
The remarkable object that spawned so much conservation soul-searching and this paper is generally known as the Christian ABC Book (fig. 1). Its full title, written in an elaborate Gothic script called frakturschriften, is: “The Christian ABC is Suffering, Patience and Hope; whoever learned this has attained his Goal.” Some aspects of the ABC Book are known to us, but many are not. We know it was created in approximately 1750 at the Ephrata Cloister, a German pietistic religious community in Pennsylvania. By applying ink to paper with amazing skill, members unknown to us created this 80-page volume of seven alphabets and one page of Arabic and Roman numbers. The manuscript contains intricate drawings surrounding ornate examples of the alphabet. It is not a primer for calligraphy but the letters are thought to be icons, objects of contemplation with symbolic significance. Some believe that the pages may have been individually hung in the cells of the brothers and sisters, who lived separately in spare dormitories.

Conservation decisions are particularly difficult with unique objects and with objects of great value, such as the ABC Book. Experienced conservators have seen hemlines on chemical treatments shift over time—calcium or magnesium, bleaches reconsidered, fumigants come and gone. Add to this the idea that our profession, unlike medicine,
The major concepts of these codes, checklists, and models, may be grouped into general categories, shown schematically in figure 2. Research has shown that people can consider seven variables at once when making judgments, and so the commonalities have been organized into seven very broad categories (Meyer and Booker 1991 cited in Caple 2000). In this paper, these categories will be used to tell the story of the real-world conservation decision-making process of the ABC Book, treated at the Conservation Center for Art and Historic Artifacts (CCAHA).

Jonathan Ashley-Smith sums it up quite well, stating “it is difficult to find any useful advice on how to treat physical objects of great value or significance” (Ashley-Smith 2009, 12–13). And so we look to resources such as: Codes of ethics, AIC, UKIC, and ICOM-CC, among the more commonly cited by western conservators. These codes have all contributed substantially to our healthy self-examination as a profession and to accountability for our work. In Britain, checklists, like those in medicine, have gained currency. One example is the very fine Victoria & Albert Museum Ethics Checklist developed initially in 1994 by Jonathan Ashley-Smith and since revised by the conservation staff (Ashley-Smith 2004). As in finance, risk management models for individual treatments and for collections have also entered the conversation (Michalski 1994; Sebera 1994; Ashley-Smith 1999; Caple 2000).

Too, various conservation decision models have been described in the literature, and they include:

- **Object centered models**—sometimes called “classical” or “truth-driven” (Muñoz Viñas 2005). These could include Chris Caple’s RIP Balance Triangle as well as conservation treatment trees (Caple 2000).
- **Functional** views stress that conservation should not only consider artistic and historic values but how an object or site function within a culture—as tourist attraction, social icon, personal icon, etc. (Muñoz Viñas 2005).
- **Values driven** models, such as that of the Getty Conservation Institute, are similar to the functional models, but stress additionally that we must consider the values that people place on an object—while also acknowledging that such values are mutable and relative. (de la Torre 2002; Muñoz Viñas 2005, Avrami 2009; Cane 2009).
- **Contemporary** model—as formulated by Salvador Muñoz Viñas—who uses terms such as negotiative, common sense, and adaptive to describe this approach to conservation and professional ethics (Muñoz Viñas 2005).

Any decisions made about the ABC Book were arrived at through the consideration of these codes and the categorization of the presenters. (fig. 2).

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The form in figure 2 shows a pre-Copernican universe, where we humans again are at the center and “you” signifies the conservator/decision maker. This model is not a checklist, since the process of decision-making is generally not linear. All of the variables presented here relate to one another, but are directed back to “you,” the decision maker and interpreter of the data from various sources. This form, or interpretive model, draws heavily from the negotiative decision model espoused by Muñoz Viñas and from the Conservation Checklist of the Victoria and Albert Museum. Though not specifically a decision tool, the interpretive model illustrates the constellation of critical factors that conservators must consider when making ethical and sustainable conservation decisions.

**YOU**

*Have I defined my role as:*
- **Manager**
- **Treatment Leader**
- **Expert/Analyst**

Who are “you,” what are your roles, and how do you support yourself in the decision-making process? “You” in this model are assumed to be the decision-maker, not necessarily the one who makes a final authoritative decision but one who negotiates the decision. “You” may also be the treating conservator or perhaps a project
manager, a supervisory role without direct hands-on treatment participation. Other functions for “you” may include the roles of expert and analyst. Ashley-Smith defines an “expert” as a third party specialist with relevant experience; an analyst is a neutral consultant/negotiator/facilitator (Ashley-Smith 1999). You may be all of these at times. The latter of these roles is extremely important today, particularly in our negotiative and interpretive mode of decision-making. In 2002, Joyce Hill Stoner, paintings conservator and faculty member of the Winterthur and University of Delaware Art Conservation Program, is reported to have asked conservators about what was missing from their training that had to be self-taught on the job. Respondents identified management and interpersonal/political skills as lacking in their training and later acquired (Muñoz Viñas 2005). Muñoz Viñas discusses the negotiative “trading zone,” where deft application of these skills is a requirement for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. In this zone, the negotiator may exert some technical authority but above all these skills are required for success. 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campaign of the early 20th century, likely between 1905 and 1917 during its stay at the State Library. At this time, chamfered inserts were made and silk linings were attached. The conservation work was quite possibly performed by Miss Mary F. McDowell and Miss Ethel Torrington, who worked for the State Library in 1905 (Mohn 2010). Though the previous conservation may have contributed to some loss of format and meaning, the repairs themselves are now part of the history of the object. Some say objects have meaning because we choose to preserve them (Muñoz Viñas 2005). Keeping the repairs in place was considered, however the silk was failing, had developed a cloudy appearance in places, and distortions were emanating from the adhered inserts—causing stress in areas of very brittle iron gall ink.

One crucial issue related to the past is the history of the conservation treatment under consideration. Jonathan Ashley Smith speaks to the importance of prediction and evaluation in considering possible treatment options (Ashley-Smith 1999). He suggests that the most obvious way is to look at naturally aged specimens, acknowledging that the utility of this may be limited due to limited pre-treatment records, small sample size, and that new treatments have not been in use long enough (Ashley-Smith 1999). For paper conservators, some treatments, such as alkalization, now have a substantial body of naturally aged examples. These samples have allowed paper conservators to examine and consider, among other things, the effects of alkalization on re-treatment. (O’Loughlin and Witty 1999). Obviously, newer treatments, such as calcium-phytate, cannot yet offer such naturally aged samples for conservators to revisit.

It appeared, therefore, that the past would not lead CCAHA conservators forward to a solution for the ABC Book. Due to previous treatment, there was no evidence of an original format to serve as guide. Even if this evidence existed, there is an inherent fallacy in returning to a new, original format (Muñoz Viñas 2005). Alteration of the ABC Book must therefore look ahead, with the task of sustaining the object and evidence of its meaning. And this is where our peers can contribute data and information to the decision making process.

PEERS

Have I consulted peers for:

- Knowledge
- Feedback
- Peer review

Who are our peers? They can be scientists, workplace colleagues, and specialist consultants. An American Institute for Conservation survey once polled members for research needs—respondents said there was not a lack of information but poor spread of information (Ashley-Smith 1999). This speaks to the importance of publication and professional meetings for dissemination of conservation information. Meetings are, evidently, not just places to offer or soak up information but places to seek consensus as well. It has been reported that conservator Miriam Clavir, during a professional meeting in 1994, asked attendees to vote on treatment options that considered the views of native peoples about spiritual values of objects (Ashley-Smith 1999). The voting indicated a popular movement toward acceptance of the views of groups outside of the museum and a greater inclusivity in decision-making—a trend that has been growing in the field of ethnographic conservation since that time.

During the research and development phase of the ABC Book project, which took nearly two years, CCAHA staff reached out to colleagues nationally and internationally as the treatment team investigated conservation options. Colleagues at institutions such as the Library of Congress, National Archives Canada, Netherlands Institute for Cultural Heritage (ICN), and Folger Shakespeare Library were consulted and or visited between 2003 and 2005, a time before many North American trials on calcium phytate were published. The CCAHA was given an opportunity to see objects treated with calcium phytate, pulp-filled, then naturally aged, albeit for only a few years. These images, too, were shared with our clients in one of several pre-treatment meetings. In particular, visual study of the Trevelyon manuscript at the Folger, with ornamental designs rendered in iron gall ink, served as a possible treatment template. Now a reformatted post binder, with small, removable booklets, the Trevelyon approach was and still is a viable formatting option for ABC Book.

RECORD/DOCUMENTATION

Have I established an appropriate treatment record in terms of:

- Accessibility of records
- Tools for monitoring
- Sustainability

The extent and type of conservation record or documentation, is, like treatment itself; a matter of judgment, although ethical guidelines provide some minimum accepted standards for item-level and group treatments. Documentation practices, again like treatment, vary from institution to institution, object to object, and often depend on whether the record will be part of a larger ongoing survey or system (Caple 2000). With item-level treatments, many details are sometimes excessively recorded while others are overlooked, particularly the negotiative and decision-making process. It is often the case, especially with unique and valuable objects, that the decision process is far more involved than the ultimate treatment—or decision not to treat. Not only is content of documentation an area for decision making, but permanence and accessibility of that record must be considered as well. Recent discussions in the literature focus on the accessibility of documentation.
High-resolution photographs are captured with a digital camera using a RAW format. Baseline photographic documentation generally includes digitally captured transmitted and ultraviolet light images, the latter are particularly important for iron gall inks. High resolution before and after treatment photographs, in normal and raking light, are also taken. Uncompressed TIFF versions of the digital images are stored on network attached storage units. Hard copy versions are printed on Epson Premium matte inkjet paper, using pigmented inks, and are retained with CCAHA treatment records.

**FUTURE**

**Are the results of my actions sustainable in terms of:**

- Predicted outcomes
- Probability of re-treatment
- Impact of proposed treatment on re-treatment (solubility, pH, etc.)

Making treatment decisions based solely on the idea that artificial aging offers a glimpse into the future is fraught. There have been many thoughtful discussions over the last decade on the fallibility of artificial aging and Arrhenius principles upon which some predictions have been made (Daniels 2009; Bansa 2002; Porck 2000). Add to this the notion that paper itself is a complicated matrix of furnish, fabrication, and finish, making the job of interpretation of aging experiments that much more complicated (Dwan 1987). Some conservators say that that there are limits to how far time can be compressed while drawing meaningful conclusions (Ashley-Smith 1999). In response, conservators and scientists have offered the idea that the artificial aging of paper should be calibrated with standards of known composition and age (Ashley-Smith 1999; Bansa 2002). Others suggest that using real time observations of small changes—for example, very low concentrations of gaseous degradation products—would be more accurate (Edge 1996 cited in Ashley-Smith 1999). It would appear, therefore, that there is risk in accepting novel treatments based on Arrhenius principles and perhaps these risks should be acknowledged by conservators (Ashley Smith 1999; Muñoz Viñas 2005). The effect of treatment on stability is not only difficult to predict because of questionable artificial aging models, but also because stability itself is always in flux and subject to environmental conditions.

One of the ways conservators have historically sought to mitigate the risks of conservation treatment is by embracing the notion of reversibility (Viñas 2005). Ideas about reversibility have been evolving for decades (Applebaum 1987; Smith 1988; Oddy 1995). The topic has been much examined, particularly in Britain, where a number of thoughtful conferences and publications have been offered. As a result, the concept of retreatability has been gaining currency and vies with stability as a leading factor today in decision making. For objects of high value, retreatment is very likely. Retreatability was an important factor in the ABC Book project, because, CCAHA conservators were, after all, essentially undoing a treatment executed approximately one hundred years ago.

Sustainability, therefore, becomes a key yardstick by which we must assess the appropriateness of conservation treatments and preservation plans. By advocating sustainability in conservation decision making, conservators must consider the effect of treatment not only on future conservators but on other users as well (Muñoz Viñas 2009). If an object is a source of meaning, loss of meaning to future users...
must be a factor in determining possible treatment—and this is a tall order. It is difficult enough to find agreement on meaning with present observers—but now we are also charged with safeguarding meaning for future interpreters and users (Muñoz Viñas 2009). And so, our jobs as conservators have become more complex in terms of critical thinking, but potentially much more rewarding.

STAKEHOLDERS

Have I identified appropriate stakeholders in term of:

- Owners/Clients
- Consultants/Specialists
- Public/Users

“Conservation should not be imposed, but agreed upon.”
Salvador Muñoz Viñas, 2005

Who are stakeholders? One good definition is that stakeholders are the people for whom an object is meaningful and who are impacted most by changes in the object (Avrami 2002; Muñoz Viñas 2005). Our field has been criticized for the misuse of scientific objectivism to create what Salvador Muñoz Viñas calls “restricted arguability” (Muñoz Viñas 2005). This occurs when scientific and conservation languages are used to limit discussion with non-technical experts, outsiders and stakeholders. An outcome of this is that our decisions cannot be questioned by others, even those who may be most affected by changes in an object (Muñoz Viñas 2005).

What type of stakeholder input is appropriate:

- Determination of value (rarity, historical significance, monetary)
- Interpretation ~ aesthetic object versus document
- Feedback regarding treatment

How should conservators weight stakeholder input in decision-making? Many of the authors cited in this paper, including Mr. Muñoz Viñas quoted above, suggest that conservators should not function merely as technical operators carrying out the wishes of the owner or curator. Yet, if conservation is performed for those people for whom the object is meaningful, it is their resources, preferences, interests, needs and priorities that should be paramount in decision making, regardless of their training (Muñoz Viñas 2005). However, it is not only the contemporary negotiative decision model that calls on conservators to acknowledge the priorities of stakeholders. The Getty’s values-driven model clearly supports the democratization of the heritage field, where the opinions of specialists are not imposed but are recognized as complex negotiations with diverse stakeholders. And the Conservation Center had complex negotiations with stakeholders during development of the ABC Book conservation plan. There wasn’t always agreement, for instance, about compensation methods and the extent of bathing. CCAHA conservators were insistent about treatment preferences in these areas because there were well established procedures at their laboratory and elsewhere.

Less well established, at least at the time, were aqueous treatment options. The ABC Book complicated matters because it is a unique object and because it straddles the realms of document and work of art. Therefore, CCAHA presented various aqueous treatment options to stakeholders (curators, consultants, site administrators), including calcium phytate—providing published and unpublished data gained from colleagues. The stakeholders felt that the calcium-phytate treatment, despite a growing trend of encouraging scientific data, was too new. It was not only new, it meant leaving a chemical deposit behind—one, which CCAHA conservators could not then, and perhaps not now—argue soundly for its effect on retreatment. And so, in keeping with the idea of not leaving a chemical deposit in the paper, neither scavenger nor alkaline reserve, CCAHA negotiated for an optimized washing treatment detailed below. Some of this decision making parallels those treatment decisions made for the conservation of the Last Will and Testament of George Washington, also rendered in iron gall ink, described and treated by Christine Smith (Smith 2003).

Decision makers are, therefore, negotiators who must find a happy-medium, a sweet spot, between preserving all possible meanings, future meanings, and outcomes. Perhaps it is useful to remember the words of Lowenthal: “nothing ever made has been left untouched. Nothing ever known remains immutable; yet these facts should not distress us but should emancipate us” (Lowenthal cited in Muñoz Viñas 2005). And in this freedom, the notion of sustainability of artifact and meaning may serve as a guide.

THE OBJECT

In the care of the Ephrata Cloister, the ABC Book had received periodic condition evaluations. Each time, the consulting conservators, either private or institutional, provided the client with their opinions on what needed to be done for the best care of the object at that given time. The recommendations were, mostly, not to perform any further treatment. Not that the object was in a perfect condition, but that the risk involved in potential treatment seemed to be too high. In 2004, the object was brought to CCAHA for another condition evaluation.

The object, as reported by the owners, had received extensive treatment in the early 20th century. By this time, it had already suffered a severe degree of ink corrosion resulting in significant losses of the paper support. The early 20th century treatment involved the following stabilization measures: filling the numerous small and large losses in the paper support with chamfered inserts attached from the verso using starch
of our treatment, without undoing our work or risking the
future by re-initiating the problem we had just treated. Could the next generation add a treatment “layer” on top of our treatment without undoing our work or risking the future? Would the changes in the appearance after treatment be acceptable? None of these questions could be easily answered, and some of them remain unanswered today.

Once the decision was made by the owners and stakeholders to go ahead with a treatment, the many significant details and extent of the treatment procedure remained for the conservators to propose, test, and evaluate. All of these were to be discussed with and approved by the client.

The crucial discussion in developing the treatment procedure involved the choice between recent chelation and anti-oxidant approaches and more traditional aqueous washing methods. As mentioned earlier, the possible application of a calcium phytate treatment was declined by the client. The client’s doubts about the unknown long term side effects were understandable and partly shared by the conservators. The stakes were too high, considering the huge amount of ink deposited in each leaf. For some of the bold, heavily drawn letters, the iron gall ink occupied nearly 50% of the page. The conservators, therefore, determined to pursue an optimized washing treatment—while attempting to assure that this washing would be as safe and as thorough as possible. The CCAHA approach essentially quotes from the prevailing treatment protocols for iron gall ink without the application of the phytate and calcium bicarbonate (Huhsmann and Hähner 2008; Albro et al. 2008). Perhaps a newer and more effective anti-oxidant or chelation treatment will become available in the reasonably near future; or the calcium phytate treatment itself may be time proven to be the safest and the best way to treat this type of object. Until then, it is hoped that our current treatment will buy enough time to transition the ABC Book into re-treatment with minimal complications. Leaving the pH of the treated object in the neutral range was done intentionally in order to “leave the door open” for a future phytate or chelation treatment.

After presenting and discussing different prototypes with the client, the basic scheme of the treatment was agreed upon. The plan was to completely remove silk and old chamfered inserts; thoroughly remove silkling adhesive remnants, which was to be achieved by alpha-amylase treatment; wash the object as thoroughly as possible to remove harmful Fe (II) ions; fill the losses with wet antique paper pulp, which provided the best results in terms of planarity and appearance without causing the localized stresses of adhered inserts; line the verso with thin mulberry paper and wheat starch paste; size the object with dilute gelatin; and inpaint the losses with ground pigment and dilute methylcellulose. Each step was refined and developed into a standardized protocol, which a team of conservators could precisely follow and reproduce over the course of one year. (See APPENDIX for detailed treatment sequence.)

The extensive washing brought out the brightness of the paper, which at first was unfamiliar and somewhat startling.

The condition examination of the object at CCAHA seemed to be reinforcing that the extensive moisture applied during the silking process had caused bleeding of latent water soluble components in the inks. Viewed under ultraviolet illumination, these latent components appeared as dark halos around the inked areas. The inks and some of the halos tested strongly positive for the presence of Fe (II) ions, using the non-bleeding bathophenanthroline indicator paper, confirming the reason for the severe corrosion and the potential for further degradation. Given the extent and the pattern of haloing, it was highly doubtful that the object had been washed during the previous treatment.

How has the previous treatment affected the condition of the object? If it had not been treated before, would the object be in a better or worse condition now? It seemed that the previous treatment was intended mainly to provide physical support for a very fragile object in dire enough condition to warrant intervention? If we are to treat the object this time, which treatment procedures can we apply with confidence, based on “real time” proven results? Would our treatment facilitate or interfere with future intervention? Could the next generation add a treatment “layer” on top of our treatment, without undoing our work or risking the

based adhesive; inpainting the inserts with a water soluble medium; and lining the front and the back of the object with fine silk and starch based adhesive. The chamfered inserts were individually made with a high degree of craftsmanship, but the silking procedure was done rather haphazardly with excessive amounts of adhesive. In some cases, the sticky surface of the freshly silked object had attracted dust and random debris from the air or a contacting material, which made the finished product appear rather hazy. Each of the 80 leaves was uniformly treated in this manner, including several blank leaves, which did not receive inserts. The leaves were then re-bound as a book with a paper tab attached on the left edge of each leaf. As a result, each leaf remained sturdy but slightly rigid, encased in the layers of aged and discolored silk and adhesive. Other than these visual clues, there was no surviving record associated with the previous treatment. With the aid of improved examination tools, an in-depth condition assessment was performed at CCAHA. It seemed that the excessive moisture applied during the silking process had caused bleeding of latent water soluble components in the inks. Viewed under ultraviolet illumination, these latent components appeared as dark halos around the inked areas. The inks and some of the halos tested strongly positive for the presence of Fe (II) ions, using the non-bleeding bathophenanthroline indicator paper, confirming the reason for the severe corrosion and the potential for further degradation. Given the extent and the pattern of haloing, it was highly doubtful that the object had been washed during the previous treatment.

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Once the decision was made by the owners and stakeholders to go ahead with a treatment, the many significant details and extent of the treatment procedure remained for the conservators to propose, test, and evaluate. All of these were to be discussed with and approved by the client.

The crucial discussion in developing the treatment procedure involved the choice between recent chelation and anti-oxidant approaches and more traditional aqueous washing methods. As mentioned earlier, the possible application of a calcium phytate treatment was declined by the client. The client’s doubts about the unknown long term side effects were understandable and partly shared by the conservators. The stakes were too high, considering the huge amount of ink deposited in each leaf. For some of the bold, heavily drawn letters, the iron gall ink occupied nearly 50% of the page. The conservators, therefore, determined to pursue an optimized washing treatment—while attempting to assure that this washing would be as safe and as thorough as possible. The CCAHA approach essentially quotes from the prevailing treatment protocols for iron gall ink without the application of the phytate and calcium bicarbonate (Huhsmann and Hähner 2008; Albro et al. 2008). Perhaps a newer and more effective anti-oxidant or chelation treatment will become available in the reasonably near future; or the calcium phytate treatment itself may be time proven to be the safest and the best way to treat this type of object. Until then, it is hoped that our current treatment will buy enough time to transition the ABC Book into re-treatment with minimal complications. Leaving the pH of the treated object in the neutral range was done intentionally in order to “leave the door open” for a future phytate or chelation treatment.

After presenting and discussing different prototypes with the client, the basic scheme of the treatment was agreed upon. The plan was to completely remove silk and old chamfered inserts; thoroughly remove silking adhesive remnants, which was to be achieved by alpha-amylase treatment; wash the object as thoroughly as possible to remove harmful Fe (II) ions; fill the losses with wet antique paper pulp, which provided the best results in terms of planarity and appearance without causing the localized stresses of adhered inserts; line the verso with thin mulberry paper and wheat starch paste; size the object with dilute gelatin; and inpaint the losses with ground pigment and dilute methylcellulose. Each step was refined and developed into a standardized protocol, which a team of conservators could precisely follow and reproduce over the course of one year. (See APPENDIX for detailed treatment sequence.)

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for the client. However, the recognizable benefit of treatment, including the revelation of fine details in the drawing that had been obscured by the previous treatment, small overlays attached by the artist to correct images, and tiny pin holes at the four corners of the image boundary, helped the client to overcome the unfamiliarity and appreciate the newly discovered details. These details have led to a better understanding of the techniques of the calligrapher and have helped to reinforce the appropriateness of the treatment decisions.

In addition to the treatment, measures to forestall the eventual degradation of the media and paper included consideration of the housing and storage of the treated leaves. Each leaf was housed in an alkaline, ragboard window mat (with zeolites), with a portfolio cover. Folded mulberry paper corners were used to secure the object in the mat, instead of using adhesive and hinges. For exhibition purposes, the cover and the window were attached in a way so that they could be completely folded back. The client felt it was important to be able to show each leaf in its entirety, with the thumb-stained margins all visible, in order to remind the viewer that the object once lived as a book page. Possible advantages of the new format and housing include increased visual and mechanical access to the leaves, once bound as a heavy book that was difficult to handle and exhibit safely. Individual leaves can now be exhibited without flexing the large swaths of iron gall design, which was not possible before treatment. Additionally, recent evidence suggests that bound stacks of paper, rather than individual leaves, age more quickly than single sheets (Shahani 1995). Again, conservators, owners, and stakeholders must balance possible “meaning loss” with longer term preservation. Final decisions on the ABC Book format were made by the owner. Today, the matted objects are housed in seven clamshell boxes.

CONCLUSION: R.I.P

Chris Caple’s elegant and ironically named RIP decision model encourages conservators to balance revelation, investigation and preservation (Caple 2000). CCAHA conservators hope that their conservation approach to the challenges of the ABC Book led to a balance of these RIP factors and to a sustainable preservation solution. With the possible exception of preventive conservation, all treatment alters and or modifies an object. While the ABC Book may have lost some if its “bookishness,” and possible meanings therein, all or some leaves may become a book again some time in the future, should evidence and stakeholder volition lead the way. It is somewhat ironic that the treatment, after one hundred years of advances in paper conservation, has come full circle in some respects. The essential ingredients of the treatment circa 1900 and today, water, starch paste, and gossamer thin linings (this time cellulose instead of silk) are much the same. Perhaps the major changes of the recent conservation efforts relate to the ways in which the ingredients were applied and the critical process that led to their use. Too, the very absence of prior treatment documentation, and of any record of the “negotiative” process one hundred years ago, is telling. It is hoped that the decision process of this century, as well as product, will be entered into the permanent record of the ABC Book and will facilitate its future care.

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APPENDIX: TREATMENT STEPS IN SEQUENCE.

1. Solubility test.
2. UV examination to record the latent bleeding caused by previous treatment (fig. 3).
3. Fe (II) test: All strongly positive.
4. 100% ethanol spray and air-dry.
5. Immersion washing in 50:50 (ethanol: water) → 25:75 (ethanol: water) → water 100%, approximately 30 minutes per each bath. The last 30 minute water bath is divided into several frequent baths in order to remove the residual ethanol from the paper prior to enzyme treatment (fig. 4).
6. Enzyme treatment: prepare 200ml alpha-amylase enzyme solution (200 ml of 100 units/ml activity solution = 0.01g amylase + 20ml 0.05M Trizma + 180ml calcium enriched deionized water) → place the object on top of a Plexiglas, which covers a tray of hot water. The Plexiglas gives away a slight curvature to contain the enzyme solution in full contact with the object. Cover the object with a piece of Mylar, bigger than the object, and keep it on the warm surface for 35–40 minutes total.
7. Cold water washing in shallow baths, repeated several times. Old patches and silks are removed in these cold rinsing baths. The gritty residues on the surface are gently squeezed out with the object sandwiched between Mylar on the front and polyester webbing material on the back.
8. Fe (II) test: All inks tested negative at this point.
9. Pulp fill the losses with pressure-cooked antique paper pulp from the verso, on the light table.
10. Line the verso of the object with Korean mulberry paper (#1101) and wheat starch paste.
11. Size with 0.25% warm gelatin by spraying on the recto—applied twice with an interval to give a chance for full penetration (fig. 5).
12. Dry the object between felts under glass plate. No weight on top. On the following day, place the object between blotters under Plexiglas and moderate weights.
13. UV exam to check if the treatment has caused any further latent bleeding of inks—a way of evaluating the success of aqueous treatment before and after treatment.
14. After several weeks of drying, the losses were inpainted with ground pigment and dilute methylcellulose A4M.

REFERENCES


**SOURCES OF MATERIALS**

Korean paper #1101
FIDES International Co.
102-811 The # Island Park
17 Yeoido-dong
Yeongdeungpo-gu
Seoul, Korea 150–874
(82) 10–2369–5433
www.ifides.com

Gelatin, laboratory grade, 275 Bloom
Fisher Scientific
2000 Park Lane Drive
Pittsburgh, PA 15275
(800) 766–7000

Ground pigment
Sinopia Pigments & Materials
1340 Bryant Street @ Division
San Francisco, CA 94103
(415) 824–3180

α-Amylase from *Bacillus* sp., A 6380, Type II-A, lyophilized powder, 1,500–3,000 units/mg protein (biuret)
Sigma-Aldrich
3050 Spruce St.
St. Louis, MO 63103
(800) 521–8956

Trizma® Pre-Set Crystals, pH 7.6, T-4253
Sigma-Aldrich
3050 Spruce St.
St. Louis, MO 63103
(800) 521–8956

JOAN IRVING
Paper Conservator
Winterthur
Winterthur, Delaware
jirvin@winterthur.org

SOYEON CHOI
Paper Conservator
Conservation Center for Art and Historic Artifacts
Philadelphia
schoi@ccaah.org