

K 128: Gold Snake, Style II, with Wire Fixings
Conservation Report

Conservation started: 13.1.2011

Finished: 14.1.2011

Digital photography: Before treatment (b.t.) and after treatment (a.t.)

The digital photos were taken with an Olympus E 620 camera. The microscopic photos were taken with a Meiji Techno RZ stereo microscope with fibre optic lights and 7.5 -75 X magnification.

Dimensions: 57.8 mm (l.) x 19.0 mm (w.) x 2.1 mm (d.) – c. 139 mm if opened out. (Diam) head 5.5mm (Th) 2mm (L) rivet 5.5mm

Weight: 5.27 g with the soil before treatment

5.13 g after treatment

Catalogue number: 527

Description:

Visual and microscopic examination using a Meiji stereo microscope with fibre optic lights and 7.0 - 45 X magnification.

Solid gold snake, Style II, with wire fixings on the back, as described in the BM&AG catalogue. The snake has a circular head with two small holes for eyes and a forked tongue. It is folded approximately in half and bent out of shape. The results of the x-ray fluorescent (XRF) analysis of one of the snakes, K 816, indicates that the purity of the gold used to make the snakes in the hoard is relatively high, with 95.4 % gold, 3.4 % silver and 0.6 % copper.

The snake appears to have been made from a length of gold wire, with the upper surface rounded and the lower surface flat. The central part of the body has a semi circular cross section. The tail end of the snake is tapering and is circular in cross section.

The slightly faceted surface of the gold suggests that it was hammered or cold worked. Gold of high purity would be relatively soft and easy to work. Therefore if the upper surface of a length of gold wire was hammered and burnished to give the smooth rounded shape, the lower surface would be flattened.

The head of the snake is 5.0 mm in diameter. It appears to have been attached to the body due to the slightly lumpy surface at the junction of the head and body, visible at a magnification of 40 X. The presence of regular, parallel striations on the flat underside of the head at the junction of the body and the forked tongue, which appear to be tool marks, also supports this.

The tool marks located on the underside of the junction of the head and the body do not match the tool marks on the underside of the junction of the head and the forked tongue, which suggests that the forked tongue may have been attached separately to the head.

The two holes for the eyes are 1.2 mm in diameter and have bevelled edges on the upper surface. On the underside there is a burr or slightly raised area of metal around the edge of the holes, which suggests that the holes were made from the front surface. The three tapering fixings appear to have been attached to the flat, lower surface of the body forming small hooks.

The slightly raised or lumpy surface around the base of the fixings/hooks and at the junction of the head and body, as well as the head and forked tongue, suggests that a gold soldering technique such as eutectic or diffusion soldering may have been used to attach these elements, rather than the snake

being cast. The striations on the underside of the head, which may be tool marks, also support the idea of the snake being made by cold working and gold soldering.

Casting gold objects is considered to have advantages if the moulds can be re-used, however it is thought to be less economical than cold working, since a certain amount of gold is lost in the casting process. (La Niece, 2009: 67-68)

Anglo Saxon gold wire is thought to have been made by strip twisting or block twisting. Strip twisting refers to the technique where a thin strip of hammered gold sheet metal is twisted until it forms a spiral shaped tube. This is then rolled between two smooth blocks of stone or metal to compress it and form a length of wire with a round cross section.

Block twisting refers to the technique where a length of gold with a square section is twisted into a spiral and rolled between two blocks to smooth the surface into wire with a round section (Leahy, 2010: 149-15). Strip twisted and block twisted wire are characterised by spiral seam lines resulting from the twisted construction. (Ogden, 1993: 164)

There are no obvious spiral seam lines on the surface of the gold snake, however, there are fine lines running the length of the wire in some areas, which could indicate drawn wire. Drawn wire is thought to have been in use in the Early Medieval Period, with different opinions on the date that it was first used, from the 7th or 8th Century (Ogden, 1993: 164), to c. AD 700 (La Niece, 2009: 68) and the 9th Century, c. AD 800 (Leahy, 2010: 149).

Condition:

Visual and microscopic examination using a Meiji stereo microscope with fibre optic lights and 7.0 - 45 X magnification.

The gold snake is in a deteriorated condition, in that it is distorted and bent out of shape. There is a small area of loss in the tip of the P.R. fork in the tongue and the P.L. fork is bent. As a result the forked tongue is a weak point on the object.

The three fixings or hooks are also bent out of shape and are weak points on the object. There are numerous scratches, small nicks and indentations in the surface of the gold. The deterioration of the snake is therefore physical rather than chemical and appears to be old, as there is soil in the recesses of the abrasions, scratches and indentations in the gold surface, as well as in the eyes and the folds of the snake's body.

The soil on the surface is compact and granular, with small inclusions such as quartz. Quartz has a hardness of 7.0 on the Mohs hardness scale, while gold has a hardness of ca. 2.5 – 3.0, therefore the gold surface is easily scratched by the soil.

Treatment:

Carried out using a Meiji stereo microscope with fibre optic lights and 7.0 - 45 X magnification.

The aim of the conservation treatment was mechanical cleaning to display level, in preparation for the Top 50 exhibition in 2011. Given that the objects in the hoard may be analysed in more detailed in the future only the relatively loose granular soil was mechanically removed and there was minimal use of solvents such as ethanol. Ingrained soil in areas such as the eyes was not completely removed.

1: The granular soil on the surface of the gold snake was mechanically removed or reduced using a fine thorn tip secured in a pin vice and a size 2 pure bristle paint brush. Ethanol was applied sparingly on a fine pure bristle brush to soften the soil and facilitate its removal. The soil was retained and stored in a small conical polypropylene (PP) sample container to be kept with the object.

2: Remaining particles of the relatively loosely bound soil were then removed with ethanol applied sparingly on cotton swabs.

3: A new storage box padded with layers of white polyethylene (PE) foam was made for the object so that the small PP sample container with the soil could be kept with the object.

4: Due to the snake's small size, the K number was adhered to the surface of the PE foam in the storage container with 10% w/v Paraloid B 72 in acetone, applied with a fine paint brush.

Samples collected in small polypropylene (PP) containers:

1: Granular soil from the surface of the snake

Time: 2.5 hours including digital photography, microscopy, mechanical cleaning, background research, documentation and a new storage container padded with white PE foam.

References:

La Niece, S., *Gold*, The British Museum Press, London, 2009

Leahy, K., *Anglo Saxon Crafts*, The History Press, Stoud, Gloucestershire 2010: 149-150

Ogden, J., *The Technology of Medieval Jewellery*, in Scott, D.A. et al (eds.), *Ancient and Historic Metals: Conservation and Scientific research*, The Getty Conservation Institute 1993: 164-171.

J.W.