Characterization of a Coin from the Shipwreck of HMS *Swift* (1770)

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ABSTRACT

A metal disk, presumed to be a coin, was found in the wreck of the British sloop of war HMS *Swift* sunk in 1770 in the Deseado estuary, currently Patagonia, Argentina. After cleaning, marks became noticeable, revealing the features of a halfpenny from the late period of King George II. Metallographic and chemical tests performed on the surface showed that the coin was made of an alloy of copper, zinc, and tin, and its microstructure was of a cast material. These characteristics illustrate the coin to be counterfeit.

Keywords: coin, HMS *Swift,* copper, George II, halfpenny, shipwreck.

Introduction

On 13 March 1770 the British sloop of war HMS *Swift*, having departed from Port Egmont in the Malvinas/Falkland Islands, sank in the Deseado estuary (currently Province of Santa Cruz, Southern Argentina) after striking an uncharted rock. Archaeological research on the *Swift* started in 1998 under the direction of Dolores Elkin. Since then an underwater archaeology team from the Argentinean National Institute of Anthropology has conducted investigations. The archaeological assemblage comprises a wide range of materials made of ceramic, glass, metal, bone, wood, and other organic materials (Elkin et al. 2000, 2001, 2007; Murray et al. 2002–2003; Bastida et al. 2004).

Among the artifacts recovered from the *Swift* is a group of small, thin, and circular metalic disks initially considered to be "coins," although neither surface inscriptions nor decoration were clearly visible (Figure 1). These artefacts were found on the sediment surface forward of the captain's cabin in the stern, without any contextual association other than being above the ship's main deck. The aim of the present work is to confirm whether these artefacts are actually coins and to characterize them from a metallurgical point of view.

One of the artifacts was selected for analysis. It is a reddish disk likely made of a copper alloy, with some non-diagnostic features slightly noticeable on one of its sides (Figure 2).

Figure 1. Group of disks found in the *Swift* site (scale in cm) (Courtesy of PROAS-INAPL, Buenos Aires, Argentina).

Figure 2. Disk selected for metallurgical analysis (Photo by the authors, 2005).

Tests and Results

The first step was to measure and weigh the sample, with the following results: maximum diameter: 27.1 mm; minimum diameter: 26.5 mm; maximum thickness: 2.2 mm; minimum thickness: 1.7 mm; and weight measured with an analytical scale (OHAUS AS200): 6.98 g.

Surface cleaning and conditioning

The disk selected for analysis was covered by two thin layers: an external one, red-colored and rather hard, under which there was a softer and mud-like layer of grey color. The sample was cleaned with tap water at 18°C using a medium-hard bristle brush, and then immersed in a bath containing a 3% aqueous solution of sulphuric acid stirred by ultrasound. By this procedure the two layers were removed from the artifact. A black stain remained on part of the metal surface, however. The cleaning operation revealed a rough metallic surface with a yellowish color similar to that of a brass or bronze alloy.

Figure 3. Both faces of the disk with side light (Photo by the authors, 2005).

Observation with Side Light

Side lighting of the surface of the disk enhanced its relief and revealed details not detected with front light (Figure 3). The sample then appeared to be a medal or coin with the left profile of a human effigy on one of its faces. To the left of the effigy and following the perimeter of the disk is the legend "GEORGIVS," whereas on the right two short parallel marks can be seen. The other side of the disk depicts the left profile of a seated human figure in the center, and three marks similar to the letters N, I, and A along the perimeter of the right edge.

Chemical composition and structural characterization

The piece was then analyzed with a Scanning Electron Microscope (SEM), in a Philips 515 instrument equipped for Energy Dispersive X-Ray Spectroscopy (EDS, EDAX 9100). The surface shows a dendritic structure (Figure 4), interpreted as resulting from a casting process. The main superficial chemical components (in weight) are copper (Cu) 84%, tin (Sn) 8%, and zinc (Zn) 6%. On the area of the surface which had the black stain, a significant amount of sulphur was detected. It may be associated with the presence of copper sulphide (SCu), an ordinary seawater corrosion product of this kind of alloy (Hamilton 1996). Finally the artifact was chemically washed with sodium sesquicarbonate in order to eliminate chlorides and prevent further corrosion.

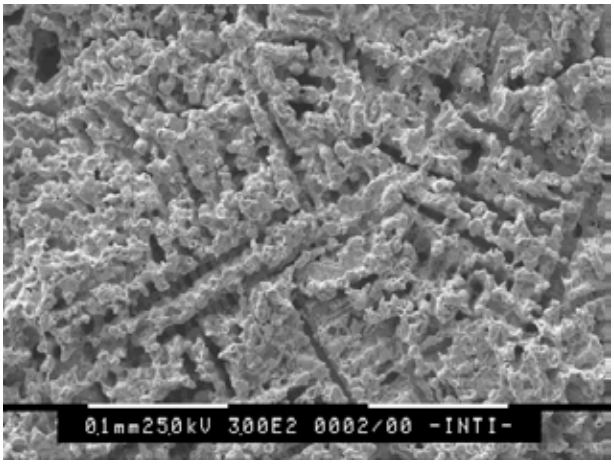

Figure 4. SEM image which shows the dendritic structure on the surface (Courtesy of the Instituto Nacional de Tecnología Industrial, Buenos Aires, Argentina).

Discussion

18th-Century British Copper Coins

During the 33-year-long reign of George II (1727–1760), several denominations of copper coins were produced: the farthing (a quarter of a penny), halfpenny, Irish farthing, and Irish halfpenny. Irish farthings and halfpennies were sent to Ireland, while the others were circulated in Great Britain and the American colonies (Jordan 2006; Stafford-Langan 2007). All copper coins of George II bear on the obverse the left profile portrait of the king, while the reverse bears either the image of Britannia, or a crowned harp for those which would circulate in Ireland (Jordan 2006). Halfpennies were coined in the following periods: 1729–1739, 1740–1745 and 1746–1754; the Irish farthings were coined during 1737 and 1740, while the Irish halfpence was coined in the periods 1736–1738, 1741–1744, 1746–1753 and in 1755 (Krause et al. 1991). The farthing had a minimum weight of 4.5 g and an approximate diameter of 23.7 mm, while the halfpenny's diameter ranged between 28 and 30 mm and its minimum weight was 9 g, although most weighed between 9.6 and 10.6 g (Jordan 2006).

During the reign of George II farthings and halfpennies were coined in three different designs. One had the left profile portrait of young George II on its obverse, and the image of Britannia on the reverse. The legends were GEORGIVS II REX on the obverse and BRITANNIA on the reverse along with the coinage year in the exergue. This design was coined every year from 1729 to 1739. One of the two editions made in 1730 had the name GEOGIVS instead of GEORGIVS (Krause et al. 1991).

Another design shows the portrait of George II at an older age, known in English as "Old Head," accompanied by the legend GEORGIUS II REX (notice the U instead of V), and an image of Britannia which is slightly different from the previous one. Currencies with this design were coined every year of the period 1740–1745, except 1741, with two editions in 1742 (Krause et al. 1991).

The third design differs only from the former in that the legend was impressed on the obverse, which again has the V in GEORGIVS II REX. Coins were made with this design during the period 1746–1754 (Jordan 2006).

The material used to make these coins was copper. Pure (or almost pure) copper was used in England for subsidiary coinage up to the mid-18th century (Coutts 1999). Coinage was produced by forming blanks of a ductile metal cut from bars or rolled sheets, then striking the blanks between dies of a suitable shape. As Tylecote (1976) states, this method of striking a prepared blank has been standard practice since the Roman period.

Counterfeits

During the reign of George II a large number of counterfeit copper coins were produced. The main characteristics of these counterfeits were (Noël Hume 1980; Jordan 2006):

1. Their weight was inferior to the one regulated for official coins.
2. In general they were not made of pure copper. Cheaper components like lead, tin and zinc were added to the alloy in order to reduce its value, resulting in a material with a lower melting point.
3. Most coins were not struck but cast in a mould; for this reason they had rough and porous surfaces with poorly defined details.
4. Their edges were seldom defined because the melted alloy often overflowed the mould and it was necessary to remove the resulting burrs. Therefore the coins were usually oval and of a smaller diameter.
5. Later counterfeit coins were also struck in a press.

Conclusions

The immediate conclusion of this study is that the artifact under consideration is a coin, and the other metal disks found in association with it are likely coins as well. The presence of Britannia on the reverse indicates that the piece was made to circulate in Great Britain or the colonies. Since the legend GEORGIVS on the coin is spelt with V, it can be inferred that it corresponds to the first or the third of the three designs outlined previously. Features of the "Old Head" version, such as the King's double chin, however, support a conclusion that it is the third design.

Attributes identify it as a halfpenny with a design of the period 1746–1754. The date on the coin cannot be distinguished; the only visible traces of numbers are three straight horizontal segments, possibly being the top of the digits 3, 5, or 7. The century designation necessarily had to be

occupied by a 7, and given the period under consideration (1746–1754), the decade digit would be a 5, and the year would be a 3. This indicates 1753 as the year of manufacture for the coin, had it been struck by the official mint. The casting structure does not correspond to the coinage method officially employed, however, and the alloy with which it was manufactured is not pure copper. The diameter is consistent with a halfpenny but the weight is lower, although this could also result, at least partially, from corrosion. The conclusion of this study, therefore, is that the piece most probably is a forgery of a 1753 George II British halfpenny.

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