

Lead and silver: Britain, France and beyond

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This volume brings together a range of papers on the history and archaeology of lead and associated silver-bearing ores, the processes by which they were smelted and refined, and the landscapes they inhabited. It has its origins in the papers presented to the Historical Metallurgy Society's annual conference in 2005, held at Middleham in North Yorkshire. They have been complemented by more recent work to reflect the range of research carried out over the last decade. It is particularly pleasing to be able to include two papers presented at the Society's Research in Progress conference, held at the University of Bradford in November 2009 to celebrate the archaeometallurgical work carried out there under Dr Gerry McDonnell. They introduce us to the work on the archaeometallurgy of lead, copper and silver being carried out in France, much of it under the auspices of the Centre National de la Recherche Scientifique (CNRS).

When HMS sponsored the *Boles and Smelting* conference at Low Row in Swaledale, North Yorkshire, in 1992 it facilitated the exchange of ideas and stimulated cooperation which significantly advanced the study of non-ferrous historical metallurgy over the following decade. The papers from this conference (Willies and Cranstone 1992) provided a picture of the range of research at that time, with its focus on field evidence for smelting but also including documentary evidence and some analysis of residues.

Our research has now moved away from the individual pursuit of data on smelting sites to embrace a greater understanding of their role in the wider historic landscape. Much remains to be done in identifying and interpreting the field evidence, as demonstrated by Smith and Murphy, and by Pickin, in this volume. The latter, presenting the evidence for early medieval smelting of lead-based ores in south-west Scotland, highlights the potential for further work to build on discoveries from the 9th to the 11th century AD on sites straddling the modern border between England and Scotland

(see, for example, Fairbairn 2007 and Smith 2006). There is also a need to re-assess some of the evidence and concepts presented in 1992 in the light of new evidence. Examples are provided with the early (Roman period) wind-blown hearth identified by Timberlake at Cwmystwyth (Anguilano *et al*, this volume) and Murphy's conclusions on the Carlisle smelter of the same period (Murphy *et al* forthcoming).

The resources and energy behind the papers presented here is typical of those driving forward research into historical metallurgy in both Britain and France. Their authors are committed individuals, some from backgrounds in higher education or government-sponsored archaeological sciences, but more important, as is often the case, they are all individuals willing to work in their own time and with their own resources to advance our understanding of the subject. The sources used in these papers vary from the accounts and correspondence of the English Crown, through to data extracted from experimental archaeology, and reflect the multi-disciplinary approach of this volume.

This volume presents successes, but there is also evidence of the limitations to some investigation from which lessons can be learned. The invisibility of late medieval lead/silver smelting and refining sites within the landscape of the Tamar Valley (Claughton and Smart, this volume) compared with upland, mainly non-argenteriferous, lead smelting sites is a problem which can be rectified by the application of existing geophysical methods. Those methods were successful in identifying a smelting furnace in the Tamar Valley, but it was dated to the 1st century AD, contemporary with the fort at Calstock also discovered during the geophysical survey (Claughton and Smart 2008).

Other problems may need fresh thinking. There are unresolved issues with medieval silver production for the 12th and earlier centuries AD, and particularly for the Northern Pennines (Claughton 2011; Claughton and

Smart this volume, n.3), where the statistical evidence is at odds with that produced by numismatics, and field evidence has proved elusive. The seminar held at Nenthead in April 2006, as a part of the National Association of Mining History Organisation's research programme, aired some of those issues and the current landscape investigations funded by English Heritage and the North Pennine AONB, the *Miner-Farmer Project*, may go some way towards resolving them (Ainsworth 2009). That project has already identified evidence for features associated with mining in the Roman period, and the fort at Whitley Castle in the South Tyne valley. Murphy's paper (Murphy *et al* forthcoming), building on work he presented at the Nenthead seminar in 2008, emphasises the interest in silver-bearing ores at that period in what is now Cumbria. An added dimension is the possible provenance of the ore smelted at the Carlisle, Botchergate site being the Caldbeck Fells rather than the North Pennine orefield.

Over the last forty or fifty years historical metallurgy has made significant advances in its understanding of iron smelting. It has been helped enormously by observing surviving practice in remote parts of the world and by carrying out experimental smelting. Non-ferrous metallurgy is fast catching up, as Cohen *et al*'s contribution to this volume demonstrates by exploring the practice and rituals associated with the smelting of lead and associated silver-rich ores in Bolivia.

Experimental archaeology for the non-ferrous metals has until recently been more tentative in its approach. It has not been possible to translate work carried out in the laboratory to large scale field experiments. Timberlake's work at Cwmystwyth (Anguilano *et al*, this volume) provided some useful data but was limited by the lack of facilities for repeat experiments. Now the experimental platform at Melle, in France, used by both L'Héritier and Guirado, goes some way towards overcoming that problem. It is difficult to see how the present arrangement at Melle could be used when working with wind-blown hearths but the ability to repeat relatively controlled processes, such as liquation and cupellation, has a significant benefit as procedures can be re-run to

provide a range of data for analysis.

In this volume we see all aspects of research into the mining, smelting and refining of lead- and silver-bearing ores. Documentary evidence, the search for field evidence and, perhaps more than anything else, the analysis of residues is informing our understanding of the processes involved (see, for example, Paynter *et al*, this volume). The move towards more laboratory based research, including greater use of analyses, is the principal difference between the papers presented in 1992 and those published in this volume. Using scientific techniques and the data they have the potential to produce will help take non-ferrous historical metallurgy forward over the next few decades as we move towards effective interpretation of all the evidence.

Acknowledgements

My thanks goes to all the authors for their work and their patience over the time it has taken to bring this volume to publication; to Justine Bayley, also for her patience and the timely prompts which have kept me focused; and to all those who have assisted in the review process.

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