



Poultice Desalination of Porous Building Materials

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BIBLIOGRAPHY

 = Essential reading material


 = Available online

  Arnold, Andreas and Konrad Zehnder. 1991. Monitoring wall paintings affected by soluble salts. In *The Conservation of Wall Paintings: Proceedings of a Symposium Organized by the Courtauld Institute of Art and the Getty Conservation Institute, London, July 13-16, 1987*, ed. Sharon Cather, 103-35. Marina del Rey, Calif.: Getty Conservation Institute.

http://www.getty.edu/conservation/publications/pdf_publications/wall_paintings.pdf

Arnold, A. 1984. Determination of mineral salts from monuments. *Studies in Conservation* 29 (3): 129-138.


Arnold, Andreas and A. Kueng, 1985. Crystallization and habits of salt efflorescences on walls I: Methods of investigation and habits. In *Ve Congrès international sur l'altération et la conservation de la pierre: Actes, Lausanne, 25-27.9.1985 = Vth International Congress on Deterioration and Conservation of Stone: Proceedings, Lausanne, 25-27.9.1985*, ed. G. Félix, 255-267. Lausanne: Presses Polytechniques Romandes.

 Auras, M. 2008. Poultices and mortars for salt contaminated masonry and stone objects. In *Salt Weathering on Buildings and Stone Sculptures: 22-24 October 2008, The National Museum Copenhagen, Denmark: [Proceedings from the International Conference]*. 197-217. Lyngby: Technical University of Denmark.



Blanc, Annie. 1996. Apport de la géologie dans l'étude des monuments avant travaux. *Le Mausolée*, 52-68.





Blanc, Annie, Charles Jaton and Geneviève Oriol. 1981. Etude des matériaux et des altérations de la façade de Notre-Dame-la-Grande de Poitiers avant restauration. In *The Conservation of Stone II: Preprints of the Contributions to the International Symposium, Bologna, 27-30 October 1981*, ed. Raffaella Rossi-Manaresi, Vol. 1, 333-354. Bologna: Centro per la conservazione delle sculture all'aperto.

 Bläuer-Böhm, C. 2005. Quantitative salt analysis in conservation of buildings. *Restoration of Buildings and Monuments: An International Journal = Bauinstandsetzen und Baudenkmalpflege* 11(6): 409-18.

Bøllingtoft, Peder and Poul Klenz Larsen, 2003. The use of passive climate control to prevent salt decay in Danish churches. In *Mauersalze und Architekturoberflächen*, ed. Heinz Leitner, Steffen Laue, Heiner Siedel, 90-93. Dresden: Hochschule für Bildende Künste.

  Bourgès, Ann and Véronique Vergès-Belmin. 2008. Comparison and optimization of five desalination systems on inner walls of Saint-Philibert Church in Dijon, France. In *Salt Weathering on Buildings and Stone Sculptures: 22-24 October 2008, The National Museum Copenhagen, Denmark: [Proceedings from the International Conference]*. 29-40. Lyngby: Technical University of Denmark. http://www.design.upenn.edu/files/14-Bourges__Verges_Belmin_Desalination_SWBSS_2008.pdf

 Bourgès, A. and V. Vergès-Belmin. 2008. A new methodology to determine rheologic behavior and mechanical properties of desalination poultices. In *11th International Congress on Deterioration and Conservation of Stone, 15-20 September 2008, Torun, Poland: Proceedings*, ed. Jadwiga W. Lukaszewicz and Piotr Niemcewicz, Vol. 1, 581-88. Toruń, Poland: Uniwersytetu Mikolaja Kopernika.

 Brajer, Isabelle and Poul Klenz Larsen. 2008. The salt reduction treatment on the wall paintings in Tirsted Church. In *Salt Weathering on Buildings and Stone Sculptures: 22-24 October 2008, The National Museum Copenhagen, Denmark: [Proceedings from the International Conference]*. 219-228. Lyngby: Technical University of Denmark.

Brochard, Bernard. 1992. La place de Notre-Dame-la-Grande dans l'histoire médiévale et les étapes de sa restauration. *Monumental: Revue scientifique et technique de la Sous-*

direction des monuments historiques, Direction du patrimoine 1(décembre 1992): 11-19.

Burkinshaw, Ralph. 2005. Wall base damp: Is one horizontal damp-proof course sufficient dampness protection? *Journal of Building Appraisal* 1 (1): 7-19.






📖 Cather, Sharon. 2003. Aqueous extraction of soluble salts from porous materials: Alternatives and contra-indications. In *Mauersalze und Architekturoberflächen*, ed. Heinz Leitner, Steffen Laue, Heiner Siedel, 167-72. Dresden: Hochschule für Bildende Künste.



📖 Cather, Sharon. 2003. Assessing causes and mechanisms of detrimental change to wall paintings. In *Conserving the Painted Past: Developing Approaches to Wall Painting Conservation: Post-prints of a Conference Organised by English Heritage, London, 2-4 December, 1999*, ed. Robert Gowing and Adrian Heritage, 64-74. London: James & James.

Colantuono, A., S. Dal Vecchio, O. Marino and G. Mascolo. 1993. Accurate measurement of expansion and shrinkage in porous stones caused by moisture absorption. In *Conservation of Stone and Other Materials: Proceedings of the International RILEM/UNESCO Congress "Conservation of Stone and Other Materials: Research - Industry - Media" Held at UNESCO Headquarters, Paris... June 29-July 1, 1993*. ed. M.-J. Thiel. Vol. 1, 204-11. RILEM Proceedings no. 21 London and New York: E & FN Spon.

📖 Colorado Department of Transportation. 2004. Determination of Moisture in Soils by Means of Calcium Carbide Gas Pressure Moisture Tester. [October 2004].
http://www.coloradodot.info/business/designsupport/bulletins_manuals/waqtc-manual/t217.pdf

📖 Delgado Rodrigues, J. 2001. Evaluación del comportamiento expansivo de las rocas y su interés en conservación = Swelling behaviour of stones and its interest in conservation. An appraisal. *Materiales de construcción* 51 (263-264): 183-195.
<http://materconstrucc.revistas.csic.es/index.php/materconstrucc/article/download/363/409>

-  Doehne, Eric. 2002. Salt weathering: A selective review. In *Natural Stone, Weathering Phenomena, Conservation Strategies and Case Studies*, ed. Siegfried Siegesmund, T. Weiss, and Axel Vollbrecht, 51-64. Geological Society Special Publications. no. 205. London: Geological Society of London.
-  Godin, Jean, Michel Pithon and Véronique Vergès-Belmin. 2000. A four-year survey of the water contents and movements within a masonry core after a restoration campaign: A case study in Notre-Dame la Grande (Poitiers, France). In *Proceedings of the 9th International Congress on Deterioration and Conservation of Stone, Venice, June 19-24, 2000*. ed. Vasco Fassina, Vol. 2, 73-81. Amsterdam & New York: Elsevier.
-  Graftex. 2009. Protection Hydrofuge CCMC 13023-R: Application > SPEC.
<http://www.protectionhydrofuge.com/pdf/fiche%20Graftex%202010%20en.pdf>
- Hall, Christopher and William D. Hoff. 2007. Rising damp: Capillary rise dynamics in walls. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* 463 (2084): 1871-1884 doi:10.1098/rspa.2007.1855
- Hammecker, C. and D. Jeannette. 1988. Rôle des propriétés physiques dans l' altération de roches carbonatées: Exemple de la façade ouest de Notre- Dame-la Grande de Poitiers (France). In *Vlth International Congress on Deterioration and Conservation of Stone: Toruń, 12-14.09 = Vle Congrès international sur l'alteration et la conservation de la pierre: Toruń, 12-14.09.1988*. ed. J. Ciabach, 266-275. Toruń, Poland: Nicolas Copernicus University, Press Dept.
-   Heritage, Adrian, Alison Heritage, Friederike Funke, Véronique Vergès-Belmin and Ann Bourgès. 2008. How do conservators tackle desalination? An international survey of current polticing methods. In *Cultural Heritage Research Meets Practice, 8th European Conference on Research for Protection, Conservation and Enhancement of Cultural Heritage, Conference Preprints, Ljubljana, Slovenia, November 10-14, 2008*, ed. Jana Kolar and Matija Strlič, 58-59. Ljubljana: National and University Library.
http://www.si.edu/mci/downloads/CHRESP%202008/CHRESP_proof_2008_LJUBLJAN A.pdf

- Jeanneau, François. 1992. Notre-Dame-la-Grande, Poitiers: Causes et dynamique des altérations, solutions architecturales et techniques. *Monumental: Revue scientifique et technique de la Sous-direction des monuments historiques, Direction du patrimoine* 1(décembre 1992): 24-37.
- Jeanneau, François, Thomas Vieweger and Paulette Hugon. 1995. La restauration de la façade occidentale de Notre-Dame-La-Grande à Poitiers. *Monumental: Revue scientifique et technique de la Sous-direction des monuments historiques, Direction du patrimoine* 10-11(décembre 1995): 50-63.
- Jeanneau, François. 1996. Le dessalement de la façade de l'église Notre-Dame-la-Grande de Poitiers: Le contexte général du chantier de restauration. In *Le dessalement des matériaux poreux: 7es Journées d'études de la SFIC, Poitiers, 9-10 mai 1996*, 199-206. Champs-sur-Marne: SFIC.
- Kamiński, Krzysztof. 2008. Brick walls structural moisture content: A new approach to diagnostic procedure. In *11th International Congress on Deterioration and Conservation of Stone, 15-20 September 2008, Torun, Poland: Proceedings*. ed. Jadwiga W. Lukaszewicz and Piotr Niemcewicz. Vol 1, 389-396. Torun, Poland: Uniwersytetu Mikolaja Kopernika.
- Kent, Douglas. 2004. French drains. *Cornerstone: The Magazine of the Society for the Protection of Ancient Buildings* 25 (4): 59.
-  Leitner, H. 2005. The treatment of wall paintings affected by salts: An Interdisciplinary task as seen from a conservator's perspective. *Restoration of Buildings and Monuments: An International Journal = Bauinstandsetzen und Baudenkmalpflege* 11 (6): 365-80.
- Liégey, Anne. 1996. Etude pour le dessalement de tablettes cunéiformes en terre crue. In *Le dessalement des matériaux poreux: 7es Journées d'études de la SFIC, Poitiers, 9-10 mai 1996*, 105-113. Champs-sur-Marne: SFIC.
-  Lubelli, Barbara and Rob P.J. van Hees. 2010. Desalination of masonry structures: Fine tuning of pore size distribution of poultices to substrate properties. *Journal of Cultural*

Heritage 11 (1): 10-18.

McKinley, J. M. and P. A. Warke. 2007. Controls on permeability: Implications for stone weathering. In *Building Stone Decay: From Diagnosis to Conservation*, ed. Richard Příklad and Bernard J. Smith, 225-236. Geological Society Special Publication no. 271. London: Geological Society.

📖 Nave, C. R. 2005. Fluids. In *HyperPhysics*. ed. C. R. Nave. Atlanta: Georgia State University. <http://hyperphysics.phy-astr.gsu.edu/Hbase/fluid.html#flucon>

Parrett, Mike. 2005. Attics and basements: Taking the pressure. *Cornerstone: The Magazine of the Society for the Protection of Ancient Buildings* 26 (2): 56-57

📖 Pel, Leo, Alison Sawdy and Victoria Voronina. 2010. Physical principles and efficiency of salt extraction by poulticing. *Journal of Cultural Heritage* 11(1): 59-67.

Pender, Robyn Jiske. 2004. The behaviour of water in porous building materials and structures. *Reviews in Conservation* (5): 49-62.

Pinchin, Sarah Eleni. 2008. Techniques for monitoring moisture in walls. *Reviews in Conservation* (9): 33-45.

Rose, William B. 2005. *Water in Buildings: An Architect's Guide to Moisture and Mold*. Hoboken, N.J.: John Wiley & Sons.


📖 Sawdy, Alison and Clifford Price. 2005a. Salt damage at Cleeve Abbey, England, Part I: A comparison of theoretical predictions and practical observations. *Journal of Cultural Heritage* 6(2): 125-35.

📖 Sawdy, Alison and Clifford Price. 2005b. Salt damage at Cleeve Abbey, England, Part II: Seasonal variability of salt distribution and implications for sampling strategies. *Journal of Cultural Heritage* 6(4): 361-367.



📖 Sawdy, A., A. Heritage and L. Pel. 2008. A review of salt transport in porous media, assessment methods and salt reduction treatments. In *Salt Weathering on Buildings and Stone Sculptures: 22-24 October 2008, The National Museum Copenhagen, Denmark*:

[*Proceedings from the International Conference*]. 1-28. Lyngby: Technical University of Denmark.


- 📖 Sawdy, Alison, Barbara Lubelli, Victoria Voronina and Leo Pel. 2010. Optimizing the extraction of soluble salts from porous materials by poultices. *Studies in Conservation* 55(1): 26-40.
- 📖 Scherer, G. W. 2004. Stress from crystallization of salt. *Cement and Concrete Research* 34 (9): 1613-24.
- 📖 SFIIC (Section française de l'international institute for conservation). 1996. Table des matières. In *Le dessalement des matériaux poreux: 7es Journées d'études de la SFIIC, Poitiers, 9-10 mai 1996*. Champs-sur-Marne: SFIIC.
<http://sfiic.free.fr/publications/dessal.html>
- Torres, M. Isabel M. and Vasco Peixoto de Freitas. 2007. Treatment of rising damp in historical buildings: Wall base ventilation. *Building and Environment* 42 (1): 424-35.
- Trotman, Peter M., Chris Sanders, and Harry W. Harrison. 2004. *Understanding Dampness: Effects, Causes, Diagnosis and Remedies*. Building Research Establishment report no. 466. Watford: BRE Bookshop.
- 📖 TU Delft, Delft University of Technology. 2009. Content. In *EU Project Desalination: Assessment of Desalination Mortars and Poultices for Historic Masonry*. Contract no.: 022714. <http://www.citg.tudelft.nl/live/pagina.jsp?id=267cbaf8-92c8-4204-92c0-97c32fff7eb5&lang=en>
- 📖 Vergès-Belmin, Véronique, ed 2008. *Illustrated Glossary on Stone Deterioration Patterns = Glossaire illustré sur les formes d'altération de la pierre*. English-French ed. Monuments & Sites no. 15. Paris: ICOMOS and (ISCS) International Scientific Committee for Stone. http://international.icomos.org/publications/monuments_and_sites/15/pdf/Monuments_and_Sites_15_ISCS_Glossary_Stone.pdf
- 📖 Vergès-Belmin, Véronique. 1996. Dessalement de la façade de l'église Notre-Dame-la-Grande à Poitiers: Contrôles d'efficacité. In *Le dessalement des matériaux poreux: 7es*

- Journées d'études de la SFIC, Poitiers, 9-10 mai 1996, 219-32. Champs-sur-Marne:*
- Vergès-Belmin, V. 2003. Desalination of porous building materials: A review. In *Mauersalze und Architekturoberflächen*, ed. Heinz Leitner, Steffen Laue, Heiner Siedel, 121-137. Dresden: Hochschule für Bildende Künste Dresden.
- Vergès-Belmin, V., and P. Bromblet. 2001. La pierre et les sels. *Monumental: Revue scientifique et technique de la Sous-direction des monuments historiques, Direction du patrimoine* (2001): 224-62.
-  Vergès-Belmin, V. and H. Siedel. 2005. Desalination of masonries and monumental sculptures by poulticing: A review. *Restoration of Buildings and Monuments: An International Journal = Bauinstandsetzen und Baudenkmalpflege* 11 (6): 391-408.
- Vieweger, Thomas, Didier Groux and Martin Labouré. 1996. Dessalement de la façade de Notre-Dame-la-Grande à Poitiers: Méthode et application aux contraintes du chantier. In *Le dessalement des matériaux poreux: 7es Journées d'études de la SFIC, Poitiers, 9-10 mai 1996, 207-218. Champs-sur-Marne: SFIC.*
- Winkler, Erhard M. 1985. A durability index for stone. In *Ve Congrès international sur l'altération et la conservation de la pierre: Actes, Lausanne, 25-27.9.1985 = Vth International Congress on Deterioration and Conservation of Stone: Proceedings, Lausanne, 25-27.9.1985.* ed. G Félix, 151-156. Lausanne: Presses Polytechniques Romandes.
- Winkler, Erhard M. 1994. *Stone in Architecture: Properties, Durability*. 3rd completely rev. and extended ed. Berlin and New York: Springer-Verlag.
- Wissenschaftlich-Technische Arbeitsgemeinschaft. 2003. *WTA Guideline 3-13-01/D: Zerstörungsfreies Entsalzen von Naturstein und anderen porösen Baustoffen mittels Kompressen*. München: Wissenschaftlich-Technische Arbeitsgemeinschaft für Bauwerkserhaltung und Denkmalpflege e.V.
- Wissenschaftlich-Technische Arbeitsgemeinschaft. 2005. *WTA Guideline 3-13-01/E: Non-destructive desalination of natural stones and other porous building materials*

with poultices. München: Wissenschaftlich-Technische Arbeitsgemeinschaft für Bauwerkserhaltung und Denkmalpflege e.V.

  Young, David and Donald Ellsmore. 2008. *Salt Attack and Rising Damp: A Guide to Salt Damp in Historic and Older Buildings*. 2nd ed. Sydney: Heritage Council of NSW, Heritage Victoria, South Australian Dept. for Environment and Heritage, Adelaide City Council.

http://www.heritage.nsw.gov.au/docs/HVC014_Salt_Damp_tech_guide_FA_web.pdf

 Zehnder, Konrad. 2007. Long-term monitoring of wall paintings affected by soluble salts. *Environmental Geology* 52 (2): 353-67.

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