Chantry Library Bibliographies:
No 5: Enamelled Metals by Dana Norris ACR

Lid from a Wedding Box, Chinese painted enamel on copper circa 1800. On the right a radiograph highlighting areas of surface loss, cracks and bubbles in the enamel.

Dana Norris completed a Bachelor of Fine Arts degree in Ceramics at Kent State University in 2002 followed by conservation training at West Dean College in 2006. From 2006-08 she worked as an Objects Conservator for the Cleveland Museum of Art in Ohio before taking up a series of conservation posts at the Ashmolean Museum of Art and Archaeology from 2008-13. She currently chairs Icon's Ceramics and Glass special interest group and splits her time between running a commercial workshop in Oxford and pursuing a research degree at Cranfield University's Forensics Institute. Her PhD research is on Chinese painted enamels and related materials including porcelain and glass. Dana is an accredited member of Icon, see www.ceramicconservation.com for further information.

Introduction

Enamelling is a technique where vitreous silicate-rich material is fused to the surface of an object by heat through a controlled firing to create a decorative surface. The earliest enamelled metals in Europe are thought to be Mycenaean *repoussé* and *cloisonné* dating between 1450-1100BCE, and *champlevé* examples on Chinese bronzes date back to 1200-1050BCE. Later techniques developed in Europe include traditions such as *Basse-taille* from the thirteenth century, and painted enamels in the sixteenth century. Conservation of enamelled metals is an interdisciplinary subject drawing on aspects of glass and metals conservation. Enamels are inherently vulnerable to high humidity, fluctuations in temperature, vibration and physical stress. The majority of publications on the conservation of enamelled metals address Limoges painted enamels due to their chemical instability and popularity in the art market leading to numerous emulations, fakes and forgeries. The following

bibliography provides a list of key publications on conservation of enamelled metals. The articles were written by practising conservators and therefore pay particular attention to degradation phenomena, whereas the books give essential background information on materials, techniques and history.

Books

Gall-Ortlik, A. *A Concise Bibliography on the Technology, Deterioration and Conservation of Enamels on Metal. Enamel 2018*. Vol. 2. Stuttgart: Staatliche Akademie der Bildenden Künste, 2018.
For those who want to know more, or are researching a niche subject, this is a thorough review of publications on enamelled metals. Publications are presented by subject and date with brief synopsis, followed by an author's index.

Quette, B. *Cloisonné: Chinese Enamels from the Yuan, Ming, and Qing Dynasties*. New Haven US/ London: Yale University Press, 2011.
The development of enamelling on metals in China is outlined in the introduction, the emphasis of the book is on stylistic progression and a compositional study can be found in the appendix.

Speel, E. *Dictionary of Enamelling: History and Techniques.* Aldershot: Ashgate, 1998.
A good starting point for clarifying the names of materials and techniques, this dictionary is an essential reference for enamelled metals with detailed historical information across cultures.

Speel, E. *Painted Enamels: An Illustrated Survey 1500-1920.* Aldershot: Lund Humphries, 2008.
A well-rounded book covering painted enamel traditions from around the world. Unusually, the subject is explored into the 20th century and well referenced making it particularly insightful.

Articles

Drayman-Weisser, T., 'The Early Painted Enamels of Limoges in the Walters Art Museum: Historical Context and Observations on Past Treatments', *Journal of the American Institute for Conservation* 42/2 (2003) 279-312.
A retrospective account of the impact of conservation treatments dating back to the 1960s on chemically unstable Limoges painted enamels from the fifteenth to sixteenth centuries in one of the world's largest museum collections. This paper addresses the underlying chemistry of unstable Limoges enamels and resulting deterioration phenomena.

Eggert, G., 'When Glass and Metal Corrode Together', *ICOM-CC 15th Triennial Conference Preprints, New Delhi 22–26 Sept 2008,* 211-216.
Corrosion products on enamelled metal objects in museum collections are identified in this paper. The interaction of off-gassing storage and case materials were found to instigate types of corrosion which would not have formed otherwise. Additional publications on enamel corrosion by this team have been published under the same title, numbered II-VI.

Norris, D., 'Chinese Painted Enamels: A Condition Survey of the Collection at the Ashmolean Museum of Art and Archaeology', *Journal of the Institute of Conservation* 38/2 (2015) 146-158.
In this paper the underlying causes of degradation in the collection of 56 Chinese painted enamels

were studied. The results indicate that these enamels do not exhibit signs of chemical instability, and that most damage is associated with use rather than accidental impact.

Schwahn, B., 'Enamel Insert Restorations on Limoges Painted Enamels: A Study on a Remarkable Nineteenth-century Restoration Technique with Particular Attention to the Original Paillon Designs', ***Studies in Conservation*** **59/3 (2014) 161-179.**
An investigation of restoration on two Limoges painted enamels where unstable areas were replaced with fired-enamel sections. This study utilises a range of analytical and imaging techniques to differentiate between original components and additions.

Online Resources
Studer, J., ***Investigations of the Application of Acoustic Emission Technique to Limoges Enamels for Damage Assessment.*** **MA dissertation. Royal College of Art, London, 2009.** Available online https://d-nb.info/1163754900/34 Accessed 6.4.20
In this project a group of fifteenth- to sixteenth-century Limoges enamels were monitored acoustically to document physical changes in correlation with temperature changes while on display. The results are relevant to preventative conservation of enamelled metals in general.