

## Decision Making and Treatment of the Ephrata Cloister ABC Book

### ABSTRACT

The decision to apply new treatment methods and technologies is often a difficult one for conservators. The history of restoration, and later conservation, is littered with technologies adopted and later discarded as unsafe. In paper conservation, fungicides, oxidative bleaches, and alkalization treatments have been modified or called in to question, particularly with the growth of conservation science and its vast contributions to our knowledge of how materials chemically interact, age, and degrade. Today's paper conservator, having experienced or witnessed the shortcomings of previous treatment protocols, has an understandable hesitance to adopt new technologies even when they are supported by promising scientific research. All treatment has side effects and despite recent advances in artificial aging, deleterious side effects that may appear in the future are difficult to portend.

This paper will discuss the decision-making process and treatment of a unique, and among cognoscenti, iconic, work of early American *frakturshriften* known as the *Christian ABC Book*. This work is neither convincingly a book nor a primer for learning the ABC's but a mysterious object that has intrigued scholars for decades. The designs are composed almost entirely of iron gall ink, bringing into debate the use of aqueous anti-oxidant treatments and the appropriateness of using them on a unique work of art. Ultimately, decisions guiding treatment protocols for this object included ample input of the owner while drawing on key trends in the treatment of iron gall ink—though ultimately leaving the application of an antioxidant to a future generation to consider.

### CONSERVATION DECISIONS

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



Fig. 1.

an elaborate Gothic script called *frakturshriften*, 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,

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does not have an entity like the FDA—telling us when to proceed with a new chemical treatment. We have artificial aging, which clearly has made important contributions to our knowledge but which too has felt like shifting sands of late, with reports that question extant models and assumptions about paper aging (Shahani 1995; Porck 2000; Bansa 2002). In addition, studies that we count on for replication often rely on differing experimental designs and aging methods—leaving us to compare apples to oranges, or in our case, Whatman filter papers to antique paper samples, dry or humid aged, cyclically under varying conditions and durations. Even our rockbed assumptions of Arrhenius relationships between temperature and degradation have been reconsidered (Daniels 2009; Bansa 2002; Porck 2000).

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).



Fig. 2.

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).

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 must call on skills of diplomacy, goodwill, and fairness to achieve optimal decision-making (Muñoz Viñas 2005).

*Have I assessed:*

- Skill level/experience
- Biases
- Risk Tolerance

As conservators, most of us know when we need to strengthen skills, seek out new technologies, or acquire knowledge to undertake a treatment. But what steps do we take to mitigate our own biases and subjectivity? Research indicates that people make judgments based on their own experiences and thoughts and are innately predisposed to consider their own ideas very highly (Caple 2000). Subjectivity and bias may be important aspects of decision-making and judgment, considering that conservation is an activity that is sometimes based on the tastes of a particular person or attitudes prevalent at a particular time. These attitudes clearly can affect treatment decisions, particularly in qualitative areas such as extent of cleaning or alteration of format, etc. (Muñoz Viñas 2005). Another factor that can play a key role in judgment, is risk tolerance. Depending on their education, experience, and biases, different people see the same activity as more or less risky (Ashley-Smith 1999). Some argue that the way that conservators work is heavily influenced by the internal politics and pressures of their work place (Caple 2000).

*Have I developed feedback loops for:*

- Stakeholders
- Peers
- Checking

Many authors have stressed the utility of biases as part of heritage assessment and have defended the role of subjectivism (Muñoz Viñas 2005). However, individual biases must be tempered in order to maintain alignment with institutional perspectives and ethical codes. One important source of countering bias and subjectivity, is feedback. Feedback loops can help test judgment. For many professions, says Caple, “reality provides a natural feedback loop” (Caple 2000, 7). However reality sometimes takes a long time to deliver the check. More immediate sources of feedback may come from colleagues. At CCAHA, feedback loops are structurally integrated in the workflow of projects. The feedback is called “checking” and is given in written form or verbally by a supervising conservator after each of the following has been completed: condition report, treatment, housing, and final treatment report. For the *ABC Book*, each treated leaf was checked, permitting feedback as the project proceeded, allowing conservators to adjust techniques and discuss possible refinements.

THE PAST

*Have I considered:*

- History of the object
- Creator intention
- History of proposed treatment

The past also influences our decisions, though it often raises more questions than it answers. Is there evidence of an object’s creation, use, and even conservation treatment that contributes to the meaning of the object? Objects are layers of meanings—having cult or historical, sentimental, ideological, or group identification meanings. These meanings may change over time and are culturally relative (Muñoz Viñas 2005).

The history of the creation and use of the *ABC Book*, mysterious to begin with, has been obfuscated with previous repair—for which there is no written documentation and only scant photographic record. Was this always a book? The object yields no physical evidence of a previous binding structure, although at least one early photograph indicates that it arrived bound at the State Library of Pennsylvania, where it remained between 1905 and 1917 (Mohn 2010). At some point in time, the edges of all sheets appear to have been trimmed. Some have speculated that the leaves were hung on the walls of the cloister, an idea partially supported by corner pinholes in some of the pages. Evidence of transfer staining and grime from thumbing, however, suggests that the leaves lived as a book for a period of time, but we cannot say for how long. It is important also to remember that the book is composed of several complete alphabets—and we do not know if they were all intended as one compilation.

No matter what their distant history, the leaves were adhered to stubs and re-bound during a conservation

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

records to persons other than the traditional “keepers” of information, conservators and curators. Some in Britain have even suggested documentation wikis, with version-controlled encoding, allowing the documentation to be available to diverse users (Kemp 2009).

The emphasis on the record is one of the defining aspects of our profession, differentiating it from craft-driven emphasis on immediate cosmetic improvement to an emphasis on long term, ongoing care (Caple 2000). It is this idea of ongoing care, which brings us back to the notion of sustainability—the goal for the preservation of the *ABC Book* and for its documentation. Therefore it was important for CCAHA conservators to determine what information would be useful to future generations—to record that information in as standard and permanent a format as possible.

With future users in mind, the Conservation Center has developed an approach to documenting culturally significant and high value artifacts such as the *ABC Book*—an approach they call *Baseline Documentation*. It is designed to provide a thorough record of condition—serving foremost as a tool for monitoring condition in the future. In considering this documentation approach, it is important to note that the extent of documentation at a regional center such as the CCAHA is often driven by the resources of the owner. Therefore, at CCAHA, baseline documentation typically relies on tools and techniques that can be practiced in-house by staff conservators. These tools for monitoring baseline generally include:

- An extended prose report, including treatment history.
- In-house analysis such as polarized light microscopy and microchemical testing. Outsourced quantitative analysis, particularly of design media, is undertaken if the owner’s budget permits.
- L\*a\*b\* color measurements of paper, media, and for iron gall inks, areas of haloing and penetration. These color measurements will provide more accurate data than photography and can detect changes before they are visible to the human eye. Hard copy records of data are retained and polyester templates used to take the readings are stored with the object.
- 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 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

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.

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 strength. It is conceivable, however, that the encasement in silk and a thick adhesive layer, though now considered disfiguring and of questionable stability, might have provided some chemical buffering by limiting to some degree the exposure to atmospheric oxygen and other pollutants. At the very least, the object was saved from extensive fragmentation owing to the mechanical and physical protection provided by the previous intervention.

The condition examination of the object at CCAHA brought up a range of questions for the conservation staff to ponder. When is the right timing to treat this or any object, now or later? Could we wait for another time? Is the object in dire enough condition to warrant intervention? If so, would the treatment decision-making be easier? How long would the object stay in this relatively stable condition without active 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

object? Will our treatment buy enough time for the next generation? 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 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.)

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

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 of 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.





Fig. 3.



Fig. 4.



Fig. 5.

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 methycellulose A4M.

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- 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
- $\alpha$ -Amylase from *Bacillus* sp., A 6380, Type II-A, lyophilized powder, 1,500–3,000 units/mg protein (biuret)  
Sigma-Aldrich  
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St. Louis, MO 63103  
(800) 521–8956
- Trizma® Pre-Set Crystals, pH 7.6, T-4253  
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#### SOURCES OF MATERIALS

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FIDES International Co.  
102-811 The # Island Park  
17 Yeoido-dong  
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(82) 10–2369–5433  
[www.ifides.com](http://www.ifides.com)

Early treatment was studied in a real-world situation where the established treatment protocols were followed with only minor adjustments, mainly to ensure timely and controlled data collection. Ethical, practical, and financial restrictions prevented random assignment of the participants into treatment and follow-up groups in each municipality. The neighboring town of Seinäjoki, where orthodontic treatment is not given until the late mixed dentition, agreed to provide untreated control subjects for the study. Matching of the treatment and control groups was achieved by using large unselected Clinical treatment decisions based on history, clinical examination, and special tests present similarly for most stress fractures (Table 1). Stress fracture injuries most often evolve with an insidious onset that typically occurs at the end of physical activity with a focal point of tenderness.<sup>3,7</sup> Athletes may identify a history that articulates the progression of stress fracture from pain with activity to. Specific special tests and differential diagnosis may vary, depending on the anatomical site of the stress fracture; regardless, prompt diagnosis is imperative in order to begin appropriate treatment plans. The most difficult aspect of stress fracture treatment entails mitigating internal and external risk factors. Practitioners should address ongoing risk factors to minimize recurrence. Disclosure. The standard text books, both for orthodontics and periodontology, regard malocclusion and mal-alignment of teeth as predisposing or aggravating factors in chronic gingivitis and chronic periodontitis (44, 50, 85). It is assumed that the mechanical removal of bacterial plaque, the major aetiological factor in the development of chronic gingivitis (80), from malaligned teeth demands greater patient dexterity, which may not be achieved under normal circumstances. One study of the effect of treatment on sociopsychological parameters has been published (105). This 5-year follow-up of individuals failed to demonstrate benefits from treatment in terms of social and personal experience when compared with an untreated control group with similar defects. The decision to apply new treatment methods and technologies is often a difficult one for conservators. The history of restoration, and later conservation, is littered with technologies adopted and later discarded as unsafe. 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. Decision making, its participants and stages. Mathematical Model of Problem Situation. Sequential Method of Decision Making. Mathematical Theory of Measurement. Topic 2. Preferences Modelling. Topic 7. Decision making under risk Classification of problems, risk measures as criteria for decision making, utility models, comparison of decisions via expected utility. Topic 8. Decision making under uncertainty Optimality principles " guaranteed result, maxmin, pessimism, lexicographic maxmin, optimism, Hurwitz, Savage, Bernoulli-Laplace principles. 5. Reading List a. Required. Aleskerov F., Bouyssou D., Monjardet B. "Utility Maximization, Choice and Preference"™, Springer Verlag, Berlin, 2007.