

# Book Reviews

**Paper and Water** by Gerhard Banik and Irene Brückle

Oxford: Elsevier; 2011. 544 pp. ISBN 978-0-75066-831-6.

Most veteran conservators will agree with the axiom that 'science is nothing but trained and organized common sense' (Thomas H. Huxley, English biologist, 1825–1895). As common sense is a direct result of experience, practicing paper conservators will enjoy many 'a-ha' moments as the scientific underpinnings of their empirical knowledge are systematically revealed by Gerhard Banik and Irene Brückle in *Paper and Water*.

Readers of *Paper and Water* are expertly led by scientist Banik and paper conservator Brückle through 437 pages of scientific and practical information starting with water and culminating in paper's total immersion in this remarkable liquid. The focus of the journey is on the interaction of paper and water; the goal is to integrate successfully scientific and engineering explanations of this interaction with conservation practice. Along the way, the authors wrestle with the sometimes uncomfortable consequences of what is chemically occurring when water comes into contact with paper. As a result, *Paper and Water* is at once a textbook for budding paper conservators, a teaching tool for educators, and a thought-provoking publication for experienced paper conservators.

Before turning to its subject matter, a brief description of the evolution of *Paper and Water* is required to understand the rationale governing its organization, as well as to appreciate the split personality of its readership, constituted of both givers and receivers of knowledge. Conceived in 2000 as a means of more effectively teaching cellulose chemistry to students in the Buffalo State College Art Conservation Program, the information was originally communicated through a one-day seminar that combined lectures and demonstrations; readings were distributed as photocopies, as no textbook existed. Initial support from a Samuel H. Kress Foundation Publication grant was followed in 2002–2005 with funding from the Leonardo da Vinci Program of the European Commission. The goal of the project continued to be educational: to develop a didactic system that could be universally used in academic, vocational, and continuing education conservation programs. As an educator, I was privileged to have been invited in 2004

to serve as an external evaluator for a 'Paper and Water: Train the Trainers' course hosted by ICCROM in Rome, which by that time had expanded into a three-day workshop. After 15 workshops in Stuttgart, Berlin, London, Oxford, Vienna, Ascona, Buffalo, San Francisco, and Austin, the session had gained a fourth day, but, more importantly, the thick binder of photocopied readings had been replaced with *Paper and Water*. Thus, in its present incarnation, the book serves as both a text book and as a course guide, with a total length of 544 pages (including appendices and end matter) and cost of \$165.00.

The majority of the original players in the 2002 challenge to develop a 'learning compendium' remain. The book's roster of highly respected contributors includes Vincent Daniels, Stefan Fischer, D. Steven Keller, Joanna M. Kosek, Reinhard Lacher, Anthony W. Smith, Alfred Vendl, Günther Wegele, and Paul M. Whitmore, with forewords by conservator Kate Colleran and scientist Jan Wouters. Equally impressive are the many conservators and scientists listed in the acknowledgments. To be recognized also are the Stuttgart and Buffalo conservation students who contributed many hours of research.

Both the book's physical and pedagogical properties guarantee its success. Its structure and design are well suited for its intended use: it opens flat and its cover is water resistant – both features conducive to consulting the book while working in proximity to paper and water! Wide margins easily accommodate copious illustrations, more than 40 tables and 300 figures, and leave room for note-taking (in pencil for personal copies only, please).

One notable design feature concerns the color-coded models: designated colors indicate the same molecular structures and processes throughout the entire book. For example, blue = water or polar groups; beige = dry paper; green = wet paper (common sense or scientific explanation (?), as blue over beige = green) and so forth. The same color-coded system has been applied to the animations contained in a DVD of supporting images. The reader/viewer thus benefits by rapid recognition of key chemical features.

To augment illustrations found throughout the text, a DVD containing 44 animations and videos is attached to the book's back cover. The animations, particularly those depicting molecular models, go a

long way in visualizing three dimensionality. For example, I was skeptical about viewing the 'flickering clusters' of water molecules in Video 2.1 until I compared them with Figure 2.6. Water suddenly became alive! The videos depicting the interaction of paper and water are the most informative of all, especially as a digital stopwatch is included, which gives the viewer a sense of passing time.

Again, the original teaching function of *Paper and Water* helps to explain apparent disconnects between some of the videos and the main text. Although cobalt-chloride wetness/dryness indicator papers appear in two figures, for example their function as showing the movement of moisture is never described in the text. In the videos, however, they play an important role, explained in a teaching appendix.

A whopping 19 appendices contain widely divergent information, ranging from basic reference materials, for example, standard conversion tables and periodic and hygrometric charts, to an hour-by-hour schedule for teaching a four-day 'Paper and Water' seminar, down to a detailed description of optimal working spaces, a reading list, number of participants, and suggested experiments. Appendices 10–14 reflect the original teaching goal of *Paper and Water* to develop a didactic system to be used by teachers. This 'system' would provide not only the facts but also instructions for transmitting them, including suggested experiments, the Tollens' and Fehling Tests, and spot tests for lignin and paper additives.

With few exceptions, the authors have followed a unified pedagogical approach. Scientific or highly technical information is presented clearly with numerous examples relevant to paper conservation practice whenever possible. In the first chapter, which reads most like a college-level *Introduction to Chemistry* textbook, over 11 examples draw the reader's attention to familiar processes in paper conservation. In addition, enlivening the discourse is an example illustrating that 'a handful of common sense is worth a bushel of learning': to wit, why water needs to be purified for making espresso, and how dunking cookies into coffee demonstrates diffusion rates in paper. Terms are carefully defined, although not always in the order in which they are introduced, and include their etymology, my favorite being 'hysteresis', which literally translates from the Greek as 'lagging behind in arrival'.

Phenomenological experiences specific to paper conservation that are explained by science include why calcium hydroxide dissolves better in cold rather than hot water, why 'like dissolves like', why starch forms a colloidal dispersion, why acetone-soaked papers are brittle, why acidity can migrate through

hygroscopic paper, and why a closed box tightly crammed with papers will increase in relative humidity (RH) while the surrounding RH decreases.

In addition to learning how paper and water interact, readers are told how to apply science in practical ways. One outstanding example is Banik's discussion on various water purification systems, which should be required reading for those establishing a conservation facility of any kind.

As explained in their introduction, Banik and Brückle deliberately decided against using actual works on paper as demonstration pieces in case they simulated 'thoughtless imitation on the part of the uninformed' or would 'raise controversy about preferred treatment approaches among professionals'. In the fact sheet for the DVD, it is unequivocally stated that 'No conservation treatment is featured'. The handful of tattered prints, pieces of sheet music, and newspapers that do appear in the videos are circumspectly described as 'a few judiciously selected expendable paper objects'. It seems that Banik and Brückle are responding to a widely held prohibition against publishing detailed descriptions of conservation treatments. In Chris Caple's *Conservation Skills: Judgment, Method and Decision Making*, we are exhorted that 'Advocacy can be a powerful tool; however, there are risks on describing conservation work, as unqualified individuals may attempt to copy some of the things mentioned and through lack of skill and understanding damage objects. Consequently, conservators should provide minimal details of materials and practices for widespread public consumption'.

Instead of stained artworks, highly soluble red food coloring was used on blank sample papers to demonstrate the mechanics of water diffusion and transfer: one is reminded of virtual dissections of frogs or the practice of CPR on manikins. Paradoxically, the use of mock-ups has resulted in case studies that demonstrate how to remove discoloration efficiently from paper or how to flatten paper successfully far more clearly and reliably than actual works of art ever could. In reality, *Paper and Water* is overflowing with forbidden details of 'materials and practices', but in a way that deftly deflects any possible accusations of irresponsibility. Whether one agrees with the prohibition is an entirely different matter. Surely, increased professionalism and better informed consumers would go a long way in addressing conservators' fear of over disclosure.

Models can indeed teach effectively, but as the authors are quick to point out, only up to a point, which brings up some of the most provocative aspects of *Paper and Water*. The primary authors, Banik and Brückle, as well as Daniels, Whitmore,

and Kosek, do not shy away from confronting the sometimes uncomfortable truths of what is actually going on within a sheet of paper as it interacts with water, which challenges our precious concept of reversibility. Thoughtful debate and cautionary discourse have been inserted in several instances with a chapter entitled 'Aqueous Treatment in Context', probably being the most intriguing, especially for experienced conservators. In it, Brückle discusses the ramifications of washing and includes some of the obvious ones, such as alteration of media and colorants, but also some less obvious ones: to name just one example, the dislocation, but not total removal, of dissolved degradation products through the action of water. Many paper conservators regard 'conservative' or partial treatments as 'safer', but, as Brückle points out, residual degradation products can cause deterioration and visual changes in the future. Other ramifications of the interaction of paper and water include alteration of dimensions, alteration of the cellulose molecular structure from repeated wettings, and, ultimately, alteration of the object's 'archeometric fingerprint'.

As stated in the introduction, cookie-cutter approaches to conservation treatment are not possible because it has been recognized that every art object is unique, not only physically, but also by virtue of its cultural value. Kate Collieran observes that 'a more philosophical approach/ethical approach to conservation treatment emerged, including the multiple meanings of objects and their potential loss through the processes of chemical alteration'. This has resulted in a moving away from some conservation treatments in favor of preserving sometimes intangible properties. Joanna Kosek wonders if this will result in the erosion of a conservator's practical skills, but it strikes me that any motor skills lost by decreased washing opportunities will be put to good use elsewhere in conservation.

Given the overwhelmingly positive attributes of *Paper and Water* and its remarkable contribution to the conservation literature, it is difficult, but still necessary in a comprehensive review, to comment on its minor deficiencies.

With nine contributing authors, writing styles will naturally vary, as will the attention invested in certain topics. In general, the voices of *Paper and Water* are remarkably harmonious. However, careful editing from chapter to chapter would have insured that technical or scientific terms are used consistently and defined immediately upon their introduction. Some subject matter seems out of proportion: D. Steven Keller's chapter on paper drying in the manufacturing process, for example, is the second-longest chapter and has the most citations. Other topics

reflect disproportionately the expertise or personal interests of the authors, such as the difficulty of paper aging experiments and the stabilization of paper in storage discussed by Paul Whitmore.

An example of a relevant topic that was excised is biodeterioration, mentioned only in passing in the first chapter and in the caption for a figure. Some judicious editorial pruning would have eliminated similar discussions on paper in humid environments that appear in two chapters.

At the risk of being characterized as overly obsessive, said by some to be a trait of paper conservators, I found oversights in copy editing – typographical errors, missing references, incorrect cross references of page and figure numbers, and inconsistent copy style – to be distracting.

The glossary and index also suffer from insufficient editorial attention. Inclusion of terms in one or the other seems to be arbitrary. Although some exotic or little used terms may justifiably be excluded from the glossary, terms common to paper conservation, such as alum or fines, should be included. Similarly, the index does not reflect the quality of editing evident elsewhere. Noting inconsistent meanings for deacidification, that is, simple neutralization versus the deposition of an alkaline reserve, I consulted the index to track its usage throughout the book. With the exception of a single instance, the index cites the term as appearing only in a chapter on aqueous deacidification, despite its frequent appearance in other places.

Although highly informative, not all the videos on the DVD are of equal didactic quality. Videos on the drying of an albumen photograph and the separation of adhered paper are not relevant to the text in which they are referenced. A video of a vintage Lascaux suction table is dated when compared with Figure 9.28. Some sort of simultaneous narration for Videos 4.1–4.5 and Videos 12.1–12.2 is needed, as comparing them with their corresponding text figures is confusing. Video 6.1 does not seem to show water-leaf paper as described. Only a limited number of viewers will be enthralled by two videos showing the restrained and unrestrained shrinkage of selected paper fibers!

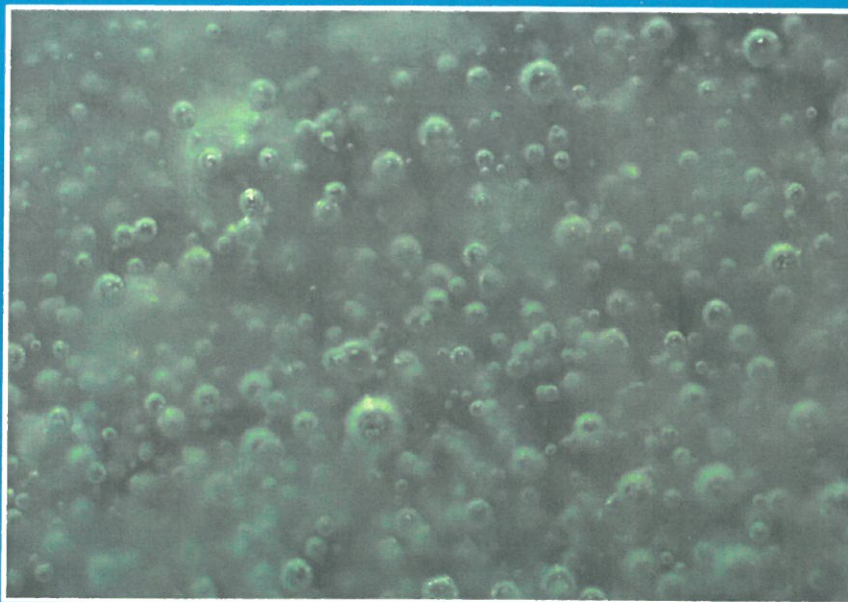
Kate Collieran rightly concludes that *Paper and Water* is 'a book that should be on the desk of every paper conservator and teacher of paper conservation'. I would add that *any* conservator – old or new – who uses water or paper will benefit from reading and re-reading it as often as possible.

Margaret Holben Ellis

Conservation Center, Institute of Fine Arts,  
New York University,  
New York, NY, USA



# Studies in Conservation



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