

Wet Treatment of Water-Soluble Media Discussion

Bibliography: APRIL SMITH

These notes attempt to document an intentionally informal and loose discussion. The group engaged with some topics and abandoned others. Since it is not easy to communicate the flavor of a discussion, its give and take, or even to identify each speaker, we hope that readers will be tolerant of the occasional non-sequitur and inconsistency, and accept that many interesting and provocative ideas were not pursued—evidence, we believe, that more discussions of this sort may be in order. Finally, the moderators are extremely grateful to the audience members for their participation, which was both generous and attentive.

Liz Lunning began the session by offering a series of questions for the audience to consider. These questions were intended to suggest a variety of ways we could look at the problem of wet treatment of water-soluble media. She then served as leader and moderator for the rest of the session, providing thoughtful commentary and direction for the participants. The first half of the session was devoted to discussing details of treatments; the second half of the discussion took a more thoughtful and philosophical view of our profession and some of the current challenges we face.

QUESTIONS AND CONSIDERATIONS

The first questions had been posed by Miranda Martin (2001 Book and Paper Group Program Chair) to all the discussion groups.

This open discussion took place on June 2, 2001, during the AIC 29th Annual Meeting, May 30–June 5, 2001, Dallas, Texas. The moderators organized and led the discussion and recorded notes. Readers are reminded that the moderators do not necessarily endorse all the 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.

- *Is there an absence of research in this area?*
- *Is there a lack of understanding of the research?*
- *Is the research unclear or untrustworthy?*
- *Is our training inadequate?*
- *Are we thinking about the problem in the right way?*

Liz then described additional issues or questions that had arisen in her discussions with Karen.

Do archival conservators and fine art conservators define “water-soluble” in the same way? How do we define it? The same questions can be asked of “acceptable loss.”

Are we talking about treatments we consider impossible, very tricky, or doable but with some uncertainty about their long-term effects?

Liz wondered if it was helpful to enumerate some of the reasons we expose works to water or moisture: for example, to facilitate the removal of degradation products or other unwanted color; to enable us to remove adhesives or attachments, including backings; to remove stains or tidelines; to deacidify; to undertake flattening or the removal of distortions; to apply a lining.

Liz said this list prompted her to ask: when we most want to proceed with a problematic aqueous treatment, are we motivated by aesthetic concerns or concerns about the long-term well-being of the work, or both?

Karen tended to see the issue being discussed in terms of specific treatments that concern her, while Liz tended to see it as a conundrum that all conservators struggle with at some point: how to treat something that in some way can't be treated.

Liz concluded this list of questions by pointing out that when she was a student, she was frequently taught there was one correct answer to a question. Training, and conservation in general, seem to have moved away from this point of view, a redirection that she thought would facilitate this discussion, because many questions can be approached in a variety of ways, yielding different kinds of answers.

DISCUSSION

Treatment of Water-Soluble Media

The dialogue began with a plea for good, practical information rather than theory, and this prompted several discussions of case histories. One person described removing adhesive from a manuscript written in extremely water-soluble ink. Saturating the paper with butyl alcohol served as a resist and permitted the manuscript to be washed with boiling water long enough to soften and remove the adhesive with no perceptible change to the ink.

The discussion turned to the limitations of testing, treating dye-based media, and the use of fixatives. Several people reported experimenting with cyclododecane, and most reported good results. However, one conservator described a treatment in which cyclododecane was extremely problematic and actually seemed to act as a poultice, holding water against the ink. There was concern that if one area of a sheet is fixed then that part of the paper is not washed, perhaps creating a problem for conservators in the future. A recent article in *Restaurator* (Blüher et al. 1999) was mentioned; it discusses ionic fixatives. No one in the room described any real experience with them, but there was interest and a hope that they will be useful.

A relatively new problem that concerned people was the treatment of digital print media, which seem to be sensitive to water, solvents, heat, and light. Some people even report problems with solubility when merely trying to apply hinges to Iris prints. A group of students had recently experimented with different kinds of prints, including Iris, but the experiments were not conclusive.

Adopting New Materials

The discussion gradually became more philosophical. As moderator, Liz posed the question, "What do we require to begin using a product?" The factors we mentioned included scientific testing, the advice of fellow conservators, and advertising. The consensus was that conservators trust the opinions of other practicing conservators more than information from scientists. While scientists may have an objective knowledge of a product, another conservator will better understand the goals and limitations of actually using it. This was a provocative idea; perhaps there is work that can be done to help bridge the gap between practicing conservators and pure scientists.

Differences Among Types of Conservators

We discussed the difference between private conservators and conservators who work in institutions. One of the most significant differences is that conservators in institutions can set something aside if treatment is too problematic, while private conservators rarely have that option. Conservators in institutions also have the luxury of dealing with the same "clients" repeatedly (the curators),

and they can approach the collection as a whole, and allocate resources accordingly. Private clients look at treatment with different expectations and understandings, and one result may be that conservators in private practice feel a greater pressure to do cosmetic treatments. Some private conservators have reported treating the same object multiple times, in one case five times in twelve years, suggesting that, although the treatment is not effective in the long run, private owners might gauge success differently.

A similar range of distinctions was noted between library and archives conservators and museum conservators. Archival collections are extremely large and heavily used, and the decision to treat something may be driven by a need to make it accessible. In making this decision, the information contained in a document is often considered to be more important than its appearance, and the chemical stability of an object may be more important than preserving every detail of its components. In some cases, for example, some color change in the ink or paper may be acceptable in archival collections, if the strength and longevity of the paper is substantially improved. Obviously this is the exception, but with works of art there seems to be much less compromise, perhaps none.

Observations About the Conservation Profession

The consensus was that conservation in the 1930s and 1940s was very different than it is today and that we have gained some sophistication in how we work. Someone described reading early treatment reports in which entries saying simply "the object was cleaned" referred to various bleaching procedures. One participant pointed out that the fact that conservation scientist Season Tse now distinguishes between yellowing and degradation of paper is an enormous leap in our understanding of the materials we treat and gives testament to our increasing sophistication as a profession. The larger issue here is that we seem to have more options in our treatments now, and that we are more willing to talk about balancing different goals or trading one benefit for another.

This led to a discussion of what we may be doing now that we, or our successors, will regret in the future. We are able to see so clearly what was lost in certain earlier treatments (paper color or texture, for example) that it is impossible not to wonder what characteristics in a work we may be overlooking and therefore compromising in our own treatments. It was noted that when in doubt a conservator can always elect to do nothing. In response, one conservator described a Toulouse Lautrec poster that was not treated in the 1970s because the treatment was so problematic. As years have passed, however, the condition has deteriorated, and the treatment has become even more difficult. This illustrates that the decision not to treat something may have ramifications as well; it may be more passive, but the effect can be similar to that of a bad treatment.

There followed a lot of back and forth reflecting individual's goals and the group's ambitions for the profession.

We need to evaluate information critically. We need to discuss changes in philosophy and openly review and evaluate our past practices. People have been criticized harshly in the past for admitting mistakes publicly, but our profession has matured, and we may be able to move beyond this response. Perhaps we can learn from the medical profession, which has developed a vocabulary to discuss what works well and what does not work well, recognizing accountability, but reserving blame and judgment. Perhaps we can develop a web site where people can post mistakes anonymously for the benefit of others, sorted by artist, material, etc.

We do not work in isolation. We need more collaboration with other departments to achieve our goals and get real work done. Within this collaboration, we need to recognize that occasionally the conservator is a spin doctor and admit that sometimes we use vocabulary to allay curators' fears. Since bleaching has become so unfashionable, one conservator reported describing it as "localized stain removal with hydrogen peroxide." We still need to improve communication with curators and society, and we need to find a common vocabulary. We need to define what is important about our profession. In the end we hope for an ongoing, open dialogue among conservators.

Before closing the session, Liz introduced April Smith, a third-year student at Preservation and Conservation Studies, Center for the Cultural Record, University of Texas at Austin, who worked very hard preparing a bibliography for us. The bibliography, reproduced below, and is available at <<http://www.gslis.utexas.edu/programs/pcs/>> by following the link for PCS Research.

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BIBLIOGRAPHY FOR WET TREATMENT OF ARTIFACTS WITH WATER-SOLUBLE MEDIA

Aqueous Treatments (general)

Banks, Paul. 1969–70. Paper cleaning. *Restaurator* 1:52–66.

Blüher, Agnes, A. Haberditzl, and T. Wimmer. 1999. Aqueous conservation treatment of 20th century papers containing water-sensitive inks and dyes. *Restaurator* 20:181–197.

Branchamp, R.R. 1968. A simple layout for the washing and bleaching of prints and drawings. *Bulletin of the American Institute for Conservation* 9:21–2.

Cohn, Marjorie B. 1982. A hazard of float washing: regeneration of paper sizing. In *Postprints from the Tenth Annual Meeting, Milwaukee, Wisconsin, 26–30 May, 1982*, 31–49. AIC Book and Paper Group.

Cullhed, Per. 1998. An alternative immersion technique. *The Paper Conservator* 22:62–64.

Hey, Margaret. 1979. Washing and aqueous deacidification of paper. *The Paper Conservator* 4:66–80.

Keys, K. M. 1987. Alternatives to conventional methods for reducing the discolouration in works of art on paper. In *Conservation of Library and Archive Materials and the Graphic Arts*, ed. G. Petherbridge, 49–55. London: The Institute of Paper Conservation/Butterworths.

Keys, Keiko Mizushima. 1994. Some practical methods for the treatment with moisture of moisture-sensitive works on paper. In *Conservation of historic and artistic works on paper, October, 1988*, ed. H. D. Burgess, 99–107. Ottawa: Canadian Conservation Institute.

Lienardy, Anne, and Philippe van Damme. 1990. Paper washing. *The Paper Conservator* 14:23–30.

Lyne, Bruce M. 1984. Wetting and the penetration of aqueous liquids. In *Handbook of physical and mechanical testing of paper and paperboard*, vol. 2, ed. R. E. Mark. New York: Marcel Dekker.

Mackay, Christine, and Anthony Smith. 1994. The effect of wetting agents on the tensile strength of paper. In *Conservation of historic and artistic works on paper, October, 1988*, ed. H. D. Burgess, 199–203. Ottawa: Canadian Conservation Institute.

Masson, Olivier, and Westby Percival-Prescott. 1987. The use of Lascaux humidification chamber in the treatment of works on paper. *Paper Conservation News*, 43:4–7.

Michalski, Stefan. 1979. The suction table: a study of air/liquid flow and spot stain removal. In *Papers presented by trainees at the art conservation training programs conference*. Cambridge, MA: Harvard University, Center for Conservation and Technical Studies.

Weidner, Marilyn Kemp. 1985. Water treatments and their uses within a moisture chamber on the suction table. *AIC preprints*, American Institute for Conservation 13th Annual Meeting; Washington, D. C.: AIC.

Bleaching

Baynes-Cope, A.D. 1977. The effect of residues of manganese compounds in paper on the bleaching of prints, etc. *The Paper Conservator* 2:3.

Bicchieri, Marina, and Paola Brusa. 1997. The bleaching of

- paper with the tert-butylamine complex. *Restaurator* 18:1–11.
- Clement, Daniel. 1983. The blistering of paper during hydrogen peroxide bleaching. *JAIC*, 23:47–62.
- Daniels, V. 1976. The elimination of bleaching agents from paper. *The Paper Conservator* 1:9–11.
- Gettens, Rutherford J. 1952. The bleaching of stained and discolored pictures on paper with sodium chlorite and chlorine dioxides. *Museum* 5:116–30.
- Hey, Margaret. 1977. Paper bleaching: its simple chemistry and working procedures. *The Paper Conservator* 2:10–23.
- Higgins, S. H. 1924. *A history of bleaching*. London: Longmans, Green & Co.
- Lee, Sang B., J. Bogaard, and R. L. Feller. 1989. Darkening of paper following exposure to visible and near-ultraviolet radiation. *JAIC* 28:1–18.
- Lee, S. B., J. Bogaard, and R. L. Feller. 1994. Bleaching by light: I. Effect of pH on the bleaching or darkening of papers in the dry and in the immersed condition under visible and near-ultraviolet radiation. In *Conservation of historic and artistic works on paper*, October, 1988, ed. H. D. Burgess, 181–90. Ottawa: Canadian Conservation Institute.
- Lee, S. B., J. Bogaard, and R. L. Feller. 1994. Bleaching by light: II. Studies of the bleaching of thermally discoloured sugars and other “model” compounds. In *Conservation of historic and artistic works on paper*, October, 1988, ed. H. D. Burgess, 191–198. Ottawa: Canadian Conservation Institute.
- Lehtaru, Jaan, and Tullio Ilomets. 1997. Use of chelating agent EDTA with sodium thiosulphate and sodium borohydride in bleaching treatment. *Restaurator* 18:191–200.
- Lienardy, A., and Philippe Van Damme. 1988. A bibliographical survey of the bleaching of paper. *Restaurator* 9:178–198.
- Ströfer-Hua, E. 1991. Classical methods of bleaching in the restoration workshop: the role of the OH radical. *Restaurator* 12:131–6.
- van der Reyden, D., M. Mecklenburg, M. Baker, and M. Hamill. 1988. Update on current research into aqueous light bleaching at the Conservation Analytical Laboratory. *The Book and Paper Group Annual* 7:73–106.
- Chemistry Pertaining to the Aqueous Treatment of Paper
- Arney, J. S. et al. 1980. The influence of deacidification on the deterioration of paper. *JAIC* 19:34–41.
- Aspler, J. S., S. Davis, and M. S. Lyne. 1984. The dynamic wettability of paper: part I. *Tappi* 67:128–131.
- Bristow, J. Anthony. 1986. The pore structure and sorption of liquids. In *Paper structure and properties*, ed. J. A. Bristow and P. Kolseth. New York: Marcel Dekker.
- Burgess, H. D. 1981. The colour reversion of paper after bleaching. In *Conservation of Library and Archive Materials and the Graphic Arts*, ed. G. Petherbridge, 171–183. London: Institute of Paper Conservation.
- Burgess, H. D. and J. F. Hanlan. 1979. Degradation of cellulose in conservation bleaching treatments. *JJIC-Canadian Group* 4:15–22.
- Carrapella, E. E., E. M. Powell, C. A. Rutiser, and M. S. Barger. 1990. Changes in paper surface morphology caused by resizing treatments. *Restaurator* 11:219–235.
- Casey, J. P. 1961. *Pulp and paper: chemistry and technology* (2nd ed.). Interscience.
- Corte, H. 1980. Cellulose-water interactions. In *Handbook of paper science*, vol. 1, ed H. E. Rance. Amsterdam: Elsevier.
- Dupont, A.-L. 1996. Degradation of cellulose at the wet/dry interface: I. The effect of some conservation treatments on brown lines. *Restaurator* 17:1–21.
- Dupont, A.-L. 1996. Degradation of cellulose at the wet/dry interface: II. An approach to the identification of the oxidation compounds. *Restaurator* 17:145–164.
- Durovic, M. and J. Zellinger. 1993. Chemical processes in the bleaching of paper in library and archival collections. *Restaurator* 14:78–101.
- Eusman, Elmer. 1995. Tideline formation in paper objects: cellulose degradation at the wet-dry boundary. *Conservation Research 1995*. Studies in the History of Art no. 51, Monograph Series II. Washington: National Gallery of Art.
- Feller, R., and M. Wilt. 1990. Evaluation of cellulose ethers for conservation. *Research in Conservation*, J. Paul Getty Trust.
- Guerra, Rogelio Areal, J. M. G. Vives, J. M. D. Monmany, and J. F. Garrido. 1998. The effect of aqueous solutions of alkoxy polyethyleneglycols (ALKPG) on the mechanical properties of paper. *Restaurator* 19:187–211.
- Hofenk de Graaff, J. 1981. Hydroxypropyl cellulose: a multi purpose conservation material. ICOM Committee for Conservation 6th Triennial Meeting, Ottawa, 81/14/9.
- Holst, G. 1954. The chemistry of bleaching and oxidizing agents. *Chemical Reviews* 54:169–194.
- Kolar, Jana, and Gabrijela Novak. 1996. Effect of various deacidification solutions on the stability of cellulose pulps. *Restaurator* 17:25–31.
- Nelson, Clark W. 1975. Technical notes: maximum safe pH. *American Archivist* 38:65–6.
- Nelson, J., A. King, N. Indictor, and D. Cabelli. 1982. Effects of wash water quality on the physical properties of three papers. *JAIC* 21:59–76.
- Shahani, C. J., and F. H. Hengemihle. 1994. Effect of some deacidification agents on copper catalyzed degradation of paper. In *Conservation of historic and artistic works on paper, October, 1988*, ed. H. D. Burgess, 263–268. Ottawa: Canadian Conservation Institute.

- Tang, L. C. 1986. Stabilization of paper through sodium borohydride treatment. In *Historic textile and paper materials: conservation and characteristics*, ed. S.H. Zeronian and H. Needles, 427-441. Advances in Chemistry Series 212. Washington, D.C.: American Chemical Society.
- Tang, Lucia C., and Norvell M. M. Jones. 1979. The effects of wash water quality on the aging characteristics of paper. *JAIC* 18:61-81.
- Varshney, M. C., and P. Luner. 1961. Reactions of sodium borohydride as applied to pulp and paper. *Tappi* 44:285-289.

Deacidification

- Burgess, Helen D. 1986. Gel permeation chromatography: use in estimating the effect of water washing on the long-term stability of cellulosic fibers. In *Historic textile and paper materials: conservation and characterization*, ed. H.L. Needles, 363-375. Advances in Chemistry Series 212. Washington, D.C.: American Chemical Society.
- Burgess, Helen, S. Duffy, and S. Tse. 1990. Investigation of the effect of alkali on paper. *The Book and Paper Group Annual* 9:29-36.
- Calvini, P. V. Grosso, M. Hey, L. Rossi, and L. Santucci. 1988. Deacidification of paper: a more fundamental approach. *The Paper Conservator* 12:35-39.
- Daniels, Vincent. 1980. Aqueous deacidification of paper. In *Conservation of Library and Archive Materials and the Graphic Arts*, ed. G. Petherbridge, 109-115. London: The Institute of Paper Conservation/Butterworths.
- Darragh, D.W. 1978. Deacidification of brittle manuscripts and documents. *Restaurator* 2:179-184.
- Hey, Margaret. 1981-2. The deacidification and stabilization of iron-gall inks. *Restaurator* 5:24-44.
- Lienardy, A. 1991. A Bibliographical survey of mass deacidification methods. *Restaurator* 12:75-103.
- Lienardy, A. and Phillippe Van Damme. 1990. Practical deacidification. *Restaurator* 11:1-21.
- Mirham, Danielle. 1986. Paper deacidification: a bibliographic survey: part I. *Restaurator* 7:81-98.
- Mirham, Danielle. 1986. Paper deacidification: a bibliographic survey: part II. *Restaurator* 7:99-118.
- Morrow, Geoffrey. 1988. Mass deacidification: operational experience at the National Archives and the National Library of Canada. *The Paper Conservator* 12:40-46.
- Smith, Richard D. 1987. Deacidifying library collections: myths and realities. *Restaurator* 8:69-93.
- Tang, Lucia D. 1981. Washing and deacidifying paper in the same operation. In *Preservation of paper and textiles of historic and artistic value II*, ed. J. C. Williams. Washington, D. C.: American Chemical Society.
- Thompson, J. C. 1988. Mass deacidification: thoughts on the Cunha report. *Restaurator* 9:147-162.
- Wilson, William K., R. A. Golding, R. H. McClaren, and J. L. Gear. 1981. The effect of magnesium bicarbonate solutions on various papers. In *Preservation of paper and textiles of historic and artistic value II*, ed. J.C. Williams. Washington, D. C.: American Chemical Society.
- Wilson, William K., M. C. Kiel, J. L. Gear, and R. H. McClaren. 1978. Preparation of solutions of magnesium bicarbonate for deacidification. *American Archivist* 41:67-9.

Enzymes

- Barrett, Timothy D. 1989. Enzymatic versus chemical pulping: washing versus chemical bleaching and the effect of gelatin and gelatin/alum size. *The Paper Conservator* 13:57-67.
- Bellucci, Roberto. 1999. A preliminary note on the use of enzymes in conservation: the removal of aged acrylic resin coatings with lipase. *Studies in Conservation* 44:278-281.
- Desantes, Pia C. 1983. Some observations on the use of enzymes in paper conservation. *JAIC* 23:7-27.
- Erickson, Harold M. 1992. Usage recommendations for α -amylases: maximizing enzyme activity while minimizing enzyme-artifact binding residues. *The Book and Paper Group Annual* 11:24-33.
- Hatton, Matthew. 1977. Enzymes in a viscous medium. *The Paper Conservator* 2:9.
- Nikolova, D. 1993. Proteinase inhibitors from vegetables and their application in enzymatic conservation treatments. *Restaurator* 14:199-216.
- Schwarz, Ingrid, A. Blüher, G. Banik, E. Thobois, K.-H. Maurer. 1999. Developing a ready-for-use pad to locally remove starch with enzymes. *Restaurator* 20:225-244.
- Segal, Judith. 1994. New techniques for the application of enzymes. In *Conservation of historic and artistic works on paper*, October, 1988, ed. H. D. Burgess, 205-208. Ottawa: Canadian Conservation Institute.
- Tse, Season, and Helen D. Burgess. (1994). Degradation of paper by Commercial Amylase and Protease Enzymes. In *Conservation of historic and artistic works on paper*, October, 1988, ed. H. D. Burgess, 215-226. Ottawa: Canadian Conservation Institute.

Fixatives/Consolidants

- Bandow, Cornelia. 1999. Cyclododecane in der Papierrestaurierung. *Restaurator* 105:326-329.
- Bell, Nancy, and Derek Priest. 1991. Fixing graphite: a preliminary investigation into the conservation of Shelley's notebooks. *The Paper Conservator* 15:53-58.
- Bicchieri, M., and B. Mucci. 1996. Hydroxypropyl cellulose and polyvinyl alcohol on paper as fixatives for pigments and dyes. *Restaurator* 17:238-251.
- Bredereck, K., and A. Siller-Grabenstein. 1988. Fixing of ink dyes as a basis for restoration and preservation techniques in archives. *Restaurator* 9:113-135.
- Brückle, Irene, Jonathan Thornton, Kimberly Nichols,

- and Gerri Strickler. 1999. Cyclodocecane: a technical note on some uses in paper and object conservation. *JAIC* 38:162–175.
- Burgess, H., and C. L. Charette. 1983. The use of fixatives to protect fugitive colorants during conservation treatments. AIC Preprints. American Institute for Conservation 11th Annual Meeting, Baltimore; Washington, D. C.: AIC.
- Derow, Jonathon P. 1993. Jorg Immendorff's 'Café Deutschland Gut': consolidation with Klucel G and the Engelbrecht radiant heat source. *The Book and Paper Group Annual* 12:8–11.
- Dwan, Antoinette. 1998. Temporary masks for aqueous paper treatments. *The Book and Paper Group Annual* 17:53–4.
- Feller, R. L., and M. Wilt. 1990. *Evaluation of cellulose ethers for conservation*. Research in Conservation Series 3. Marina del Rey, CA: The Getty Conservation Institute.
- Flieder, F. et al. 1981. Étude expérimentale sur les fixatifs des traces pulvérulents. ICOM Preprints, 6th Triennial Meeting, Ottawa. 14/8/1–16.
- Grantham, Sandra, & Alan Cummings. 1999. The consolidation of flaking and powdering gouache-type paint layers on a paper substrate. In *The broad spectrum: the art and science of conserving colored media on paper, October, 1999*, ed. H. K. Stratis and B. Salvesen, 83–84.
- Hansen, E., R. Lowinger, and E. Sadoff. 1993. Consolidation of porous paint in a vapour-saturated atmosphere: a technique for minimising changes in the appearance of powdery-matte paint. *JAIC* 32:1–14.
- Hofenk-de Graff, J. 1981. Hydroxypropyl cellulose: a multipurpose conservation material. ICOM Preprints, 6th Triennial Meeting, Ottawa. 81/14/9–16.
- Keynan, Daria, and Sigrid Eyb-Green. 2000. Cyclodocecane and modern paper: a note on ongoing research. *WAAC Newsletter* 22:18–21.
- Maheux, Anne F., and Wanda McWilliams. 1995. The use of the ultrasonic mister for the consolidation of a flaking gouache painting on paper. *The Book and Paper Group Annual* 14:19–25.
- Marconi, Bohdan. 1962. Some tests on the use of wax for fixing flaking paint on illuminated manuscripts. *Studies in Conservation* 7:17–21.
- Phenix, A. 1992. A solvent for Paraloid B72. *Conservation News* 45:23–25.
- Ream, Julie Dennin. 1995. Observations on the penetration of two consolidants applied to insecure gouache on paper. *The Book and Paper Group Annual* 14:27–31.
- Rodgers, Sylvia M., ed. 1988. Consolidation/fixing/facing. *The Paper Conservation Catalog*, 5th ed., 1–20.
- Strickler, Gerri Ann. 1998. An investigation into the use of cyclododecane in objects conservation. Twenty-Fourth Annual AGPIC Student Conference, May 1998. 203–211.
- Vodopivec, J., and M. Cernic-Letner. 1990. Applying synthetic polymers to conserve cultural property on paper. *Restaurator* 11:34–47.
- Iron-Gall Ink**
- Biggs, Julie L. 1999. Conserving iron-gall ink on paper artifacts. *The Book and Paper Group Annual* 18:11.
- Eusman, Elmer. 1999. Aqueous treatment effects on iron-gall ink. In *The broad spectrum: the art and science of conserving colored media on paper, October, 1999*, ed. H. K. Stratis and B. Salvesen, 42–43.
- Hey, Margaret. 1981. Deacidification and stabilization of iron-gall inks. *Restaurator* 5:22–44.
- Schonbohm, Dick. 2000. A partly non-aqueous enzymatic removal of silk gauze linings from iron gall ink corroded manuscripts. *WAAC Newsletter* 22:14. This is a description of his graduate work, not a full article.
- Philosophical/Ethical Issues of Conservation**
- Price, Nicholas Stanley, M. Kirby Talley Jr., and A. Melucco Vaccara, eds. 1996. *Historical and philosophical issues in the conservation of cultural heritage*. Los Angeles: J. Paul Getty Trust. This is a book of essays encompassing the following topics: Pt. I: The eye's caress: looking, appreciation, and connoisseurship; Pt. II: The original intent of the artist; Pt. III: The emergence of modern conservation theory; Pt. IV: Historical perspective; Pt. V: Restoration and anti-restoration; Pt. VI: Reintegration of losses; Pt. VII: The ideal patina; Pt. VIII: The role of science and technology: various genres and their treatment in water.
- Various Genres and Their Treatment in Water**
- Côté, Susan Hillen, M. Phillips, and A. McGuire Olsen. 1999. An introduction to the history, technique and conservation of shaped crayon portraits. Twenty-Fifth Annual ANAGPIC Conference, April 1999. 110–132.
- Cumming, Lisa, and Jane Colbourne. 1998. The conservation of Mrs. Marton, an 18th Century pastel and gouache portrait by Daniel Gardner. *The Paper Conservator* 22:38–47.
- Daniels, Vincent. 1995. Factors influencing the wash-fastness of watercolors. *The Paper Conservator* 19:31–40.
- Daniels, Vincent. 1998. The effects of water treatments on paper with applied pastel or powder pigment. *The Paper Conservator* 22:29–37.
- Dube, Liz. 1998. The copying pencil: composition, history and conservation implications. *The Book and Paper Group Annual* 17:45–52.
- Hansen, Eric F., S. Walston, and M. Hearn's Bishop, eds. 1996. Matte paint: its history and technology, analysis, properties, and conservation treatment, with special emphasis on ethnographic objects. *WAAC Newsletter* 18:15–24.

- Hatchfield, Pamela. 1986. Note on a fill method for water sensitive objects. *JAIIC* 25:93–96.
- Keyes, Keiko Mizushima. 1994. Some practical methods for the treatment with moisture of moisture-sensitive works on paper. In *Conservation of historic and artistic works on paper*, October, 1988, ed. H. D. Burgess, 99–107. Ottawa: Canadian Conservation Institute.
- Kosek, Joana. 1990. The porosity of pastels and the effect of water treatment on the suction table: a preliminary investigation. *The Conservator* 14:17–22.
- Moroz, Richard. 1997. Aqueous treatment in pastel conservation. *Restaurator* 18:39–49.
- Pascoe, Michael W., and Caroline Skinner. 1994. Studies with sodium borohydride and hydrogen peroxide acting on artists' colours and pigments. In *Conservation of historic and artistic works on paper*, October, 1988, ed. H. D. Burgess, 209–213. Ottawa: Canadian Conservation Institute.
- Phenix, Alan. 1998. Solvent-induced swelling of paint films: some preliminary results. *WAAC Newsletter* 20(3):15–20.
- Rodgers, Sylvia. 1985. A method for temporarily facing a varnished map during aqueous conservation treatment. *The Book and Paper Group Annual* 4:89–93.
- Stevenson, Mark. 1994. The treatment of prints: a history. In *Conservation of historic and artistic works on paper*, October, 1988, ed. H. D. Burgess, 133–142. Ottawa: Canadian Conservation Institute.
- Turner, Nancy. 1994. The conservation of medieval manuscript illuminations and the question of compensation. *WAAC Newsletter* 16(1):21.
- van der Reyden, Dianne, C. Hofmann, and M. Baker. 1993. Effects of aging and solvent treatments on some properties of contemporary tracing paper. *JAIIC* 32:177–206.
- Weidner, Marilyn Kemp. 1967. Damage and deterioration of art on paper due to ignorance and the use of faulty materials. *Studies in Conservation* 12:5–25.
- Weidner, Marilyn Kemp. 1993. Treatment of water sensitive and friable media using suction and ultrasonic mist. *The Book and Paper Group Annual* 12:75–84.
- White, Alison C. J. 1998. Analysis of four water-based silkscreen inks and the implications for conservation treatment. *The Paper Conservator* 22:56–61.

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