

DUNADD ARCHIVE

SECTION 3: ANALYSIS AND SPECIALIST REPORTS

3.7 Reports on the finds conservation

By *Ewan Campbell and Richard Wellander*

The conservation of the artefacts was carried out at the Conservation Laboratories of the Historic Scotland (then S.D.D.) in Edinburgh and the Archaeology Department, University College, Cardiff. Louise Mumford of the National Museum of Wales, Archaeology Conservation Laboratory, made the silicon rubber casts from the mould fragments. The full records are in the possession of these bodies. Most of the objects did not require complex treatment, but the conservation of the enamelled disc 2123, a fragile and important object, is described here in full by Richard Wellander of the Scottish Development Department (Ancient Monuments) Laboratory.

Iron objects: all x-rayed, cleaned manually and/or with air abrasive. In Cardiff the iron was stabilised using Sodium Hydroxide and the objects coated in microcrystalline wax. In Edinburgh, Lithium Hydroxide and Ercalene (cellulose nitrate) were used.

Copper alloy objects: cleaned manually and impregnated with Benzotriazole under vacuum, coated in Inralad in Toluene with Santocel 62 matting agent. 214 was consolidated with epoxy resin.

Bone: cleaned manually, treated with fungicide, and impregnated with 10% PVA.

Jet/oil shale; cleaned manually, not treated.

Moulds: cleaned manually, silicon rubber casts taken.

Conservation of enamelled disc 2123

by *Richard Wellander* Scottish A.M. Lab. no. 810469.¹

The find had been lifted on site supported by a lump of soil, part of the disc being exposed by excavation but partially obscured by overlying soil debris. The surface of the exposed disc was clearly fragmentary and a coating of polyvinyl emulsion (PVAe) had been applied to hold the fragments 'in situ'.

In the laboratory, the object and surrounding soil was x-rayed to determine the orientation of the disc. The temporary coating of PVAe was removed from the partially exposed surface (later recognised as the back of the disc) and the loose soil debris cleaned away to expose the whole of the back of the disc.

The surface of the disc was heavily corroded and appeared to have been crushed in the ground (probably in antiquity; fracture lines were themselves filled with corrosion products and debris). Two boss-like features noted at the time of recovery and thought to be a possible catchplate and hook fittings for a saucer or disc brooch were examined closely. Both were corrosion warts and further cleaning to the back confirmed that there was no such form of attachment (one assumes that the disc was adhered to the objects from which it came by a natural adhesive, no trace of which was observed). A fine muslin cloth was applied to the cleaned surface with PVAe and allowed to dry.

The disc was then inverted and the remaining soil removed to expose the copper corrosion products covering the upper surface of the disc. Cleaning continued under the microscope to show the decorative features of this face and the enamelled cells. The circumference of the disc had been disrupted by corrosion processes but the original diameter of the object was estimated to be c.33 mm.

The artefact was constructed from a simple copper alloy disc with the upstanding rim being a separate element attached subsequent to the completion of the enamelling and other decorative work. The XRF analysis of the base metal (F0926B) showed it to be a leaded bronze. The fragile condition of the find did not allow a detailed metallurgical examination to be conducted to determine the nature of the

bronze (i.e. cast or beaten), but both the thinness of the disc and the relatively high Pb content (indicating a soft alloy) may suggest that the disc was formed by hammering the bronze onto a pattern. However leaded bronze also has improved flow properties during casting and it is not possible to be definitive as to the method of manufacture of the disc or of the rim. Areas of the surface had a 'white metal' appearance - probably tinning (see XRF analysis F0924B).

The rim has a flanged inward edge, which projects over the outer circumference of the disc by c. 1 mm. The effect of this flanged rim is to disguise the solder seam which joins the rim to the disc. This seam is only visible from the back of the disc and it is presumed would have remained unseen during use.

The ornamented surface of the disc is decorative with triskele and expanded trumpet ornament and closely parallels the hanging bowl escutcheon found at Hitchin and the lead mould from Birsay, Orkney. Cells of coloured enamel were inlaid into the design and XRF results (F0925B) and F0927B) suggest that green and white enamels may have been used (the remaining enamelling was very deteriorated and contaminated by copper corrosion products making analyses difficult). Observation under the microscope during cleaning noted a few, small red 'crystals' embedded in the surface of the deteriorated enamel in certain cells - this was interpreted to be red enamel, but no firm conclusions can be drawn from the object regarding the colouring of each enamel cell.

A number of fragments of the rim were recovered, detached from the disc. These were cleaned and re-located around the circumference of the disc, using a cellulose nitrate based adhesive. The entire upper surface of the reconstructed disc was then coated with a clear acrylic polymer (methylmethacrylate copolymer 'Incralac') and the muslin/PVAe backing subsequently removed (industrial methylated spirit was used as a solvent for the removal of the PVAe). The back of the disc was then similarly coated with the acrylic resin, completing the conservation of the piece. Due to the fragile and deteriorated condition of the object in general and the presence of enamelling, it was considered inadvisable to stabilise the metalwork using benzotriazole. The acrylic polymer coating contains benzotriazole as an additive and the object, given adequate storage conditions should remain stable.

Results of analysis:

All of the spectra are surface analyses and must contain a large amount of copper, tin and lead from the metal corrosion. This makes it hard to draw any conclusions about the original colours.

Metal: F0926B, mainly from base metal, shows this to be a leaded bronze with no zinc.

Silvery enamel: F092B is from the 'silvery' area on the enamel (see diagram). This could be from tin on the surface, although there does not seem to be much more than there is in the dark green enamel.

Pale green: F0925B, high lead, low tin and copper. Could be white contaminated with copper from the metal corrosion.

Dark green: F0925B, high copper and tin, low lead, as expected from a copper based green.

¹ The original AM report has illustrations which are not included here.