

CONSERVATION TREATMENT RECORD

Lab number: 8447
 Brief description: Roman copper alloy ring
 Name of owner: S. Thomas c/o Portable Antiquities Scheme
 Owner's number: Fieldwalk Item 1

Name of student: Libby McCormick
 Date allocated: 05/02/2009
 Date completed: 29/05/2009

Material type: Copper Alloy

Dimensions: Width; 2.3cm Depth; 2.0cm Width of Ring wall; 0.3cm

Weight (to 2d.p.): before 4.25g after 4.25g

Technology

It is a keeled ring; from the front there is a triangle to either side of the central oval-shaped raised area. The shape in plan is more rhomboid than circular as there is a sharp keel about half way around the hoop on either side. The inner shape of the ring is elliptical rather than circular. As would be expected of an item of jewellery, there are no obvious tool marks. There is also no evidence of welding, soldering etc. It is therefore likely it was cast in a piece mould and the flash-lines trimmed and polished off as the aesthetics of the object are important. A reusable mould is also likely to have been used as the ring is of a typical shape of its period.

Pre-treatment condition

There are corrosion products of various colours, mainly dark green, also areas and specks of light green, and some emerald green areas (the latter on the front left of the object). The corrosion is in layers. The surface is not pitted so it is not suffering from bronze disease. There are light brown soil accretions, especially on the inner side of the ring.

There are vertical lines on the inner side of the ring, especially behind the central oval section, that look like they were made as a result of hasty cleaning when found. Cleaning revealed these lines to be scratches in the object itself rather than just the pattern of adhering soil. There are numerous other small scratches across the object's surface, discernable using optical microscopy, that are probably due to burial conditions and/or cleaning when found.

Significance

The ring was found whilst field-walking in the area surrounding Thwing, East Yorkshire by S. Thomas. Excavations at Thwing from 2004-2008 have revealed Iron Age and 1st/2nd Century activity at the site, with a stone house constructed in the late 2nd/early 3rd Century and in use until the 4th Century. The site is important as it is an example of life in a rural, remote area of the Roman Empire, and as it challenges assumptions about the use of Roman buildings, for example an iron smelting furnace was found in the main room (Ferraby et al. 2008). The ring therefore has educational value because it is associated with this site.

The ring is 3rd Century in style (Johns 1996, 48), which also ties in with when the Roman house was occupied. Although the ring lacks some research value as it is a surface find and lacks archaeological context, it has aesthetic value and unique features. The inscriptions on Roman rings from this period were usually to protect the user, this ring is unusual as it instead has the inscription "SSS". This bears some similarity to inscriptions on Roman Chnoubis amulets, except on these there is a strike-through across the middle of the "SSS".

The ring probably has personal value to the finder, but they are likely to give it to a museum because of its unique qualities and educational value.

Examination

Visual examination, including use of optical microscopy

X-radiography at 105kv for 90secs

Tests / analysis:

SEM analysis: Copper, Tin, and Lead were present in significant quantities. The results should be seen only as semi-quantitative as they are affected by the contours of the object. The atomic percentages of these elements at spot x were: Cu 7.64%, Sn 4.99%, Pb 8.90% at spot y: Cu 7.92%, Sn 7.09%, Pb 1.89%, spots x and y being representative areas on the object

Justification for treatment

Cleaning the object is justified as it will reveal more of the detail and shape.

The active corrosion is not vigorous enough to warrant use of a corrosion inhibitor such as BTA (benzotriazole). There is no pitting that would be evidence of bronze disease (extreme active corrosion). There are also no crumbly, friable deposits that would suggest a significant level of active corrosion. Therefore the use of BTA is inappropriate, especially as there are health issues associated with its use. The object would not be able to be handled without gloves, and this may drastically hinder the object's future use, which is currently uncertain.

The coating is therefore justified as a protective measure, even though it may impede future research of the object, as the exact use of the object and environmental conditions it will face are unknown.

Cleaning

- The areas of corrosion above the dark green layer and soil accretions were removed using a bamboo stick, harder areas removed using a scalpel with a sharp blade, changed regularly. Cotton swabs of white spirit were used to clean off the surface at regular intervals so that the material removed did not obscure work. Areas below the dark green layer were not cleaned at the risk of removing too much material and revealing the metal underneath.
- It was attempted to clean the central oval section to potentially reveal more detail of the design, but the corrosion layers were found to be thin and there was a risk of exposing the metal underneath so cleaning in this area was halted.

Stabilisation

Consolidation and protective coating

- Paraloid B44 (methyl methacrylate copolymer) 5% w/v in xylene was used to consolidate the powdery light green areas. Xylene was chosen as it has a slow evaporation time meaning that the consolidant would penetrate deeper. It also gives good, even solutions of Paraloids as it breaks them down well. The object was allowed to dry.
- Paraloid B44 5% w/v in acetone was then applied to protectively coat the object, ensuring that all of the object was covered otherwise uncovered areas will preferentially corrode. The coating was not applied too thickly as this would have made the object appear glossy. Two coats were applied.
- Microcrystalline wax was applied on top. The wax was thinned with white spirit to make it into a cloudy solution and then brushed on.

Reconstruction / repair

n/a

Loss compensation

n/a

Other

n/a

Packaging

The object has been packaged in a crystal box. The object is supported underneath with plastazote (polyethylene foam) and plastazote cut out to the shape of the object surrounds it, with another layer of plastazote on top, for protection from physical forces and movement during transport.

Condition after treatment

The object has been successfully cleaned and been given a coating that will adequately protect it from moisture and oxygen and consequently drastically reduce the rate of corrosion. The object is now stable enough to be handled.

Student evaluation of treatment

The treatment was successful as the object is now stable enough to be handled, the rate of corrosion has been significantly decreased, and although the future use of the object is unknown its condition has been made suitable for display or storage. The protective coating may impede future research but it was deemed of prime importance to protect the object from further corrosion. The coating was successfully applied with no excess needing to be removed and the surface finish is even and not too glossy. The treatment was straight forward, quick and no problems were encountered.

Recommendations for further care

The object should be stored in the packaging provided.

Fluctuations in temperature and RH should be avoided, and RH should ideally be kept less than 35%. If the object is given to a museum silica gel should be added to the packaging to provide a desiccated environment. The silica gel will require changing regularly.

The object should be monitored periodically to ensure the protective coating has halted corrosion sufficiently and because the coating may need to be reapplied after several years.

Photography / other illustrations

Colour slide/digital/ print

Other documentation (analytical, object report, etc)

Student signature

Erabbh McQuil

Date

24.9.09

Staff signature

Date