Brunel University London

A Metallurgical Miscellany

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The HISTORICAL METALLURGY Society

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by Brunel University London Follow

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Abstracts

The bad side of recycling: the use of ancient coins as a source of material for deceiving counterfeits
(Laura Perucchetti and A Dowler, British Museum)

A group of six coins of Ithaca denomination from the British Museum has been analysed using a bench Bruker Artax XRF on a polished surface. The coins can be stylistically divided into two variants, with one suspected of being a forgery. The analysis highlighted that the two variants are chemically different. The first records of coins stylistically similar to the ones suspected of being forgeries are dated to the 19th century.
This paper hypothesises that the suspected forgeries were produced by an expert forger remelting other, more common, ancient coins. We suggest that the forger was an expert smith and an expert numismatist and antiquarian who was possibly aware of the most recent studies dedicated to the chemical composition of the ancient coins. The forger was therefore remelting ancient coins to produce forgeries with an “ancient” composition.

Roman mould technology for small castings
(Justine Bayley)

Many small everyday Roman objects were cast from a range of copper alloys. The moulds used to make them were often ceramic two-piece moulds. Sometimes these mould pairs were assembled into multiples so between 10 and 20 objects could be cast at one time. More complex objects were cast using multi-piece moulds, while investment moulds for casting some one-off objects such as statuettes are also known. All these ceramic moulds would have been discarded after a single use. Relatively recently copper alloy moulds for casting copper alloy objects have also been recognised; these could have been used many times. Other evidence for mould technology is provided by failed castings and lead models from which moulds were made. Examples of all these objects will be illustrated and their use described.

A very compleat paper trail
(Peter Northover)

In 1783 the Navy Board in Britain decided to build all new ships with copper rather than iron bolts to avoid the corrosion problems that had occurred when copper sheathing came into contact with the iron bolts in seawater. There was a need to ramp up production of copper bolts which meant mechanising their production. Perhaps acting on "information received" William Forbes, the Navy's copper contractor, was in July 1783 the first out of the gate with a patent for using grooved rolls to hot or cold roll the copper bolts. By the end of October he had his rolling mill at Byfleet in Surrey up and running and for two years bolts were rolled there.
There is a wonderful archive of contracts, orders from the Navy, payrolls, ledgers, record of metal used, production losses and metal shipped out. Especially interesting are the weekly reports from

William Forbes' brother, the works manager. Eventually the enterprise failed, probably through the mill being underpowered, interruptions to production when the river froze, and transport difficulties. The paper trail is completed by bolts with Forbes' works stamps recovered from ships for which we know he supplied the bolts – so we can follow the metallurgy of his process.

The context of the British Iron Act of 1750
(Peter King)

In 1750 the British Parliament legislated to encourage iron production in America, but to restrict its manufacture into finished artefacts there by prohibiting certain kinds of ironworks. The paper will consider the deployment of prohibited processes in England and Wales and the impact of the Act on trade.

Bright sparks to engine blocks: the history of magnesium, the lightest of the structural metals
(Chamini Mendis, BCAST Brunel University London, Uxbridge)

Magnesium is the youngest and the lightest of the structural metals and is the sixth most abundant metal in the earth's crust. Since its discovery in 1808, magnesium as a metal has seen many different applications from bright light used in still photography, as an automotive and aerospace alloy to applications as a biomaterial in stents. Recently magnesium has been considered to be suitable for hydrogen storage as well as battery applications. In 1930 the industrial applications of magnesium alloys were pioneered by the German industrialists for both automotive and aerospace applications due to its light weight and the relative scarcity of aluminium due to the war effort. Use of magnesium continued to increase until 1970 when it fell out of favour due to its low corrosion resistance. However, there was a resurgence of interest in magnesium in the 1990s for structural and automotive applications as the push to develop vehicles with better energy efficiencies became more important, due to adoption of treaties such as the Kyoto protocol and Paris agreement on climate change. Biomedical applications of magnesium have a similarly long history with first reported uses in the 1890s as wires in human body and recently a magnesium stent was made commercially available. In this presentation I take you on a journey through the world of magnesium with a rich history of diverse applications as well as looking into current uses and potential industrial applications in the future.

The rising of the smith
(Paul Rondelez)

In much of northern Europe, both archaeological and iconographic sources suggest that a profound change in blacksmithing practices took place in the late medieval period: the location of the hearth moves from ground-level to waist-level. This talk will present the current evidence, its implications and proposes some reasons for this change.

In addition to these talks, during the lunch break we will be screening two contributions submitted for the 2020 online Woodford Furnace Festival. The Furnace Festival aims at reviving the production of iron in Ireland using only local materials. The films are:

Smelting Irish bog iron ore in Master Kihara's tatara furnace, Japan (32 mins)
Bog iron ore from Ireland was sent out to Japan where it was smelted into sword-grade steel by tatara master Akira Kihara and Prof Yasuyuki Murakami. It shows the complex furnace building process, the associated rituals and, ultimately, the tamahagane ('jewel steel') produced.

Current bloomery iron production in Yakutia, Russia (25mins)
Bloomery iron and steel production was carried out in Yakutia until at least the 1920s and was revived after 1980 as part of the renaissance of local Sakha culture. The film shows the unique furnaces used, the shamanic rituals involved and the wide variety of objects made for everyday use in the wide area.