IRON FROM LONDON'S WATERLOGGED SITES: ASSESSING THE OUTCOMES OF TREATMENT AND PASSIVE STORAGE

ROSE JOHNSON and HELEN GANIARIS[1], LIZ BARHAM and LIZ GOODMAN[2]

[1]Museum of London, London Wall, London EC2Y 5HN, UK,
rjohnson@museumoflondon.org.uk, hganiaris@museumoflondon.org.uk
[2]Museum of London Archaeology, London Wall, London EC2Y 5HN, UK,
ebarham@museumoflondon.org.uk, lgoodman@museumoflondon.org.uk

Presented at
Archaeological Iron Conservation Colloquium: Stuttgart June 2010
Extended abstracts edited by Gerhard Eggert and Britta Schmutzler, pp 43-46.

In the 1980s, a number of conservation treatments were used on 'waterfront' iron at the Museum of London and elsewhere. Surveys of condition suggested that the iron objects that had been treated remained in good condition compared to objects that had not been treated. However, since 1990, active conservation treatments for iron have been largely discontinued in the UK. At the Museum of London this is largely due to changes to funding and project priorities, a minimally interventive approach to treatment and environmental issues regarding use and disposal of treatment solutions. However, the effect on ironwork of this approach has not been studied. The original aim of this work was to establish whether untreated iron from waterlogged contexts from the 1980s and 1990s in good desiccated storage had deteriorated since excavation compared to treated iron. By assessing several different sites using a standard statistical method, it is hoped that some conclusions can be made. However as this work progresses, the limitations of assessments of working archives have become apparent. This paper will also discuss these limitations.

The material and assessment method

The quality of iron objects from London's excavations with waterlogged conditions can be exceptional. Corrosion layers tend to be thin, conforming to the surface, and features such as plating, pattern welding, maker's marks, copper alloy, silver and tin inlays survive well. In contrast, iron from aerobic contexts normally has voluminous corrosion that obscures and sometimes destroys surfaces and features.

Fig. 1 Saxon blade with brass and copper alloy inlay, typical of the excellent condition of some iron from London 'waterfront' sites

The assessment currently has two parts:

- A reassessment of the condition of a group of 'waterfront' iron objects treated in the 1980s and assessed at regular intervals until 2000.
- Examination of 'waterfront' iron objects from sites that have had no active treatment, relying on passive storage in boxes with silica gel.

Assessments will use the Criterion Anchored Rating Scale (CARS) method to create statistically valid data. CARS was applied by Suenson-Taylor and Sully (1996) to archaeological leather and then adapted by Heywood in 2000 for the assessment of iron. CARS is based on the idea of interval data, that is measurement on a scale of equal intervals, eg length or weight, rather than ordinal data, which is a physical measurement that can be put into ranked order or counted.

Work in progress: assessment of untreated iron

At the time of writing of this abstract, the assessment of an untreated group from a 1990s excavation has been completed using CARS. This group of iron was chosen as it was thought to have received consistent desiccated storage in good archival packaging throughout its excavated life, with the intention of comparing it with treated material. The 741 objects from this one site ranged from pins to knives to styli and a large number of unidentified fragments or parts of objects. Nearly all the objects are packed in perforated clear polythene bags with Tyvek labels. The bags are stacked upright in a polythene box with a sealable lid and a bag of silica gel. The boxes are stored in a dehumidified store designated for metals.

It was found that 684 objects, that is, 92% of those examined had the highest possible CARS score. CARS does provide for some corrosion in its top score (up to 15% of the object affected by corrosion is acceptable within this score). As a result, it was decided additionally to get an indication of the proportion of these that have no corrosion at all. 134 objects were surveyed; 109 out of the 134 (over 81%) still had no active corrosion.

This demonstrates that most of the objects are in very good condition. This has been achieved, despite long periods when it was found that the desiccated environment had not been maintained over the 15 years since these objects were excavated. It had been assumed that we would be assessing a group of iron that had been in well-maintained silica gel storage for a valid comparison to treated material. However, when this material was retrieved it was found that a low RH (below 12%) could only be assumed for approximately half the time it had been in storage. This was due to periods of examination by finds specialists, illustrators and photographers, and a lack of staff resources to routinely maintain the gel. For the rest of the time it will have been stored in an environment of 30-40% RH and within that, short periods of several months potentially at higher levels when removed from store and not kept in silica gel.

Work in progress: assessment of treated iron

At the time of writing the group of treated material from the 1980s is about to be assessed. It will have been over 25 years since this material was treated; the condition of this iron has been tracked with regular assessments (Keene 1994; Heywood 2000).

Observations to date

With the pressures on budgets in both commercial archaeology and museums, it is essential to establish the effectiveness of treatment and storage regimes. For excavation archives in use (eg for assessments, illustration, research), and with limited staff resources, the reality is that it can be difficult to maintain the desiccated conditions recommended to slow down or halt corrosion. As a result, we do not have a group of untreated iron that can show the effectiveness of consistent desiccated storage. Nevertheless, the material examined to date has survived well despite no treatment and long periods out of desiccation.

We cannot claim the sites chosen to be statistically representative of all the excavated 'waterfront' iron in our stores, nor are we likely through this assessment to be able to isolate factors in the causes of good preservation for our 'waterfront' iron such as burial environment, treatment and length of time in desiccation. Reducing variables is difficult with 'real' material. However it does provide a starting point which we would welcome further researchers' assistance to better define. Stored material can provide an invaluable resource for reviews of treatments and storage methods if limitations are factored in.

This body of work is a result of a 'call to action' at a recent conference on iron (ICON Archaeology Group, *Archaeological Iron: Reflection and Outlook*, London, September 2009). Our assessments on 'real' material are intended to complement the experimental work in progress at Cardiff University, English Heritage and the British Museum. These studies are looking at optimum conditions for storage of iron, and the effectiveness of treatment in a wider body of UK material. It is hoped that the combination of experimental work and assessments of excavation archives will lead to significant and useful conclusions.

References

Heywood, C. (2000) *Ferrous metal treatments undertaken by the Museum of London: observations and a statistical evaluation,* unpublished thesis, Durham University.

Keene, S. (1994) 'Real-time survival rates for treatments of archaeological iron', in D. Scott, J. Podany and B. Considine (eds) *Ancient and Historic Metals: Conservation and Scientific Research,* Getty Conservation Institute, 249-264.

Sully, D. and Suenson-Taylor, K. (1996) 'A condition survey of glycerol treated freeze-dried leather in long-term storage', in A. Roy and P. Smith (eds) *Archaeological Conservation and its Consequences: Preprints of the Contributions to the Copenhagen Congress, 26–30 August 1996*. London: International Institute for Conservation, 177-181.