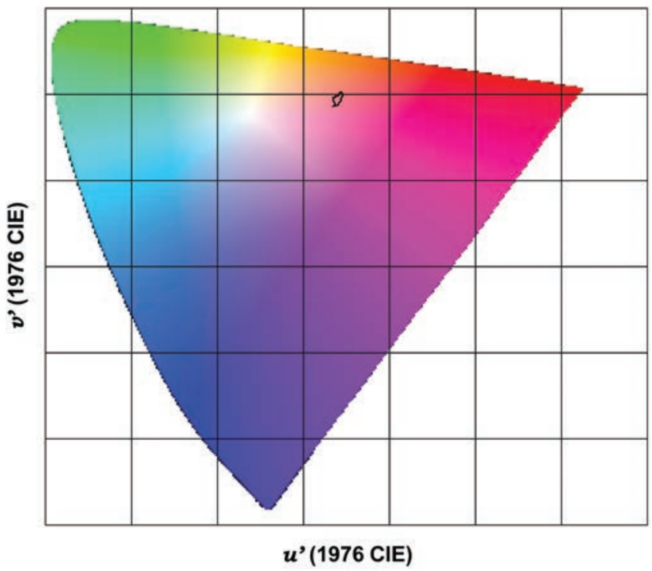

FIGURE 8. An example of a chart providing a simple view of a complicated concept. From Herendeen (2011, Fig 2). Courtesy of *The London Philatelist* and the Royal Philatelic Society London.

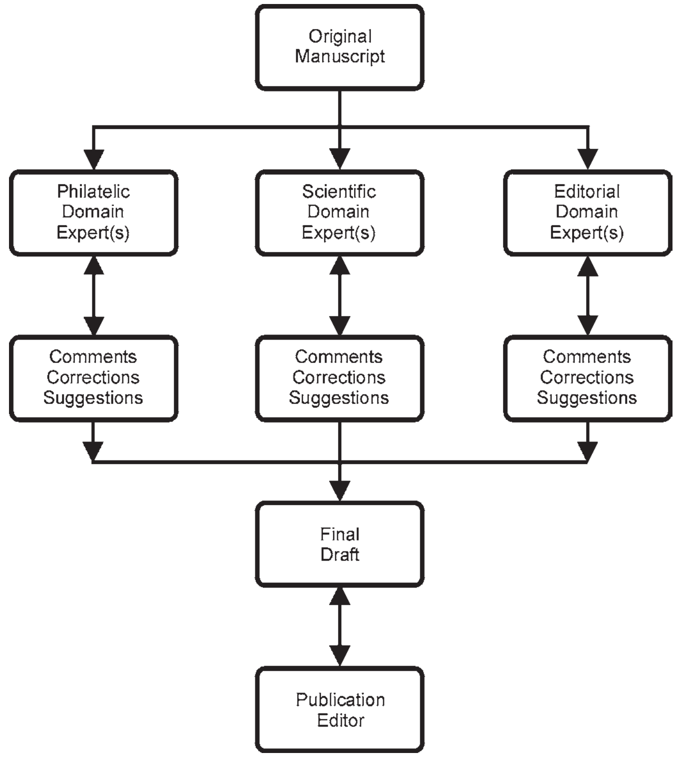

FIGURE 9. Logical flow of the ideal manuscript peer review process.

Charts

Charts include bar, pie, scatter, area, surface, and many others. Generally, these charts allow different classes of data to be readily viewed and understood. For example, typically, bar charts are used to illustrate quantities such as sales by quarter or height by age of children.

There are many more exotic types of charts. Consider Figure 8. This is what is called a chromaticity diagram. It is very difficult to express what is shown in words alone. Generally speaking, the small area noted by the arrow describes the various shades of color (red-orange) within the spectrum of colors defined by a specific color model of a large group of stamps. These words simply do not convey as memorable a concept as what is present in the drawing.

The flowchart is another useful device. It is often used to show the logical flow of a process. An example is shown in Figure 9.

Tables

Sometimes an author wishes to present actual numeric data. This may be done in tables. Normally, such tables, to be useful, have only a few numeric values in them.

For example, Table 1 shows a portion of a table that shows how an expert identified colors based on their chromaticity coordinates (Herendeen et al., 2011, Table 1:111). The author believes tables tend to be much more useful in humanities research than numeric-based research because there are usually very large quantities of data that are being reduced to draw specific conclusions. Mind-numbing tables of raw data seldom communicate such conclusions effectively.

TABLE 1. Allocation of color categories (extracted from Herendeen, 2011, Table 1).

	Chromaticity coordinates		
Sample	***x***	***y***	**Expert allocation**
P_1	0.3381	0.4948	H2
P_2	0.3370	0.4940	H2
P_3	0.3433	0.4993	H3
P_4	0.3351	0.4917	H1
P_5	0.3364	0.4926	H1
P_6	0.3395	0.4943	H1

OUTSIDE READERS

One of the most important aspects of scientific research is to have one's work reviewed by outside readers. The principal reason to use outside readers is to make certain that no simple errors have been made and that the paper is understandable. All authors are subject to the same modes of failure. For complex subjects that take prolonged periods of research, the scholar is often so embedded in his work that a wide perspective is lost. Experience has shown that it is possible for small, but very important, facts to be overlooked.

Odenweller (2012b:132), in an editorial in the *Collectors Club Philatelist*, wrote

> On occasion we have been asked if it would be a good idea to "referee" the articles that appear in the way they are done for scholarly journals. Usually this is not practical, either due to time constraints or for finding the appropriate referee, since the author is likely to be one of the most likely to know the subject best. Still, we do try to ask for input from other specialists when it is possible, sometimes while the article is being processed for print. If this is the case, and an answer is received too late for the issue, we can entertain a "response" article for the next.

The author, as one who has edited several philatelic specialty journals, understands the origin of this position. Few philatelic publications have the luxury of an article "backlog." The production of even a quarterly journal requires a constant scouring of a society membership for material. When using a review process of any type, there is usually a time lag that can easily be intolerable.

The second objection, the difficulty of finding domain experts to act as referees, is not necessarily true, as amplified in the next section.

Philately is Different

Scientific papers relating to philately are different from those in many other disciplines because there are three domains of expertise that come into play with philatelic science. The first domain is the science itself. Thanks to the advent of IAP and a growth in scientific analyses, especially those related to spectroscopy, there is a growing pool of talented researchers qualified to objectively review such manuscripts. The second domain is the philatelic one. The author believes that there is always at least one additional expert capable of critiquing and fact-checking a research manuscript. This is similar to finding professors to serve on a Ph.D. committee for a candidate who is already working at the state of the art in some scientific field. This is, in fact, a common occurrence. The third and final domain is a reviewer who can determine if the manuscript is conveying useful information to readers who may not have a strong scientific background. Such reviewers will most often be scientific managers who were fighting this battle for many years when trying to convey extremely difficult scientific concepts to upper management in the corporate world.

The Procedure

The logical flow of the actual procedure for the ideal peer review process is shown in Figure 9, an iterative procedure including feedback loops between the reviewers and the author and later between the author and the publication editor. It is this feedback that improves publication quality.

A Real-World Example

To see how this works, consider the author's article on the inverted frame postage-due stamp of Labuan (Herendeen, 2006). This project was quite large in scope. Without getting into great detail, this study required contacting many collectors, dealers, and expertizing groups around the world; combing thousands of auction catalogs; and scouring many journal articles and stamp publications. After two and a half years, the basic research was completed. The article itself was multidisciplinary in nature. It included a detailed history of the stamps, a comprehensive census, the use of computer graphics to reconstruct multiples, and statistical analysis to estimate the number of errors that may have been printed.

So how does one have such an article "refereed?" For this paper, several domain experts in British colonial stamps were used, a university professor was used to check the statistical formulation, and several philatelic editors were used to insure the quality of the manuscript.

Does such a procedure take time? Most certainly, but this time is well worth it when it yields a superior result.

Where to Publish Scientific Philately

Once the scientific study has been documented, exactly where should it be published? There are two aspects to consider when making this decision. The first is whether a sufficient audience of philatelists exists with enough scientific background to gain important insight from one's work. The second is the philatelic subject matter.

The Collectors Club Philatelist

The *Collectors Club Philatelist* (*CCP*), until recently under the editorship of Robert P. Odenweller, is an excellent venue for publishing scientific articles. There are several reasons for this. First, Odenweller (2012a) noted that the *CCP* plans to be a leader in the publication of quality scientific articles. During the 2000s, a fair number of important articles have appeared (e.g., Liston 2005, 2012; Lera, 2012). Odenweller's successor, Gene Fricks, has indicated that he will continue supporting scientific articles. Fricks is a professional scientist and will be a great editor for scientific work.

The *CCP* has a circulation of more than 900 and a good penetration into major public libraries. This makes it easy for philatelists to access materials published in it. Others may be able to find material on the IAP Web site,[2] at the American Philatelic Research Library,[3] or through the recently formed Global Philatelic Library (Walton, 2012).[4]

The London Philatelist

The honorary editor of the *London Philatelist* (*LP*) is Frank Walton. The *LP* is the literary organ of the Royal Philatelic Society London (RPSL). To date, only a modicum of scientific analysis has been presented in the pages of the *LP*. However, the RPSL now has a Video Spectral Comparator 6000 and an XRF spectrometer on order. These should become a source of more articles based upon optical and chemical spectroscopy in the near future. With a worldwide circulation of more than 2,100, this publication is also ideal.

The American Philatelist

The *American Philatelist* (*AP*) is the monthly magazine of the American Philatelic Society. The editor is Barbara Boal. Many years ago, the *AP* editorial policy changed its tone, leaning more to historical and thematic articles than hard-core research. Nonetheless, scientific articles have appeared occasionally over the past four decades (e.g., Tyler and Peck, 1978; Glazer and Dow, 1983; Hanneman and Hintze, 1991; Bell and Blackett, 2012).

The obvious plus for the *AP* is that it has a circulation of more than 32,000 monthly, and many philatelic scientists are members.

Major U.S.-Related Journals

The major U.S. specialty journals *The Chronicle* (U.S. Philatelic Classics Society, circulation 1,200), *The United States Specialist* (United States Stamp Society, circulation 1,800), and *The Confederate Philatelist* (Confederate Stamp Alliance, circulation ~700) have large circulations and a significant number of practicing and retired scientists. For research related to U.S. material, these may be the best venues for articles. They have already published some of these, such as White (1989a, 1989b, 1989c). These are all high-quality productions with good color. *The Postal History Journal* would generally be most appropriate for research relating to verifying markings, cancels, and other indicia on covers.

Specialty Journals

Most specialty journals have relatively low circulations, e.g., 100–600. With the exception of *Philatelica Chimica et Physica*, the journal of the Chemistry and Physics on Stamps Study Unit, these specialty groups also tend to have relatively few scientists as members.

Professional Technical Journals

One should consider submitting work to the various professional journals as well as the philatelic ones. There are several reasons to do this. First, it raises the stature of analytical philately in the eyes of those who feel that these publications are a validation of the worth of research. Perhaps more important, there is an opportunity to expose large numbers of scientists, all of whom have analytical capabilities, to the fact that there are philatelic mysteries to be solved. Readers may think of novel approaches to solving problems exposed by published papers.

This is not an easy road, and perhaps current researchers in academia will be able to help pursue this area.

The Book

Finally, you can write the great book on a particular philatelic subject. For example, works that have wonderful scientific content include Glazer (1994) and Odenweller (2009b).

The problem with a philatelic monograph is that it is virtually impossible to tell from the title that there is any scientific content. Also, generally speaking, the circulation of monographs in today's world is modest, and their cost is often significant. This is not a good combination for making maximum penetration to the potential technical audience.

Web Publishing

The final possibility is to create an electronic article that is hosted by a Web site. IAP will do this for members and nonmembers without charge. By using this vector, the number of possible worldwide readers will be increased dramatically.

THE POWER OF GRAPHICS

The author requests that readers of this paper now go back to the beginning. By looking only at the section headings and graphics, do you know what the paper is trying to convey? If yes, then the paper is a success. In no, the author will go back to the drawing board.

CONCLUSION

This paper has described the difficulty scientific philatelists may have in communicating scientific results to nonscientific philatelists. It has identified a set of problems and suggested a number of solutions to them.

It is hoped this new proposed publishing paradigm will allow the current renaissance in scientific enquiry to flourish rather than wilting like other earlier attempts.

ACKNOWLEDGMENTS

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NOTES

1. The First International Symposium on Analytical Methods in Philately was held at the Smithsonian National Postal Museum, 12–14 November 2012. It was organized by the Institute for Analytical Philately, Inc.

2. More information on the Institute for Analytical Philately, Inc. may be found at http://www.analyticalphilately.org. For the National Postal Museum, see http://www.postalmuseum.si.edu (accessed 18 July 2012).

3. To see what the APRL offers and to use the online catalog, see http://www.stamps.org/About-the-Library (accessed 18 July 2012).

4. Through its portal, the Global Philatelic Library has access to 19 different philatelic libraries in the USA, United Kingdom, Australia, Canada, Germany, and Norway. See http://www.globalphilateliclibrary.org (accessed 18 January 2013).

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