

**'The tears wept by our windows': severe paint loss from  
stained glass windows of the mid-nineteenth century.**

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## **Abstract**

The aim of this study is to investigate the phenomenon of severe paint loss from windows of the mid- to late-nineteenth century, commonly known as the 'borax problem'. Focussing on three case study windows made by Hardman and Company of Birmingham and installed at Sherborne Abbey, Beverley Minster and All Saints' Church Emscote, the study addresses historical, technical and conservation aspects of severe paint loss.

Hardmans began making stained glass windows in 1845 and quickly became one of the most prolific nineteenth-century producers of stained glass.

Materials (glass and paint) were bought in, mostly from local suppliers, and conformed to the standards and published knowledge of the time. Similar materials were used in each of the three case studies, over a period of nearly forty years between 1851 and 1889.

The cause of paint loss in these cases does not appear to have been the use of borax, although this cannot be confirmed by the analytical technique used in this study. Rather, over-pigmentation and under-firing resulted in paint layers that were vulnerable to attack by moisture, leading to deterioration of the layer structure through corrosion of the glassy phase of the paint. Loss is almost total in the case of much of the Sherborne glass, moderate from the Beverley glass and relatively little from the Emscote glass, suggesting that Hardmans gradually improved their production methods over time.

Available techniques for the conservation and restoration of windows suffering from paint loss are considered, the most important being the installation of protective glazing systems to protect vulnerable paint from further deterioration, and the use of back-plates to reinstate lost detail and improve readability as well as aesthetic appearance.

This study represents an initial investigation into the wide-ranging problem of severe paint loss from nineteenth-century windows, and much more remains to be done; for example, study of other firms and types of deterioration, as well as technical investigation into the various factors affecting the rate and extent of paint loss.

## List of abbreviations

BA&H	Birmingham Archives and Heritage
BMAG	Birmingham Museum and Art Gallery
CCC	Council for the Care of Churches
CVMA	Corpus Vitrearum Medii Aevi
EDS	Energy Dispersive X-ray Spectrometer / Spectrometry
ICBS	Incorporated Church Building Society
ICOMOS	International Council on Monuments and Sites
IoE	Images of England
RCHME	Royal Commission on Historical Monuments (England)
SEM	Scanning Electron Microscope / Microscopy
WCRO	Warwickshire County Record Office
YGT	York Glaziers' Trust

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