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Article: Art on Paper Discussion Group 2019: Expanding the Toolbox: Making Artists' Materials Reference Collections Relevant to Conservation Practice

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Art on Paper Discussion Group 2019

Expanding the Toolbox: Making Artists' Materials Reference Collections Relevant to Conservation Practice

INTRODUCTION

As conservators we are drawn to artifacts, whether for their beauty, their spiritual or intellectual significance, or the tactile qualities they display. Most conservators can also attest to their love of art-making materials, and many of us have personally amassed or enjoyed collections of beautiful papers, pigments, pastels, ink, and paint. This year's Art on Paper Discussion Group program examined how conservators build and utilize reference collections of artists' materials to inform conservation practice, our understanding of works of art made with them, and our treatment of these objects. The session began with an introduction to current collection initiatives. This was followed by seven presentations by paper conservators, scientists, and educators on their personal and institutional approaches to collecting, using, and organizing these materials and associated data.

The topic is relevant today for several reasons. First, the proliferation of Internet resources for historical specialized artist materials has facilitated direct relationships with vendors and manufacturers, making it possible for individual conservators to build significant collections of these items. In addition, as our colleagues begin to retire, they are considering steps to organize and share the valuable study materials they have amassed over long careers. This also holds true for collectors outside our field who have extensive collections of materials that would be of great interest to paper conservators. Recent examples include study collections such as the Berger-Cloonan Collection of Decorative Papers at Texas A&M University, or more data-driven resources such as the

This open discussion took place on May 17, 2019, during AIC's 47th annual meeting in Uncasville, Connecticut. The moderators organized and led the discussion and recorded notes. Readers are reminded that the moderators do not necessarily endorse all comments recorded, and although every effort was made to record proceedings accurately, further evaluation or research is advised before incorporating any observations into practice.

Paul Messier Photographic Papers Collection, purchased in 2015 by Yale University for its Lens Media Lab.

The process of forming these two collections was presented to raise several points that were addressed by our speakers: How does one determine where their collection goes? How are these collections being cataloged and accessed? What are the most basic solutions for organization? Is the collection static or evolving? How is the collection made most useful? The topic resonates as our colleagues at several institutions have begun the Herculean task of determining cataloging methods to systematically organize and describe artist materials reference collections on a large scale. With these thoughts in mind, the first three speakers, Michelle Facini, Marjorie Shelley, and Jodie Utter, presented significant institutional reference collections developed by paper conservators, outlining their current organization and use. Our second group of speakers, Amanda Hunter Johnson, Margaret Holben Ellis, and Joseph G. Barabe, addressed the topic of making reference collections relevant to conservation practice, and our last speaker, Andrew Davis, addressed issues of accessibility and complex data management. What follows are summaries and/or excerpts from their oral presentations, revised into the third person for clarity and ease of reading.

SUMMARY OF PRESENTATIONS

MICHELLE FACINI

THE PAPER COLLECTION AT THE NATIONAL GALLERY OF ART

In the opening presentation, Facini introduced the audience to the paper sample collection at the National Gallery, describing it as a collection of mainly 20th- and 21st-century paper samples. Criteria for acquisition require that the sample papers be intended for making works of art; that they be dated; and that any information about the manufacturers, distributors, and merchants associated with the paper samples be provided. To date, there are approximately 3000 pieces in the collection that comprise booklets, bound volumes, and

whole individual sheets from approximately 160 different companies. A database of the collection includes information regarding country of origin, manufacture date, papermaking process, and watermark. Those interested are encouraged to examine the collection firsthand so that they can get an aesthetic and tactile sense of the samples; examine color and texture; and, if so desired, also consult the National Gallery's volumes on paper history, its watermark publications, and its extensive collection of paper trade directories.

Paper conservator Judith Walsh, who had forged a relationship with the Strathmore Paper Company (purchased by International Paper in 1986), conceived of and started the paper sample collection. Walsh negotiated that any duplicate paper samples that Strathmore had would be put together as a group and donated to the National Gallery. Today, the Strathmore donation comprises 30% of the paper sample collection. Perhaps better known is the collection that was acquired when New York Central Art Supply closed in 2016. The owners of the store were true curators of paper and had acquired many special 20th-century papers over a period of 70 years. For the owners of the store, it was important to know that the collection would be preserved for posterity. And as various smaller art suppliers close, they too have made donations to the National Gallery's collection. Facini showed a 1982 example of an Arches paper sample book that includes valuable information on the production method, fibers, sizing, weights, dimensions, color, and watermarks of each paper in the volume. Gallery paper conservators Marion Dirda and Kim Schenck are constantly looking for materials to add to the collection from online sources and eBay. One example of a recent acquisition is a two-volume sample book, dating from 1914 and 1916, that includes samples and a price list.

Users of the paper sample collection include everyone from historians to curators to paper conservators. More often, a curator will be interested in a watermarked print or drawing, and using the collection, the conservators are sometimes able to find an exact match and follow the trajectory of its use over a period of years. For paper conservators, the collection provides several significant uses. In one example, Facini cited a treatment carried out at the National Gallery that involved comparing an exact match of a *gampi* paper used for a print that the conservator hoped to treat using gels and acetone. Before using these materials on the work of art, she was able to use the sample as a surrogate to ensure that her treatment protocol would not alter the surface sheen of the delicate *gampi* paper. In another example, a conservator from another institution contacted National Gallery conservators regarding a Jasper Johns print that was thought to be discolored. A matching paper sample located in the collection showed that the current paper tone was accurate, and was then successfully used to prove that the print was not at all discolored and actually in very good condition. Comparison with

another impression of the same print on the same paper in the National Gallery's collection made it clear that the paper tone was intended by Johns and that no aqueous treatment was necessary. And in a final nod to artists' intentions, Facini cited a Picasso collage entitled *Cup of Coffee*, in which the tone of a central collage element of Fabriano paper had discolored. Using a sample of the same type of paper from the collection, she could ascertain what the color of the collage element was intended to be—and this visual information, of course, could be readily used as a baseline to digitally color correct an image to create a surrogate that more accurately reflects the original tone of the paper.

Looking to future development of the paper sample collection, Facini emphasized that relationships are everything. Paper conservators from the National Gallery actively take oral histories from manufacturers, papermakers, and suppliers in the US and abroad. They visit paper mills and are active in the International Society of Paper Historians. Outreach is very important to continue to actively build the collection. And with new digital initiatives at the National Gallery, they hope to make their database more dynamically searchable. They will be checking content for accuracy and ascribing authorship to comments. They are pondering how they might incorporate images, and, most importantly, how to link this data to works of art to provide broader context. Hoping to make the database more versatile, they know that they will need to migrate data from platform to platform as new technologies arise. They also wish to make the database open access, and for this they need to determine what kind of coding platforms are needed. Although there is a lot of work ahead, there is no doubt that the National Gallery's paper sample collection will continue to grow and remain an important resource for scholars and paper conservators.

Michelle Facini, Paper Conservator, National Gallery of Art, Washington, DC

MARJORIE SHELLEY

THE METROPOLITAN MUSEUM OF ART HISTORIC
ARTISTS' MATERIALS COLLECTION

Shelley began her presentation by noting that there are many different ways of forming and interpreting a collection of important historical art-making materials and summarized the Metropolitan Museum of Art's criteria for collecting these materials, the condition issues that they present, and their connections to the arts practices and cultural milieu in which they were produced. She started by emphasizing that most are rare, unique objects for which there are no precedents or bodies of information. They are cultural and utilitarian tools. They reflect historical practices and lend themselves to interpretation by conservators, as well as to collaboration with art historians, curators, and scientists. Shelley

has had ongoing success since starting the collection, deepening the Met's holdings and spreading the word about these materials through presentations, essays, and visits to the paper laboratory where they are stored in cabinets and displayed in vitrines. However, access is limited, as the paper conservation department is not open to the public. The collection has not been included in the museum's online database because it is considered nonaccessioned material; this is something that Shelley wishes to change with the hope that the collection will get more use. To do so will require hiring a collection manager to prepare an exhaustive inventory. Until then, the materials are listed in a FileMaker Pro database. Nevertheless, the collection has proven highly valuable for studying and teaching the history of materials to art conservators and art historians. It comprises fascinating examples of material culture; the tangible evidence of the equipment and tools that have shaped our artistic heritage and speak to the interwoven network of discovery, trade, and the transmission of ideas. Its diversity also provides possibilities for analysis and identification.

Shelley assembled objects and apparatus associated with the European and American works on paper from the 17th through the early 20th century in the collection that are part of her department's purview. The collection encompasses materials and tools used in studio and *plein air* practice. She has been able to acquire or purchase them from art dealers, flea markets, and eBay, and is supported by departmental funds, gifts from friends and dealers, and remarkably from strangers who have only heard about the collection. Among her first challenges in making an acquisition is determining its worthiness—how it fits into the collection, the story it tells. Typically, lacking provenance and substantive information is the case. A range of resources are consulted to justify a purchase or to accept a gift. Background checks include finding comparable objects in painting, drawing, and print descriptions, as well as in encyclopedias, artist manuals, memoirs, and the art-historical literature. A thorough examination is also undertaken to determine the authenticity of the component parts. Another issue that is considered is condition. Frequently, such objects are in poor shape from the ravages of time and generations of use. Conservation of these objects usually is not undertaken apart from the repair of small elements.

Many of the issues that Shelley faces are exemplified in a French 18th-century manikin that was a gift from a portrait painter—and there was no question as to its importance to the collection. Manikins were part of artists' workshops from the 14th to the late 19th century, serving as surrogates for sitters. Although far from paper (apart from the removable papier-mâché head), it was an appropriate acquisition because such objects served as models for drapery and figure studies drawn on paper. In addition, this example is notable because it is life size, fully articulated, and signed, which is a great

rarity. Technical examination reveals that it is composed of metal, bast fiber stuffing, and silk stocking coverings. X-rays show an armature that is in extraordinarily good shape and in fact corresponds to the illustrations in Diderot's encyclopedia. Its external condition, however, is very poor. Because this and the other objects in the collection are not works of art, acquisition criteria are not based on aesthetic or pristine appearance but on how they were used and what they can tell us about the artistic process and other related information. Here, conservation intervention was a necessity. The damage distracted from the manikin's visual integrity, and it could not be handled safely. To prevent further damage and preserve the original silk coverings, the textile, upholstery, and ethnographic conservators agreed that a nylon fabric covering should be used to protect the silk coverings. This precaution was successful in that the original fabric remained visible and the nylon fabric covering can be removed at any time. As a result of successful conservation intervention, the manikin was included in an exhibition at the Met and recently has been requested for loan, making it possible for more and more people to see objects like this—ones they may not know even existed.

Among the many riches in the collection, Shelley showed examples of a colorman's sample kit dating from ca. 1900, a box containing vials of pigments with the label Sewell; a *plein air* set with a collapsible paint box, stool, and mahl stick; and 19th-century pastel boxes, including one owned by Mary Cassatt dating from ca. 1893. Lightweight tinned containers that became popular in the 19th century are well represented, as are geometric and drafting tool sets. An 18th-century painter's table intended for studio use contains two drawers and a wooden palette. Some of these objects are luxury goods replete with sterling silver and ivory tools, whereas others are more humble, ordinary examples. Shelley pointed out one simple tool known as a grainer intended for decorating paper—and as luck would have it, she was able to determine that in a collage in the collection, artist Juan Gris used a similar tool! Another box that is of particular interest was custom made in the 18th century and contains what Shelley believes is the atelier of an itinerant artist, including powdered colors, hard cake colors, and ivory palettes. But what is most interesting is that it corresponds to a painting by Rembrandt Peale in which he is seated at a similar paint box and on which he has placed miniatures with the lid serving as an easel for his work. Also interesting is that one of the vials of powdered pigment contains the label of a Baltimore colorman, with Baltimore being the very city in which Peale worked as a miniaturist. Today, this box is on permanent display in the Met's American Wing, in the miniature gallery.

As for the future, in addition to building the collection further—it presently comprises 200 objects—Shelley hopes to continue to link these materials with works of art and to see them included in more of the museum's exhibitions. She

hopes to encourage greater use of media samples for analysis and, most importantly, to wholesomely catalog and inventory the collection.

Marjorie Shelley, Sherman Fairchild Conservator in Charge, Paper Conservation, The Metropolitan Museum of Art

JODIE UTTER

ARTIST MATERIALS AT THE AMON CARTER MUSEUM OF AMERICAN ART

Utter has been dedicated to building the Amon Carter Museum of American Art's study collection of artists' materials, cataloging and making them accessible for many years. The collection includes examples of materials from the late 19th to the early 20th century. Utter started the collection as part of her research on the artist Charles Russell, hoping to replicate his methods and better understand his materials and techniques on a visceral level. From that beginning, she has been collecting for close to 10 years, with funding provided by the museum. The collection includes watercolors, sample booklets, different types of papers, and advertisements that are particularly important for the addresses they include. Recently, she has started to collect French trade manuals. In her presentation, Utter discussed cataloging the collection as a nonarchivist and trying to think about a numbering system as an archivist would. With the guidance of the museum's archivist, they established "family numbers" that, although long and cumbersome, reflected the year the object was acquired and what number object it was in that given year. From there, any additional elements are "children" that are further numbered. Luckily, Utter was able to bring in a master's student in library sciences to catalog about 3000 discrete objects. Each object is numbered together as a group, and because it has family and children numbers, discrete parts can be separated if necessary and then put back into place. The cataloger took detailed photographs of the materials in their boxes, with the numbers of each item visible in the picture. All of this was entered into an Excel spreadsheet.

Early on in her collecting, Utter paid a visit to Michael Skalka at the National Gallery, where he oversees an enormous collection of artist materials. His database was built in FileMaker Pro, as was Marjorie Shelley's at the Metropolitan Museum of Art. And although the information technology department at the Amon Carter did not wish to, they allowed Utter to retain access to FileMaker Pro so that she is able to retain access to the National Gallery's database. However, at the Amon Carter, Utter used Excel to build the bones for her cataloging, and at some point this information will be uploaded to the museum's collection database (developed in New Zealand and called *Ke Emu*). The fields she established in Excel will have a place within that database, and considering that it was built for natural science collections, it will be well suited to her needs.

Hand in hand with cataloging the artist materials, Utter had to give serious consideration to how and where the collection would be stored. In the early days of collecting, the materials were stored in the paper conservation laboratory; however, as the collection grew and once it was cataloged, Utter turned it over to the archives department. The various materials are stored there in archival boxes. And instead of numbering each object individually, each small package within a box is numbered. For example, a watercolor tin will have a family number and children numbers on it, using labels adhered to the outside of the wrapping tissue. These numbered packages are photographed in situ and can be consulted in the event that one element within a larger box is misplaced. Utter also took the precaution of putting individual paints into small sample bags in the event that they begin to ooze or fall apart. She makes sure that there is not a lot in each archival box so that boxes do not become cumbersome or too heavy.

Ultimately, Utter's goal was accessibility. Once the artist materials were cataloged in a searchable database and properly stored so that they could be handled and cared for, she realized that they were useless to anybody else unless she could share them. Her goal was to share items from the collection with the education department, her exhibitions department, and with her curators as didactic teaching tools. Even though the database currently resides in the Excel spreadsheet, the archives department has made it a goal to upload the information into the collection database in the coming year. The museum will also be getting a new website in which the artist materials collection will be completely accessible. Her hope is that this will be welcoming not only to outside scholarly researchers but also to teachers all the way from grade school to the graduate level. Increasingly, classes are being offered on historic artist materials, and her collection is a perfect fit for this kind of class. Finally, the museum has undergone a major remodel that includes a new permanent collection area in which the curators are now routinely incorporating various tools and materials alongside works of art to demonstrate how these objects and artworks were made. This drives interest as well, and with the interest garnered, Utter anticipates that the collection will become more and more accessible in the future.

Jodie Utter, Senior Conservator of Works on Paper, The Amon Carter Museum of American Art

AMANDA HUNTER JOHNSON

THE ARTIST MATERIAL COLLECTION AT THE SAN FRANCISCO MUSEUM OF MODERN ART

As a conservator working in a museum of modern art, Johnson continued the discussion by presenting her museum's unique perspective on the artist materials collection at the San Francisco Museum of Modern Art and how they are

using it. The museum's mission states that they believe the art of our time is vital and shared with passion and purpose. Each year, the museum works with 30 to 40 living artists through exhibition, acquisition, or loan of art. Building trusting relationships with artists over time leads to better stewardship of their art. And this dynamic is one of the biggest contributions that conservators can make to the future care of contemporary art. This working relationship often results in tangible evidence of an artist's practice, and this is what they are including in their artist materials collection items that help to illustrate practice. The Artist Material Collection (AMC) is constantly growing and includes approximately 300 objects. These could be objects used by artists to create artworks, such as Jay Defeo's painting tools or fragments from an Yves Klein sponge. Items may also be given by an artist or an artist's estate to help inform a treatment, such as mock-ups and tools from Robert Gober used to treat one of his beeswax sculptures. The collection also includes mock-ups created by conservators to better understand techniques, such as those made to study Robert Rauchenberg's process. Sometimes there are formal donations, such as a recent large donation from the Frederick Hammersley estate that includes many unfinished paintings and tools.

Over the years, the conservators turn to these objects during tours and presentations because they help tell the story of their work as contemporary art conservators. When planning began for their new building, they knew they wanted to make the AMC a focal point. Samuel Andersen Architects designed many of the nongallery spaces in the new building, and they designed a two-story tower to display and store the AMC. The tower became the central integrating feature of the conservation studios and extends from the seventh floor, through a hole in the ceiling, to the eighth-floor studio. All objects on that central tower are artists' materials. Having a two-story tower to display materials that deepen knowledge about an artist or work in the collection is a whole other arena for engagement. The tower has different surfaces, painted drywall to pin objects, steel to hang works with magnets, light boxes, and many drawers.

Currently, the objects in the AMC are in a database that is in the process of being linked to the museum's collection management system to provide more access. The aspiration for these materials is for them to be available to staff, scholars, students, and the public for research or study to deepen appreciation and awareness of an artwork by illustrating the artist's process, materials, or ideas; to help preserve an artwork; and to create a record of iterations of conceptual works. Conservators at the museum are using these materials and making them relevant in three different areas: incorporating artist materials into gallery spaces, hands-on engagement, and creating a record of conceptual art iterations. Artist materials are routinely incorporated into exhibitions in an interpretive gallery on the second floor. A recent rotation

included tools and sketchbooks from Ruth Asawa's studio. A recent exhibition of Wayne Thiebaud's work was complemented by materials from his studio that included brushes loaded up with paint; paper plate palettes; or, Johnson's favorite, palettes made from the lids of tennis ball cans. Staff from the Content Strategy and Digital Engagement team managed the case in the exhibition.

One of the beautiful aspects of the AMC is that these objects can be handled. As part of the Artist's Initiative Program funded by the Andrew W. Mellon Foundation, several workshops were held in the seventh-floor workroom to complement a Vija Celmins retrospective. One of the main goals was to provide the means and access for close looking and discussion of Celmins materials and techniques. One session explored Celmins' drawing process by testing different grades of pencils on papers with an acrylic ground and papers without a ground. This activity led to a rich discussion about the physical interactions of materials and how the ground layer changed the sensation of drawing. It is a fairly simple exercise, but it led to a nuanced discussion and observations that probably would not have been arrived at without physically handling the materials. In a similar activity, the group looked at Celmins' *To Fix the Image in Memory I-XI* (1977–1982) in the gallery. The work consists of 11 found stones and 11 painted bronze casts of those stones, created by Celmins over 5 years. The participants made several bronze casts of found rocks that they could hold and feel and learn about from tactile means. When in the galleries, participants commented that they really wanted to touch the rocks and feel them and turn them over and look closer. This exercise provided that opportunity.

Perhaps some of the most relevant objects in the AMC are the objects that relate to conceptual works in the collection. Adrian Piper's installation *Art for the Art World Surface Pattern* is a good example. The work is dated 1976, as that is the date the work was conceived. As a conceptual work, honoring the intentions of the work and experiencing the installation are paramount, and the work is remade as needed. The artist provided written instructions, a digital file of the wallpaper image, and audio recordings. Due to the nature of the instructions, slight variables arise in its design and appearance every time the work is remade. An opportunity to learn more about the work by discussing it with the artist and the curator to further refine acceptable parameters of variability takes place each time the work is recreated. The work has been loaned three times in the past 15 years and is remade each time. The iterations were each approved by the artist's studio. After each exhibition, the San Francisco Museum of Modern Art requested that the borrower send a sample of the wallpaper for the AMC, as well as installation photographs, to add to the record. Then the work was destroyed. In the few iterations of wallpaper, you can see slight variations each time, and review with the artist or studio can lead to a fuller record

of acceptable variability. Considering that these iterations were destroyed after exhibition, if a staff member wanted to learn more, he or she would have to turn to the content management system, archives, photographs, and instructions, so having a physical record, even if just a fragment, of the various iterations becomes very valuable for reference. In this way, the AMC is a complement to the museum's current documentation system and an ever-growing part of the museum's resources.

Amanda Hunter Johnson, Conservator, San Francisco Museum of Modern Art

MARGARET HOLBEN ELLIS
EXPANDING THE TOOLBOX: MAKING REFERENCE
COLLECTIONS RELEVANT TO CONSERVATION PRACTICE

Ellis began by stating, "By now it should be clear that our interests in historic artist materials extends far beyond a natural attraction to mysterious substances and gadgets found in antique wooden boxes and shiny black japanned tins. Be it teaching, research or treatment, reference sets of historic artists materials can inform daily conservation treatment." Rather than showing an assortment of beautiful 18th- and 19th-century watercolor sets and oil painting kits and their related paraphernalia, Ellis concentrated on just three types of artist materials introduced in the early to mid-20th century. Although less photogenic, mid-century porous pointed pens, water soluble pencils and crayons, and optically brightened papers can all serve as examples of how we can expand our conservation toolbox by making use of these collections. Ellis has found that an in-depth study of historic artist materials can lead to many positive outcomes when it comes to conservation practice, and she cites just four: they can more accurately be used to identify media and techniques, they can better inform our conservation decisions, they can guide preventive conservation strategies, and they can encourage something she calls *technology transfer*. Ellis goes on to share her findings about the three groups of materials: the porous pointed pens, the water soluble pencils and crayons, and the optically brightened papers.

Porous pointed pens were first introduced to the American public during the Second World War. However, they were far different from the markers we use today. Advertised as a new way to write, even in rain and snow, these pens were quite primitive, mechanically speaking. An empty metal barrel served as a reservoir for xylene-toluene-based inks that contained highly saturated, light-sensitive dyes. Exchangeable felt tips allowed for a variety of lines ranging from bold italics to a standard pen line. A valve controlled the amount of ink flow. Ellis asked, "How does the study of early porous pointed pens produce the outcomes listed above?" She showed that the width of lines produced in a ca. 1960 drawing corresponded with a range of nib profiles that were

available with a Flowmaster pen, all of which she had. The saturated colors corresponded with those for sale with the Flowmaster pen. The solvent caused the inks to immediately penetrate the paper and dry quickly, allowing for overlap and making it possible for the scribbled colors to not bleed or blend. The uneven deposition of ink indicated an inconsistent release of ink due to faulty valve control and pressure, a problem overcome in later pens by the insertion of a controlled fluid delivery system using Teflon and polyester nibs. By carefully comparing the characteristics of the drawing's lines and colors with the actual implement and its inks, she could more precisely identify the media and technique. This knowledge contributes to what she knows about the artist's studio practice and potentially aids in dating. Because Ellis knew that the inks were solvent based, she was pretty sure that the water stain in the drawing could be safely reduced with water, whereas Scotch tape residue would require a careful solvent application. Thus, by having a reference set, Ellis could make better treatment decisions.

Ellis goes on to state that it is now known that drawings done in these early porous point pens suffer from poor light stability and that certain colors, especially the blue ones (as seen in a drawing she showed as an example), mysteriously transfer from one sheet when in direct contact with another in storage. This is a phenomenon that is called *color transfer*, and it can continue for more than 25 years. Thus, based on this knowledge, she asserts that conservators can suggest limited exhibition and no contact between drawings while in storage. Therefore, knowledge of the properties of the solvents and dyes of these inks results in better preventive conservation strategies.

In addition, conservators can apply a higher understanding of the technology of porous point pens to conservation-related uses, again something she refers to as technology transfer. For example, a contained and controlled flow of solvents is useful for spot testing. Easily obtainable barrels and nibs can be assembled and filled with solvents or water. This reduces the amount of expensive and toxic solvents that we typically pour out for spot testing, plus it limits our exposure to them. Spot testing pens are also very portable. The plastic components of Flair pens are not compatible with solvents but can easily be converted into water tear pens. And she showed two spot testing pens for use with acetone and toluene. The reserve materials are called the *fluid delivery system*. This is something found in later pens and has potential for use as poultices or to control the directional flow of liquids.

The next category of artist reference materials that Ellis discussed is water-soluble pencils and crayons, and by carefully studying these materials she stated that many of the same desirable outcomes could be achieved. No surprise to veteran paper conservators, Mephisto copy pencils look like graphite but bleed bright purple at the slightest hint of moisture. The ability to accurately identify copy pencil as a

medium reflects studio practice and dating but also alerts us to avoid the application of water in any manner, and knowing the light sensitivity of methylene purple also warns against a prolonged display. Other dry media that easily solubilize in water include colored pencils and crayons. When used in a dry manner, these media are virtually indistinguishable from regular colored pencils and crayons. However, Jackson Pollock used both water-soluble and regular colored pencils indiscriminately on the same sheet of paper. A drawing by Joan Mitchell can be more accurately identified as being created in water soluble wax crayons, not only through close examination but also because the Joan Mitchell Foundation has scrupulously saved Mitchell's studio materials, allowing for easy comparison.

Finally, Ellis discussed her new, groundbreaking research on papers containing optical brightening agents (OBAs) that were introduced in the mid-1950s. Ellis showed a selection of printed greeting cards by Milton Avery dating from the 1950s. Under visible illumination, they are similar in color—a fairly consistent white. Although the properties of paper are rarely, if ever, mentioned in gallery labels or catalogs, the knowledge that a paper contains optical brighteners explains its appearance and potentially informs dating, thus satisfying our objective of more accurately identifying media and techniques. She goes on to show that under UV radiation, the Avery papers differ greatly in their fluorescence. Going back to one of the cards, she shows that the front of the card no longer fluoresces, whereas the back of the card that was protected from light still fluoresces brightly. Although the color of the paper may persist, the brightness decreases over time. The knowledge that a paper contains OBAs thus can influence our preventative conservation strategies for its exhibition. But how does the presence of OBAs inform our treatment decisions? We know from previous research that OBAs are soluble in water. As part of a broader investigation of OBAs, New York University students tracked their migration during a typical washing and drying process. Reference sets of popular contemporary printmaking papers containing OBAs were assembled and documented using UV targets, and a range of fluorescence was visible. Samples were washed, and the amount of OBAs released was measured over time using a colorimeter. After washing, samples were transferred onto nonoptically brightened blotters for drying. Significant migration of the OBAs occurred! In addition, the OBAs that remain on the conservator's hands can migrate and deposit onto other nonoptically brightened papers, such as in an example of a 16th-century antique laid paper that she showed the audience. The knowledge that OBAs can migrate during treatment will certainly demand different treatment protocols in the future. With just three sets of artist reference materials used in her presentation, Ellis articulated how substantial study of these materials can inform conservation practice.

Margaret Holben Ellis, Eugene Thaw Professor of Paper Conservation, Institute of Fine Arts, New York University

JOSEPH G. BARABE

ARTISTS' MATERIALS REFERENCE COLLECTIONS: HOW TO CREATE AND USE THEM AND WHY THEY ARE ESSENTIAL IN ANALYSIS

As a private consultant in art materials and document analysis, Barabe has created several reference collections to aid his work. Barabe's main tool for analysis is the polarized microscope, a tool that he favors as an analytical method because it is a very fast way to identify a wide variety of materials. His large pigment collection includes both mounted samples and dry samples, and having both provides him with the versatility to use additional analytical methods. He has found that the reference samples that he has collected over the years are especially important in teaching pigment identification and in the identification of printing processes. Now that he has retired after a 25-year career at McCrone Associates, he is taking selected materials, creating sample sets, and sharing them with others who have similar interests. In his laboratory, he has a vast collection of mounted pigment samples, as well as samples of drawing materials. From Dr. Walter McCrone, Barabe received significant examples from the Forbes collection, the Doerner collection, and the Cornell collection, where McCrone had access to some very early industrial and commercial pigments. Over the years, Barabe has also developed a relationship with Dr. Georg Kremer and has a comprehensive collection of his company's materials, as well as a collection of pigments manufactured by *Aus Eigener Herstellung*. Barabe's collection continues to grow as he receives sample collections from friends and colleagues.

To organize his collection, Barabe collects and stores his pigment samples in small capillary tubes, then numbers and catalogs them using an Excel database. His records include source information for each sample, as well as the original classification system that he received from Dr. McCrone, which he believes originally came from colleagues at Harvard University. Barabe noted the value in collecting similar pigments from difference sources, citing the mineralogical and visual differences, for example, in lapis lazuli sourced from Chile versus Afghanistan. This emphasized the importance of provenance and the benefit of understanding variability of a pigment from a range of samples.

In addition to pigment analysis, Barabe has extensive experience in forensic document examination that involves the study of various printing processes. As an instructor, teaching workshops in pigment identification and printing process identification for the Hooke College of Applied Sciences, he has created affordable reference collections of 70 artist pigments and 45 printing process exemplars chosen to provide good-quality samples with characteristics that are

typical for the materials. He recommends photomechanical and photographic reference materials compiled by photo conservator Gawain Weaver, as well as the *New Zealand Police Printing Process Manual*, as valuable references for print process identification.

Joseph G. Barabe, Research Microscopist, Barabe & Associates LLC

ANDREW DAVIS

PRESERVATION REFERENCE MATERIALS: PHYSICAL COLLECTIONS AND DIGITAL INFRASTRUCTURE

Dr. Andrew Davis introduced the Center for the Library's Analytical Scientific Samples (CLASS), of the Library of Congress, established in 2008 to collect scientific reference materials that would support research and reflect the diverse range of materials in the collections. CLASS includes William James Barrow's 1000-book collection, modern and historic paper samples, parchment, textiles, plant and synthetic fibers, pigments, modern media, wax cylinders, photographs, and modern artists' and conservators' materials. Advancing from the physical collation was the digital infrastructure to collect, track, and link scientific analyses to the original reference samples (CLASS-D, "D" for digital). This database includes baseline characterization data for all the reference samples, aiding the selection of the best reference sample that matches collection items. The reference sample from CLASS can be used for destructive and predictive testing in research projects to support assessment of conservation treatments and impact of environmental parameters. CLASS-D has been structured so that research projects can be created by linking multiple reference samples and multiple analytical techniques to each reference sample—a unique aspect of the infrastructure. Standardized file formats and protocols have been established for open access and sustainability of the research data.

To increase accessibility of the reference materials within the Library of Congress, the Preservation Research and Testing Division established protocols for barcoding and cataloging all items within CLASS to ensure tracking and provenance. All information is uploaded into CLASS-D, and a system is in place for tracking and linking any extracted smaller "child/sibling" samples taken from the original "parent" reference sample. This allows for linking of temporal data and changes due to both natural and accelerated aging between different research projects. When new reference collection materials come into CLASS, they are assessed, cataloged, and collated into either a new or existing CLASS collection material type, then rehoused for ease of access and longevity with storage materials that meet Library of Congress quality assurance specifications. One procedure that has been established for new reference samples is to extract a small "pure" sample that is not used for testing.

This helps ensure that there are pure, uncontaminated reference samples stored separately from frequently accessed items, such as pigments.

CLASS is continually expanding to include additional reference materials that are needed to aid preservation of Library of Congress collections. The reference samples have been imperative for providing historic materials of known origin and/or composition, needed for various research projects. The baseline characterization of all reference samples through both destructive and noninvasive testing has greatly assisted the application of noninvasive testing on Library of Congress collection items by being able to link the noninvasive with the destructive testing on reference samples. Having an extensive characterization of the reference materials' composition from chemical, mechanical, and optical analyses significantly expands the cross utilization of the data from these samples for research. Research projects include linking the destructive and nondestructive analytical techniques for assessing organic and inorganic materials, and from the creation of replicates of potential conservation treatments, researchers can use these with accelerated aging for predictive testing. Additionally, the continued repeated analysis of the reference materials allows for assessment of the natural aging of the reference materials, which can then be aligned with results of their accelerated aging. This component is expanded further by then linking this information with the natural aging found in Library of Congress collection items. A proactive aspect of CLASS is the creation of new composite materials that better assist research into collections. For example, those in the Preservation Research and Testing Division staff have actively been creating pigment samples using original historic recipes on a range of substrates (papers of different sizes, parchments, glass slides, etc.) to best replicate historic materials within Library of Congress collections. Considering that many modern pigment manufactures are creating pigments and colorants that are not the same as historic examples, this set of reference samples has been invaluable. Part of the new reference materials' creation process includes creating mock-ups with different binders and concentrations, as well as multiple sets, so that a "pre" reference set can be kept in cold storage while other replicates from the set can undergo various analyses and aging. These samples have also been useful where it is necessary to determine possible impurities from the original material to ensure an accurate mock-up. CLASS and CLASS-D have expanded and supported research into preventing degradation of Library of Congress collections. The research projects including the use of the reference samples has allowed for more informed use and interpretation of nondestructive analyses of organic and inorganic Library of Congress collection items.

Dr. Fenella G. France, Amanda Satorius, and Andrew Davis, Preservation Research and Testing Division, Library of Congress

DISCUSSION

After the last presentation, the moderators opened up the floor for questions and comments. The closing group discussion reiterated the value of reference material collections to inform conservation treatment decisions, to educate colleagues and the public, and as a vital record of material culture. Institutional conservators with established collecting practices encouraged colleagues in smaller institutions and in private practice to seek support for acquiring any potentially valuable reference materials, with a consensus that these materials are quickly disappearing from the market as specialty manufacturers close and dealers retire. Challenges regarding cataloging and access were also expressed, with a collective desire for a simple open source platform as a place to start compiling a record of existing reference collections of any size. Book and Paper Group Wiki volunteers expressed vocal support to create a basic searchable repository to which individual conservators could submit a description of available materials so that colleagues can more easily locate and utilize material information. Even if only a general description of a collection can be publicly shared, an appropriate contact may be established to facilitate greater access to materials. Another viable open source platform was shared by Sarah Reidell, conservator at the University of Pennsylvania libraries, who suggested Shared Shelf Commons, now JSTOR Forum, as a potential platform for this information.¹ Reidell also mentioned a unique collection resource at the University of Pennsylvania—the Fisher Fine Arts Materials Library that offers three-dimensional scanning of collection

reference materials and other unique resources.² As organizers, it is our hope that the presentations were engaging and helpful in offering a survey of current technical resources and initiatives for reference materials that, as the presenters have shown, clearly support and can be integral to paper conservation research and treatment.

NOTES

1. JSTOR Forum is web-based software for managing, describing, and delivering library and museum collections: <https://www.artstor.org/jstorforum/>.
2. The Fisher Fine Arts Materials Library: <http://www.library.upenn.edu/finearts/materials-library/>

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