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## Copper Alloy Casting at Skamby in Kuddby parish, Östergötland

In 2005, co-authors Rundkvist and Williams (2006; subm. 2007) directed the excavation of a Viking Period boat inhumation at Skamby in Kuddby parish, Östergötland (registered site Raä 158). It was found that the grave had been cut through a pre-existing settlement layer onto which the Viking Period monument's stone superstructure extended. C. 43 m<sup>2</sup> of this 30 cm layer were removed and sieved. Finds included a small decorated silver pin (fig. 1), iron fragments, pottery, burnt daub, burnt bone, herbivore teeth, a piece of worked antler and knapped quartz.

The most striking discoveries among the settlement finds were made by co-author Stålborg. Examining material that had been separated from the burnt daub and labelled "vitrified" or "slag", he identified it as copper-alloy casting debris: five small fragments of lidded crucibles and six small fragments of casting moulds. The moulds do not permit the identification of the objects they produced.

Finds like these are relatively rare in Östergötland, largely because they are difficult to identify. All fragments are heavily burnt and some of them vitrified to various degrees. Three of the crucible fragments are tong handles and three of the mould fragments casting flues: these are the parts that suffer the greatest heat during casting and are thus most likely to become vitrified. More fragments of metallurgic ceramics may lie in wait among the over 18 kg of burnt daub collected.

Cut into the natural beneath the settlement layer were ten sunken features: two hearths, one post hole charred to the bottom and six pits with dark fill. One of the larger pits was filled with burnt daub, and thus probably the result of site-cleaning efforts after a violent house fire. Lime wood charcoal from a pit and young pine wood charcoal from a hearth gave closely similar radiocarbon dates (Poz-13535, 2110±40 BP; Poz-13532, 2075±35 BP) that can be combined with



Fig. 1. Silver pin found in culture layer with copper-alloy casting debris. Current length 38 mm. Photograph by MR.

great statistical confidence. If the samples represent the same event, then it occurred in the interval 190–40 cal BC (95.4% probability).

Judging from the similar finds and fills, most of the sunken features were dug and backfilled while the settlement layer was forming. Yet, in view of the unusual metalworking finds, we must stress that the date of the culture layer is not entirely clear. It was relatively thin, had been subject to disturbance by the subsequent use of the site as a Viking Period cemetery, and had no internal stratigraphy to illustrate the character of its deposition or build-up.

Stratigraphically, the culture layer post-dates the sunken features with radiocarbon dates in the 2nd century BC and pre-dates a burial of the 9th century AD. The pottery and the burnt daub recovered from the layer fit well with a 2nd century BC date, but the crucibles pose a small conundrum. They belong to the so-called Helgö type: lidded with a little handle for the tongs, a type previously known only from mid-1st millennium AD contexts in Scandinavia (Lamm in press).

Only three bronze-casting sites of the Pre-Roman Iron Age are previously known in Scandinavia, all in Jutland: Vitved, Vildbjerg and Egebjerg (Andersen & Madsen 1984; Winther Ole-

sen 1997; Kristiansen & Fristed Jensen 2005). Vitved has produced a lidless crucible, Vildbjerg a set that may or may not have had lids, and Egebjerg a lidded one that may or may not have had a handle. Pre-Roman Iron Age lidded crucibles with indisputable handles occur in Germany (Lamm in press p. 18–21 w. refs).

The silver pin might help in dating the culture layer, but we have been unable to find good parallels to it. It was found near the surface and so may be an intrusive later object. Its line decoration has parallels in mid-1st millennium AD metalwork, but the main period for prehistoric silver importation in Sweden is the Viking Period.

The Skamby metalworking finds should belong either to the 2nd century BC activity documented by radiocarbon or to a mid-1st Millennium AD phase for which we have no positive evidence. Whatever their date, they offer rare and valuable information. Similar copper-alloy casting debris has been identified from only two sites in Östergötland: crucibles from Sverkersgården at Alvastra in Västra Tollstad parish and casting moulds from Linneberga in Å parish, a site located only 1.3 km from the Skamby cemetery.

The Sverkersgården crucibles (lidded, with handles) were found in 1995 on a multi-phase site, in and around a clay-lined hearth-pit along with metal slag (registered site Raä 2, Västra Tollstad parish; Ersgård 2006, pp. 18, 37–39). Radiocarbon has dated charcoal from the hearth lining to 660–860 cal AD, and associated loose charcoal to 690–880 cal AD (Lu-3998, 1290±80 BP; Lu-4000, 1240±60 BP). The intrinsic age of these samples was not determined but is likely to have been considerable, as metalworking requires prepared charcoal preferably made of tree trunks.

The Linneberga mould fragments were found in 1994 in a hearth at a cremation-urn cemetery from the centuries either side of AD 1 (registered site Raä 85:2, Å parish; Hörfors 1994; Svarvar in prep.). It has so far not proved possible to determine what type of object was cast. The hearth was 8-shaped, which is typical for Helgö-style metal casting: one end of the hearth was used to melt the metal at a high temperature, the other to heat the mould to a much low-

er one (Lamm in press p. 12–13). The Linneberga hearth currently has no radiocarbon date.

If the copper-alloy casting at Skamby and Linneberga can be tied to the mid-1st Millennium AD, then these finds provide an interesting background for the boat inhumation cemetery. Such finds indicate a degree of affluence in the Skamby area. This might be interpreted as evidence for the historical roots of the Viking Period local aristocracy who produced the boat-grave cemetery.

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A crucible from the hillfort of Gullborg in Tingstad parish (SHM 13 824) came to our notice during proofreading.