RACHEL FREEMAN, CYNTIA KARNES, AND HARRIET K. STRATIS
DISCUSSION GROUP CO-CHAIRS

Art on Paper Discussion Group 2017
Multiple Perspectives on the Treatment of Multiples: Innovative Thinking on the Conservation of Prints

INTRODUCTION

Prints, which are often produced in large numbers, present challenges for the conservator who seeks to treat them. Treatment of prints takes two forms: most often it is undertaken with the print in isolation from the rest of an edition; less frequently, the conservator has the opportunity to treat an entire group of prints that is issued as part of a portfolio. Prints from an edition may be pristine, whereas others may evince various degrees of damage since some examples may be safeguarded by storage within the folds of a portfolio never to see the light of day, or the prints may be significantly altered by long-term display, poor storage conditions, or previous restoration. Furthermore, once an edition or series is dispersed, the condition of individual exemplars can span the gamut from pristine to severely damaged.

To address these issues, Judith Walsh, Sarah Bertalan, and Anisha Gupta presented the experiences, reactions, or observations that they have made over time, and that have influenced how they approach working with prints. Each speaker explored the complex considerations given to the conservation and display of multiples and emphasized how the treatment of a print is shaped not only by its context within an edition or a portfolio but also by the sometimes divergent expectations of curators and collectors for display among related works. Walsh's talk focused on how she approached the treatment of a single isolated example from a group of multiples, faced with the fact that the work appears far different today than it did when first printed by the artist. Bertalan addressed how we as conservators may add clarity to an artist's intent or surmise the original appearance of a print by looking at the papers used in 19th and 20th century printmaking side by side in comparison to related works. Gupta presented her approach to treatment of a group of prints that could be challenging because one or more prints in the group do not look the same, although they were originally intended to match by the artist. She asked might there be an implied imperative to unify the appearance of works that were intended to be viewed in a series?

As noted in the session's title, for our purposes the term *multiples* comprises duplicate impressions of an edition print, or prints issued as a group, created by the same printer at a particular time and place. The materials are often the same, and we assume that the individual works were almost indistinguishable at the time of their manufacture. We also talk about a print's "cohort." *Cohort* is a term from statistics that refers to a group of subjects with a common defining characteristic, usually age. This is a useful concept for conservators because the materials used in works from the same era and culture can be expected to be similar.

Both multiples and items within a cohort are useful to us as we design treatment and determine desired outcome. Unlike duplicate copies of a particular print that tend to be dispersed, items in a cohort are more likely to be available to us for consultation. But there are limits to the usefulness of these comparable items. Importantly, we can rely on our own practical experience of similar objects for comparison, on the experience of colleagues, and on published conservation information on the treatment or study of similar of items.

PRESENTATION SUMMARIES

JUDITH WALSH
SINGULAR PROBLEMS IN SIMILAR PRINTS: THE TREATMENT OF THREE 15TH CENTURY ENGRAVINGS

In the opening presentation, Walsh shared her insights on the treatment of three old master prints that she undertook as a senior paper conservator at the National Gallery of Art (NGA) in Washington, DC. Although not "multiples" per

This open discussion took place on June 1, 2017, during AIC's 45th Annual Meeting, May 28-June 2, 2017, Chicago, Illinois. The moderators organized and led the discussion and recorded notes. Readers are reminded that the moderators do not necessarily endorse all comments recorded, and that although every effort was made to record proceedings accurately, further evaluation or research is advised before putting treatment observations into practice.

se, the prints formed a physical cohort based on material and execution: all three were copperplate engravings made in Europe within a 15-year period between 1465 and ca. 1480. And although their physical condition had diverged over the course of 550 years, it had also accrued meaning through research and interpretation that needed to be considered in treatment. Given the rarity of these surviving impressions, it was clear that a worldwide audience of experts would be aware of each print's particular history and its place within current research. Scholars would certainly have opinions about any treatment, and for some their stake in this was personal, having already published judgments on prints in the condition in which they were acquired. Curatorial reverence for published scholarship, which documents a print's condition in images and descriptive prose, was put forward as an important concern. Walsh relied heavily upon the NGA's curator to articulate the requirements imposed by scholarship as treatment goals were decided. She underscored the critical importance of the curatorial-conservation partnership for a successful treatment outcome by making sure that she understood the curatorial enterprise of relying on visual memory to rank prints among multiples, and by clearly communicating expectations for treatment to the curator.

The three prints exhibited similar damages related to age, misuse, and poor storage. *Saint Michael Defeating the Devils* (fig. 1), by The Master E.S. (1420-1468), sustained a particularly large loss to the image, whereas *Man in a Fantastic Helmet* (fig. 2), by an unknown Florentine artist (15th century), and *The Virgin and Child* (fig. 3), by Andrea Mantegna (1431-1506), had previous interventions that would need to be reversed before any subsequent treatment would effect a change in their condition.

Man in a Fantastic Helmet is a small print, about 3 × 5 in., which had at some point been repaired and mounted to a stiff paper card, later trimmed. Losses in the sheet had been patched from behind and inpainted, rather inexpertly, with watercolor. One large loss in the backside of the putto had been filled with a fragment from an engraving. The surface had been scuffed and abraded, which, along with the losses, contributed to the "visual noise" that interfered with the legibility of the print.

The Virgin and Child by Mantegna was mounted overall to paperboard, which secured a long gray tear extending through the background and into the faces of the Madonna and child. At some point, the corners had been clipped and then filled with paper of a similar tone and texture. Walsh considered such damage disfiguring since the prints did not at all resemble others in their cohort held in museum collections.

But in fact, the material condition represented in each of these prints had acquired important meaning during their long history. The Master E.S. print, originally one of a large edition of multiples, was now only one of five impressions known in the world, and the last held in private hands. Moreover, it had been described and published in its current state ca. 1910 by Max Lehrs, the great chronicler of 15th century prints (Lehrs 1970). Known as the "Oettingen-Wallerstein" impression, it had been seen and studied in this condition by at least three generations of old master print curators. For the current curator, the *tradition* of its condition, rather than its original condition alone, became the important factor in establishing goals for treatment. In other words, the curator insisted that the present appearance be privileged over the original appearance.

Fig. 1. Master E.S., German, active ca. 1450-1467, *Saint Michael Defeating the Devils*, 1467, engraving on laid paper, sheet (trimmed to plate mark): 17.6 × 13.3 cm. National Gallery of Art, Washington, DC, Gift of The Artemis Group, 1997.89.5. Before treatment.

The Mantegna print was likewise only one of five extant first state impressions and the last in a private collection. Furthermore, recent scholarship on Mantegna prints by Shelley Fletcher, then head of Paper Conservation at the NGA, had shown that two of the five first state impressions of this very print, held in important collections around the world, were not as they seemed: in fact, she showed through careful photographic documentation that many Mantegna prints were heavily overpainted or reworked by hand to enhance the engraved lines (Fletcher 1970). This caused a worldwide reevaluation of the ranking of impressions. This recent scholarship also meant that any work on the Mantegna print would be scrutinized, and certainly any inpainting of losses in the engraved lines would be roundly criticized by curators.

Fig. 2. Italian 15th century, *Man in a Fantastic Helmet,* ca. 1470–1480, engraving, sheet: 12.8 × 7.5 cm. National Gallery of Art, Washington, DC, Rosenwald Collection, 1943.3.9069. Before treatment.

Man in a Fantastic Helmet is a unique image—it is the only surviving copy of the many that were surely printed in Florence in the 1470s. Its imagery connected it to the studio or artists around Verrocchio, although the artist has not yet been identified (Rubin and Wright 1999). It had been studied in this condition by generations of scholars. The current curator worried that the existing repairs might contribute to a future attribution, one that might connect it to one of the best artists around Verrocchio—perhaps even to Leonardo da Vinci. Walsh also noted that the curator seemed concerned that any changes to its appearance might dismay curators who had just published it, or that the NGA would be criticized for imposing changes to the print.

Eventually, through discussion and negotiation, the curator and conservator agreed that treatment would benefit each of the prints by making them more legible to both scholars and visitors to the museum, and could be undertaken as long as honest concerns about their curatorial history were respected.

Fig. 3. Andrea Mantegna, Paduan, ca. 1431–1506, *The Virgin and Child,* 1470s (?) engraving on laid paper, sheet (trimmed within plate mark): 27.7 × 23.1 cm. National Gallery of Art, Washington, DC, Patrons' Permanent Fund, 1998.50.1. Before treatment.

Given the increased scrutiny of the Mantegna print, the treatment proposal did not include any cosmetic compensation for losses. In addition to the long, dirty, misaligned tear noted earlier, and gray accretions in the upper right, there were areas of abrasion and old creases that were slightly lighter in tone than the rest of the sheet. Ideally, the flaws would be ameliorated by treatment, without the inclusion of any inpainting. To begin, the print was surface cleaned, wet out, and turned facedown on a light box to remove the backing. Tears were secured without adhesive by flowing liquid paper pulp from the reverse, under and over the grayed edges that had contributed to its disfigurement. Any pulp on engraved lines was removed when dry, with a needle under magnification. Since the print was only wet out and blotted, not bathed, the discoloration inherent to old papers was only subtly reduced and redistributed, thereby improving the visibility of abraded areas without drastically altering the paper color. Gray pigment stains were made less prominent by rolling over the surface with a cotton swab to remove old retouching and to deposit a fine layer of liquid paper pulp on top. The layer of pulp blended with the surrounding paper, disguising the stain in a completely reversible way without removing it through treatment or added inpainting (fig. 4).

Fig. 4. Andrea Mantegna, *The Virgin and Child,* 1470s (?). National Gallery of Art 1998.50.1. After treatment detail.

Treatment of *Man in a Fantastic Helmet* likewise required removal from a secondary support, along with removal of the old paper repairs. The secondary support and repairs were saved in the curatorial file for future research. As before, the print was wet out and blotted, and losses were filled on the reverse with paper pulp. Before proceeding with any further treatment, the curator considered what compensation might be acceptable. Walsh informally solicited suggestions from colleagues about possible reconstruction of the image until the curator was ready to discuss options. Over several meetings, each fill was considered separately, and all compensation for design on the pulp fills was considered line by line, detailing exactly what the print would look like after treatment (fig. 5).

The *Saint Michael* print, also wetted out, blotted, and repaired with paper pulp, was allowed to dry in its intermediate state before considering how best to compensate for the large image loss in the corner. After comparing the print to its cohort in the NGA, and examination of two impressions in Dresden and Berlin, Walsh decided to fabricate two removable inserts for the loss. The two interchangeable repairs allow the print to be viewed in an unrepaired state without any fill, or in a repaired state with complete compensation of the printed design. Walsh used a collotype reproduction of the Dresden impression to create a suitable insert. After scanning the reproduction, she printed the image onto clear plastic, adjusting the dimensions in Adobe Photoshop until it matched the exact dimensions of the print. The area of loss was digitally segregated from the rest before printing

Fig. 5. Italian 15th century, *Man in a Fantastic Helmet*, ca. 1470-1480. National Gallery of Art 1943.3.9069. After treatment.

at 60% gray onto a vintage laid paper. This produced a faint outline of the lost design, which Walsh reinforced by working under the microscope with a fine-point Rapidograph pen and Rapidograph ink she had mixed to match the original. The repair was then trimmed and toned with watercolor and pastel to match the print.

The large chamfered edges in the loss carried vestiges of the printing that were not to be covered, so Walsh mounted the insert to a shaped piece of mat board that fit securely into a hole cut into the backing board of the mat (fig. 6). The edges of the insert fit on top of the chamfered edges of the loss to visualize the seamless continuation of the engraved lines without a permanent attachment. Another fill, consisting only of a shaped piece of antique paper, was similarly mounted onto mat board, although the edges fit *under* the chamfer of the loss to leave the vestiges of printing visible (fig. 7). Each repair acted as a puzzle piece that could be popped into holes cut in the mat as the curator wished. This solution allowed the print to be seen in two "formats" without compromising the evidentiary value of the print's

Fig. 6. Master E.S., *Saint Michael Defeating the Devils*, 1467. National Gallery of Art 1997.89.5. During treatment, showing puzzle-piece method of attachment to mat board.

damaged condition. Although initially resistant, the curator was pleased to have the option to visualize the work in a fully restored state, and it is this view that was chosen to be shown on the NGA website (fig. 8).

As she reflected on her treatments, Walsh noted that at the time she had not thought of the prints as a related group, but realized later that thinking about them together illustrates a process that all conservators go through to make subjective decisions about treatment. Both condition and context are critically important, and balancing these factors, making judgments about them, and communicating our expertise to devise individualized, subjective solutions is the essence of our job as conservators.

Judith Walsh, Williamstown Regional Art Conservation Center, Member, Board of Trustees; formerly Professor of Paper Conservation, Art Conservation Department, Buffalo State College

SARAH BERTALAN

EDITIONS AND TREATMENT: VAN GELDER ZONEN, ARCHES, RIVES, MONTVAL, MBM, …

Bertalan discussed how the experience of treatment may be enriched when one treats multiples. She showed highlights of late 19th and 20th century multiples, examined and treated over the past 20 years, to illustrate that paper conservators can learn a great deal about how papers age when multiples are compared in a focused and systematic way, that the types of damage observed in papers made for printmaking "evolved" during this period, and that the experience of treating very similar papers or multiples influences treatment decisions and treating multiples allows conservators to examine and critique standards of treatment.

In the 19th century, the European paper used for lithographs was notoriously poor in quality. This paper was available to artists in the generations of Henri de Toulouse-Lautrec (1864-1901) and Édouard Manet (1832-1883). At the time, calcium carbonate was added to British and European paper. This traditional additive was widely known to be beneficial to handmade papers. Later in the century, when the condition of paper was widely deplored, it was discovered that rather than benefit the paper, an excess of inorganic additives interfered with inter-fibril bonding. This led to strict limitations on the percentage of ash content in British and European paper at the end of the 19th century[1] (Burns 2002). As a result of getting to know this paper from multiple examples, Bertalan believes that a good mat is more beneficial than treatment and no longer elects to use aqueous or other typical treatment procedures to address its brittle condition.

Fig. 7. Master E.S., *Saint Michael Defeating the Devils*, 1467. National Gallery of Art 1997.89.5. After treatment, with removable insert behind loss, without design compensation.

Fig. 8. Master E.S., *Saint Michael Defeating the Devils*, 1467. National Gallery of Art 1997.89.5. After treatment, with removable insert in position over loss, with design compensation.

In the 19th century, the alternative to poor-quality European papers was "China paper" for lithographs and Japanese paper for etchings. These papers were often used as "chines" over secondary supports or as supports in their own right. Outside a controlled environment, Chinese papers were known to develop little brown spots. True, long-fibered, Japanese papers appear to have been in very wide use when available. Often the edges were trimmed, and today they are erroneously described as "wove" paper. Many Japanese papers undergo significant color change within a window mat when exposed to unfiltered daylight.

Toward the end of the 19th century, when academically trained artists began to make etchings, they sought French and Dutch papers made for book printing, which were strong enough to withstand the etching process. When the multiples that artists such as Mary Cassatt (1844-1926), Edgar Degas (1834-1917), and Camille Pissarro (1830-1903) pulled for themselves are examined and documented, the same French and Dutch watermarks appear[2] (Perkinson 1984). In a controlled museum environment, these papers are protected from the wide-ranging condition changes that occur when they have been in private collections. Treatment by conservators and intervention by framers, such as flattening a print by wetting and "stretch mounting" it to a backing, appear to contribute to the extreme changes conservators now observe.

In the first decade of the 20th century, the paper options for an edition tended to be Japanese paper, Arches, or old handmade papers (fig. 9). In the 19th and early part of the 20th century, impressions were often pulled on demand. Finding papers for editions was not just a matter of aesthetic preference but a necessity that often fell to the publisher. In France, Ambroise Vollard (1866-1939) found mills to make new papers and sought the highest-quality papers for his publications. For some early editions, Vollard used Van Gelder Zonen wove paper. Although this paper is well known to paper conservators for its condition problems, its production appears to have been relatively short lived. Untreated Van Gelder Zonen wove paper will invariably have dense areas throughout that appear as more-or-less dark stains in normal light (Bertalan 2015). Having examined and treated numerous impressions on thick Van Gelder Zonen wove paper, Bertalan now advises clients that the stains are due to inherent components in the paper and not a result of mold damage. Once the mold question is resolved, clients are more likely

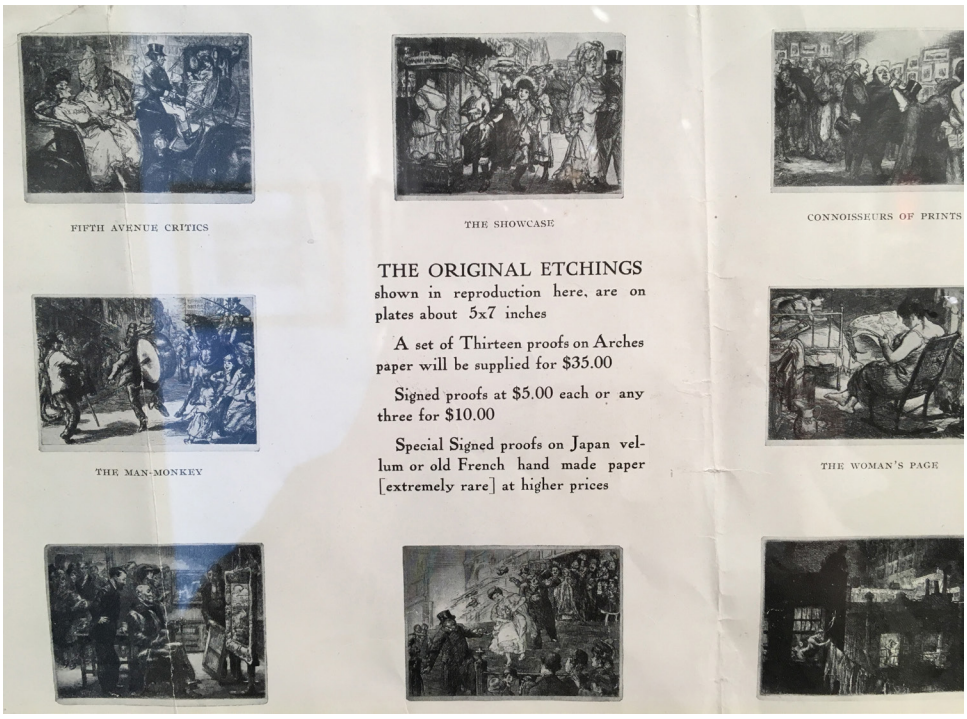

Fig. 9. John Sloan (1871–1951). *New York City Life* portfolio of etchings. 1905–09.

to agree to accept small imperfections in an impression or simply overmat stains in margins.

The most beautiful paper that Vollard found for his editions was Montval. Laid Montval paper was used for Picasso's set of 100 etchings, the *Vollard Suite* (1930–37), and for Picasso's famed *Minotauromachie* (1935) and *La Femme qui pleure* (1937). Montval paper is a mixture of linen and cotton fibers, as compared to most 20th century papers made for printmaking that are composed entirely of cotton fibers. Its condition problems are minimal. It will darken superficially when the surface is in contact with low pH mats or media.

Rives was also used by Vollard for editions of Picasso's prints in the 1930s. Rives, as shown in transmitted light, is an absolutely even and smooth wove paper with very few inclusions. In France, mills tended to specialize rather than compete. Rives produced papers for photographic prints. Early on, it was acknowledged that papers for photographic processes would require a high degree of purity.[3] The papers used for Vollard's editions have been documented; however, many catalogues raisonné of artists' prints do not even discuss paper. It is up to conservators to promote publication of this information.

In the late 19th century and into the 20th, the preeminent paper for printmaking in both Europe and the United States has been Arches wove or cover. Until the 1920s, the Arches papers used for multiples were laid papers. Arches wove paper was used for Henri Matisse's (1869–1954) lithographs of dancers in 1927, but not for the lithographs he did earlier in the 1920s (Bertalan 2013). Arches papers should appear neutral and off-white, not pink or beige. The latter are the result of the extensive changes that occur in an uncontrolled environment. Matisse's *Jazz* impressions (1947), one version on Arches wove from the 1940s, exemplify how far the damage can go. In private collections, when displayed in unfiltered daylight and when poorly framed, not only do the vibrant colors of the pochoir fade, but the paper is extensively altered as well.

Picasso's linocuts are good examples of condition problems very common to Arches papers from the 1950s and 1960s. The extent of damage never goes as far as earlier Arches papers. There are never any unusually dark local stains. There may be a pale brown "burn" from contact with the edges of an acidic mat, or the paper may go buff or yellow where exposed to light.[4] Prints of this vintage tend to be overmatted because the margins are narrow and not very interesting. Any portion of the paper that has been covered by a mat will differ in tone.

The changes in certain Arches papers in the 1960s and 1970s can be so subtle that if there is not another impression for comparison, one might think an intentional plate tone had been used. As observed repeatedly on the ULAE lithograph by Jasper Johns (born 1930) titled *0 through 9* (1960), conclusions about "intended" paper tone can be very wrong. A numbered print from an edition by Johns, purchased at

auction, had changed so slightly and evenly that when it was placed side by side with another numbered impression from the edition that had been protected from daylight, the owner began to theorize that the edition had been printed on different papers (fig. 10). Only when it was observed that the verso was the same off-white as the protected paper did Bertalan and the owner realize that the original tone was not beige.

In the late 1960s and early 1970s, paper distributors like Michael Ginsberg of Legion sought new papers for printmaking. A very beautiful paper called *Somerset* was used for etchings and lithographs by Lucien Freud (1922-2011), David Hockney (born 1939), Paula Rego (born 1935), and other contemporary artists. In certain conditions, Somerset Satin White papers turn yellow in contact with buffered mat board—a condition problem that is difficult to accurately document with photography but very easy to remedy.

When conservators treat multiples in private hands, they often examine and treat prints that were previously treated. This affords them an opportunity to judge the success of prior treatment. There is always a perfectly preserved example for comparison. A pristine impression of Mary Cassatt's *Feeding the Ducks* (1894) is printed on off-white paper. The colors are both bold and subtle (fig. 11). By comparison, Bertalan was asked to treat an unevenly stained and blotchy impression that had been previously treated in the 1970s by a reputable colleague (figs. 12, 13).

Fig. 10. Identical papers from an edition compared after approximately 40 years in private hands.

Fig. 11. Mary Cassatt (1844-1926), *Feeding the Ducks*, 1894, drypoint, softground etching, and aquatint, 36.8 × 50.8 cm. Metropolitan Museum of Art, H.O. Havemeyer Collection, bequest of Mrs. H.O. Havemeyer, 29.107.100.

Often, conservators observe that treated stains reappear. Bertalan experienced this with an impression of Matisse's *Grand Bois* (1906). Under ultraviolet illumination, it was apparent that the former treatment had consisted of local brushing of bleach on the verso, possibly with insufficient or no rinsing afterward. Not only had the stains returned, but they were now surrounded by broad white haloes. That condition problems reappear or worsen after conservation treatment should prompt conservators to question whether the causes of stains and discoloration in paper are really understood. In a final example, a print with extensive notations in

Fig. 12. Mary Cassatt, *Feeding the Ducks*, 1894. Private collection. Previously treated in the 1970s.

Fig. 13. Mary Cassatt, *Feeding the Ducks*, 1894. Private collection. Previously treated in the 1970s, detail.

the margins about a slow-drying ink and a paper that tears under pressure, Bertalan sought to show that in addition to the artist, the publisher, and the paper manufacturer, whoever was doing the actual printing would play a role in finding a suitable paper for printing multiples, and all participants contribute to how these works of art come into being.

Sarah Bertalan, Conservator and Consultant for Works on Paper, New York, NY

ANISHA GUPTA

STRIKING A HARMONIOUS TONE: WET TREATMENT OF A MODERN PRINT EDITION

Gupta gave a detailed overview of the treatment of the 24 lithographs that comprise Ben Shahn's *Rilke Portfolio*. The prints were discolored to different degrees, and the goal of treatment was to unify paper tone so the portfolio could be displayed as a group. During the treatment process, Gupta made use of a spectrophotometer to quantify her results. The *Rilke Portfolio* was created in 1968 by Lithuanian-born American artist Ben Shahn (1898-1969). The lithographs illustrate a quotation by Rainer Maria Rilke entitled "For the Sake of a Single Verse from the Notebooks of Maria Laurits Brigge." The portfolio was printed from zinc plates in an edition of 950 by Atelier Mourlot Limited in New York. The first 200 portfolios were printed on Richard de Bas handmade paper. The remaining 750 portfolios, including the portfolio that Gupta treated, were printed on Velin d'Arches paper, also known as Arches Cover in the United States. This paper is mould made, 100% cotton, and internally sized, and has a pronounced grain. It is made specifically for printing.

The lithographs that Gupta treated were included in a de Young Museum exhibition of modern and contemporary works entitled *Printed Stories*. Previously deemed unexhibitable due to the inconsistent yellow discoloration of the sheets, the portfolio was going on display for the first time and exhibition aesthetics called for float matting the prints in their frames.

In general, the lithographs did not have condition issues aside from discoloration, but each print was discolored to a different extent (fig. 14). This was due to the fact that the original owner was a corporate entity that displayed the prints under fluorescent lights in secretary typing pools and in conference rooms with strong natural light. Museum records indicate that the prints were displayed for 23 years, and the amount of light they received ranged from 8 to 30 footcandles. The curatorial mandate for treatment was to make the portfolio appear uniform in a display that would emphasize the sequential and interconnected relationship of the prints in the portfolio. Gupta worked out a treatment plan that incorporated consistent review of the prints with the curator and standardization of results with a spectrophotometer.

Gupta used an X-Rite eXact spectrophotometer[5] (fig. 15), an instrument with both spectrophotometry and densitometry capability; however she used only the spectrophotometry function. Spectrophotometers measure reflected or transmitted light across a light spectrum by assigning a numerical value to the sampling area, representing the reflected light as L*a*b* values. The L* values represent the white to black range, the a* values are the red to green range, and the b* values are the yellow to blue range. Gupta primarily looked at the L* values for brightness and the b* values to see a decrease in yellow. She took spectrophotometer measurements of each paper. To ensure consistency in measurement, she made a Mylar template that lined up with the top left corner of the object and took five readings for each print to have a statistical average value for each one.

Fig. 14. Ben Shahn (American, born Lithuania, 1898-1969), *Rilke Portfolio: For the Sake of a Single Verse*, lithographs, 64.8 cm × 48.3 cm. Fine Arts Museums of San Francisco, Anderson Graphic Arts Collection, gift of the Harry W. and Mary Margaret Anderson Charitable Foundation. 1996.74.434.1-.24. Before treatment, the prints in the portfolio displayed varying degrees of yellow discoloration and most of the prints had severely darkened edges.

Fig. 15. The X-Rite eXact spectrophotometer set up for before treatment documentation of paper tone.

The portfolio included black and white prints but also a range of colors. Gupta thoroughly tested the inks to ensure that none of them were water soluble, and with Debra Evans, she bathed the prints in an initial filtered tap water wash of pH 6.75. Tenacious discoloration was reduced by then bathing the prints in a warm bath of ammoniated water. The ammonium hydroxide adjusted the pH of the water to a higher alkalinity and helped to release the discoloration more effectively. The higher temperature of the water also aided in drawing out discoloration. After evaluating the results of bathing with the curator, the conservators proceeded to light bleaching. The prints were light-bleached incrementally. They were placed in a tray covered with UV-filtering Mylar. A small fan was run near the trays so that there was no excessive heat buildup. The lamps were about 24 in. above the prints. They were placed in a bath with 45 to 50 mL of magnesium bicarbonate and 4 L of deionized water, with two drops of 3% hydrogen peroxide. Since the papers were of a good quality, 100% rag, they could withstand the light bleaching treatment. The prints were light-bleached in intervals of 3 hours, followed by a 10- to 15-minute rinse bath and then air-dried overnight. Although one print was bleached 12 hours, most prints averaged about 6 hours. There was minimal risk in light bleaching the *Rilke Portfolio*, particularly in terms of the colored inks, because the prints had already been exposed to so much light already.

Each morning, Gupta and the curator met to visually assess the efficacy of light bleaching and to determine how many more hours of light bleaching each print needed. This was challenging because the curatorial and conservation team did not want to overbleach any print, as the goal was to keep the portfolio as uniform as possible. Gupta had originally envisioned using the spectrophotometer at this stage, but it was not feasible since it takes a considerable amount of time to take the measurements every morning and then determine which prints to light-bleach.

Once the conservation/curatorial team was satisfied with the level of brightness, Gupta flattened the prints by misting with filtered tap water and sandwiching between spun-bound polyester and board. The prints were pressed in a large air

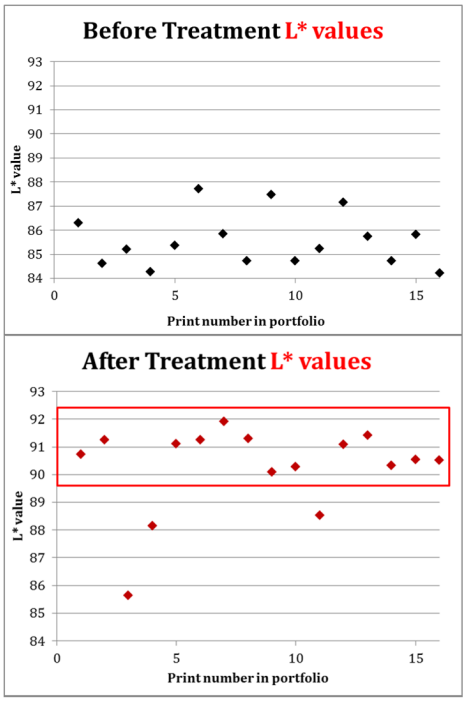

Fig. 16. The L* graphs from before and after treatment. Before treatment, the plotted values show a wide range of black to white values. The values are more closely aligned after treatment.

mattress press for 13 days. This large-scale press is similar to one at Crown Point Press: the boards are placed into the press and an air mattress is inflated to compress the pile and provide pressure. Initially, cool air was pumped through the boards for two hours to speed up the drying and keep the prints flat.

In terms of the results from the spectrophotometer, two graphs (fig. 16) indicate that although the L* values (black to white spectrum) were more spread out before treatment, the values came together after treatment, an indication that visual analysis was an effective method of evaluating uniformity of paper tone. With the exception of a few outliers, the numbers cluster between 90 and 92, very close to 100, which is equivalent to white.

Examination of the b* values reveals results similar to L* (fig. 17). As the values decrease, the prints become less yellow. The graph indicates that not only are the prints moving away from yellow, they are also clustering together.

To Gupta, the spectrophotometer measurements indicated that using visual assessment can be just as good and a lot less time consuming than applying scientific measurements to each treatment. The outcome of treatment was similarly satisfying, as the prints looked uniform during display, and without the distracting selective discoloration to individual sheets, the bold and graphic quality of Shahn's work was much more evident (fig. 18).

Anisha Gupta, Andrew W. Mellon Fellow, Fine Arts Museums of San Francisco

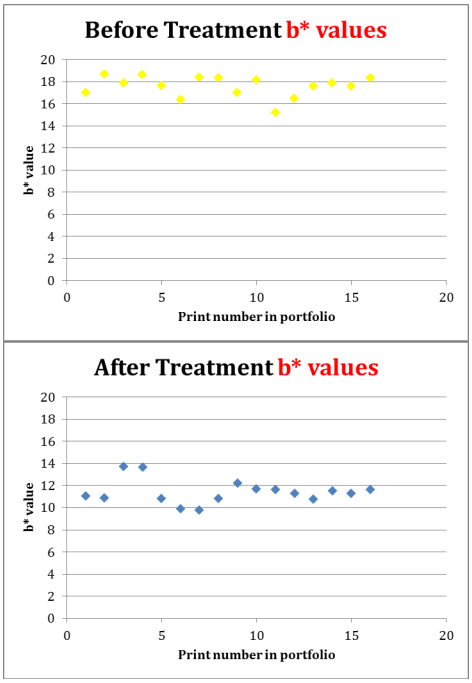

Fig. 17. The b* graphs from before and after treatment. Note the lower b* values after treatment, an indication that the paper is less yellow. Also note the values cluster together after treatment.

DISCUSSION SUMMARY

These three presentations generated a lively dialogue touching on the merits and limits of referencing other prints as touchstones for treatment goals. Several participants shared their experiences with navigating curatorial expectations, which often diverged from the conservators' own knowledge of paper history and the historic use of bleaching treatments. It was noted that cultural attitudes about discoloration and staining

Fig. 18. The results of treatment were a consistent paper tone across the portfolio, and the works were displayed together on a single wall in *Printed Stories* at the de Young Museum, San Francisco.

can change and influence the course of treatment, particularly when attempting to unify an edition or present individual prints in a sympathetic manner to their cohorts in an exhibition.

The speakers were asked how they worked with curators to describe paper color, and if there were any words or discussion that led them to conclude what "the right color" for a paper should be after treatment. Bertalan mentioned that she has had clients who wanted the print to "pop"—a pretty disconcerting concept to a paper conservator! Gupta described how the curator for the Ben Shahn portfolio was concerned that the prints looked *dingy* and had wanted them to look *more alive* as they assessed the prints after each bleaching cycle. Gupta interpreted these terms to mean "brighter" or "whiter," but she herself was concerned that they not get "too white." The end point for treatment was a compromise between curator and conservator preference, when a uniform level of brightness for all prints in the edition had been reached to the satisfaction of both.

Walsh remarked on the difficulty of describing paper color to curators, which she generally avoided in her discussions of treatment. In her experience, most 15th century prints in the NGA are quite white, which she attributes to high standards of papermaking during that period. She also wondered if many older prints have already been treated to remove discoloration, often with stronger bleaching agents than those used today. A paper conservator in the audience suggested that we look for cohorts of these papers in bound volumes, as they have had little or no treatment nor any light exposure. She agreed that the 15th century papers she observed in bound volumes are remarkably white, and recent analysis of them has indicated high quantities of calcium. She went on to remind everyone to share their experiences in treating some of the more commonly used printing papers, such as Arches, Rives BFK, and Van Gelder Zonen, particularly those who have been in the field a long time, and those who have witnessed the many changes in bleaching agents over the years.

Walsh emphasized that in her experience working with all kinds of curators at different kinds of institutions, one of the most powerful skills conservators can bring is their own experience of treatment. Consultation with curators can help refine goals, but without a lot of practical experience with a particular paper over a period of time, one is really in the dark when trying to describe the expected result to a curator. She continued by saying that colleagues in private practice and in regional centers regularly do much more work than those working in museums, so it is important to have a forum for experiences like theirs, and for everyone to talk more about treatment to help predict outcomes. She added that reliance on cohorts and multiples to inform treatment decisions may be useful for modern and contemporary works but is perhaps misleading when thinking about older prints. Older prints likely have received some kind of intervention during their long history, perhaps with stronger bleaches than would be

used today. Do we try to match the cohorts, or do we treat according to our current aesthetic? What if a print will look different on the wall than others adjacent to it?

To the first question, one participant expressed her desire to see more exploration of "the connoisseurship of stains," a concept championed by John Krill. Walsh commented that the reticence of her curator to approve any changes to the aged appearance of old master prints seemed to prioritize historic condition over how we might expect to see them now in a museum context. Another noted the opposite experience at her museum, in which curators have been in favor of removing stains from prints if they enter the collection in much better condition than had been documented. To the second question, a conservator relayed her experience with some Picasso lithographs that she had initially considered to be too oddly discolored for exhibition. Upon seeing the exhibition, however, she saw the prints displayed alongside others with a similar kind of discoloration and thought they looked acceptable in that context. Walsh observed that curators will research an artist's work for years prior to an exhibition, but conservators often do not get to see a full range of an artist's work until the day of the exhibition, after the treatments are done.

The audience was asked how they worked with curators when asked to approve the exhibition of a few prints from a series, and what recommendations they have made regarding their exposure. In her experience, conservators have recommended that either the whole portfolio be displayed at once or that the prints be rotated through the course of the exhibition so they are not exposed differentially. She also asked how conservators have kept track of light exposure. One conservator recalled how her museum wanted to display only half of a portfolio of eight silkscreens by Andy Warhol because there was only enough space for four. Ultimately, conservators agreed, but only if the other four prints were rotated in halfway through the exhibition. The use of a spectrophotometer was considered as an option for evaluating the impact of any potential differences in exposure, but the turnaround time was too quick.

The discussion then addressed the question of spectrophotometers to objectively measure changes in paper color after treatment or exhibition. Early on, one participant mentioned the possibility of using a densitometer, rather than a spectrophotometer, to measure density loss in the ink and paper following treatment, as used by photograph conservators. Gupta commented that spectrophotometer readings would be used in tandem with tracking lux hours of exposure for the Shahn portfolio. In another conservator's experience, it was noted that spectrophotometer readings correlated well with visual assessments by conservators in controlled lighting conditions and agreed with Gupta that it was an effective tool to bolster the validity of, or confidence in, our own eyes.

Participants also discussed the difficultly of predicting a paper's original color, complicated by the uncertainty surrounding causes of paper discoloration and staining. A conservator shared her own experience with treating edition prints that had not responded as predictably as the Shahn portfolio, and remarked that even though papers may seem identical, they may have different histories that cause them to respond differently from one another.

Bertalan was asked what might explain the discoloration she observed in Somerset paper when stored in contact with buffered mat board. She responded that pigment additives, such as titanium dioxide, might have had an impact. Walsh wondered if bluing agents may have been extinguished in the paper, causing it to shift toward yellow. One conservator expanded on the possible causes by citing research at the Getty, which measured localized staining in books caused by alkaline paper slips.

Later in the discussion, a conservator pointed out that Somerset paper was offered in multiple buff colors by the 20th century, so when one thinks he or she is working with "Somerset" paper, it does not necessarily mean that they are all the same. In addition, she has observed alterations in paper color even in closed sample books, so over time, a "white" paper can look similar to the paper labeled "buff." This becomes especially complicated when thinking about bleaching treatments, when "white" is not the color the paper wants to be.

Bertalan was also asked what might have caused the white blotches within dark-stained areas in the Cassatt print that she had illustrated in her presentation. Although the mechanism may be unknown, she emphasized that we should consider how aqueous treatment might have affected these modern papers. One paper conservator remarked that she and her colleagues in private practice have observed many 20th century prints on Arches, Rives BFK, and other papers with similar types of staining and wondered if aqueous treatment should be reconsidered for such works.

Participants then discussed the propensity for Van Gelder Zonen papers to exhibit these stains, first referred to as reverse foxing some 35 years ago, perhaps by Keiko Keyes. Several conservators cited their own or others' investigations into the problem, particularly in Picasso's *Saltimbanque* series. In all instances, including a recent, comprehensive study soon to be presented and published in Europe, there were no detectible differences between the white areas and the overall paper. One conservator wondered if newer technologies, such as scanning XRF, would give a better picture of what is going on. Bertalan thought microscopy and sampling might be necessary for some of these questions. Another added that her use of micro-fade testing to assess prints on Van Gelder papers indicated that they were quite light stable.

Bertalan emphasized that the printing process itself was very rigorous, and depending on studio practice, papers could be wet for days or be subjected to multiple wetting and drying cycles during extended runs through the press. Another conservator added that in her experience as a printmaker, she also wondered if a deterioration mechanism is set up when

printing papers are wet out and stacked during the printing process. She knows that 20 or 30 years ago, some printers used formaldehyde and other kind of biocides in their water baths to prevent mold when they were doing long print runs.

CONCLUSION

As the session drew to a close, there was general consensus on the importance of sharing treatment protocols with one another, particularly by conservators who have been practicing for a long time, and who are in a position to evaluate how treatments have aged over the years. Many in the audience asked for an online repository of images, such as a Wiki, which several specialty groups already use to share images.

NOTES

1. Conservators in private practice are generally expected to rescue, transform, or "work their magic" with treatment. Bertalan's private practice has instead focused on consultation, dialogue, and providing the kind of conservation support found in a museum context to a small number of clients over many years. She has often recommended cautious handling and preventive conservation measures rather than treatment interventions.
2. Dambricourt Freres, Blacons, Van Gelder, and Arches watermarks were found. Whatman, Van der Ley, D&C Blauw, and Adrian Rogge papers were also used.
3. Under UV, untreated examples of Montval laid and Van Gelder Zonen wove paper will absorb. Untreated Rives tends to reflect yellow.
4. On these prints, the Arches watermark, in large Roman letters, is invariably in reverse. Picasso's linocuts were all printed by the same professional printer on the reverse of the Arches sheet.
5. Data recorded in CIELAB 1976 color coordinates, using illuminant D65 and 10 degree observer.

REFERENCES

Bertalan, S. 2013. A note on Matisse papers. In *Matisse: The essence of line*. New York, NY: Marlborough Gallery.

Bertalan, S. 2015. Foxing and reverse foxing: Condition problems in modern papers and the role of inorganic additives. *AIC Book and Paper Group Annual* 34: 13-22.

Burns, T. 2002. "A serious and universal evil": The early scientific study of paper deterioration. In *Works of art on paper: Books, documents and photographs: Techniques and conservation; contributions to the Baltimore Congress, 2-6 September 2002*., eds. V. Daniels, A. Donnithorne, and P. Smith. London, UK: International Institute for Conservation of Historic and Artistic Works. 36-41.

Fletcher, S. 1970. A re-evaluation of two Mantegna prints. *Print Quarterly* 14 (1): 67-77.

Lehrs, M. 1970. *History and critical catalog of German, Netherlandish, and French copper engravings in the 15th century*, vol. 2, no. 154. New York, NY: Collector's Editions.

Perkinson, R. L. 1984. Degas' printing papers. In *Degas: The painter as printmaker*. Boston, MA: Museum of Fine Arts. 255-261.

Rubin P. L., and A. Wright. 1999. *Renaissance Florence: The art of the 1470s*, no. 65. London, UK: Yale University Press for National Gallery Publications.

RACHEL FREEMAN
Associate Paper Conservator
The Art Institute of Chicago
Chicago, IL
rfreeman@artic.edu

CYNTIA KARNES
Independent Paper Conservator
Toronto, Canada
cyntia.karnes@gmail.com

HARRIET K. STRATIS
Former Senior Research Conservator, Art Institute of Chicago
Stratis Fine Art Conservation LLC
Chicago, IL
harriet@stratisartconservation.com
hkstratis@gmail.com