THE FUTURE OF ARCHAEOMETALLURGY AND HISTORICAL METALLURGY

It is impossible to predict the future of one's own research, let alone that of whole disciplines involving research by many individuals. These notes are therefore more suggestions than predictions, combining extrapolation of recent trends with identification of some lacunae that would benefit from scholarly attention. These observations are based on the intuition and impressions of the two authors; no literature review has been attempted which might form the basis for more comprehensive discussion.

It is worth saying at the outset that the dichotomy between 'archaeometallurgy' and 'historical metallurgy' is purely a reflection of convention, and does not have any bearing on methodologies or research priorities. In European contexts, a nominal cut-off may be identified somewhere in the mid-16th century AD, when increasing written sources (such as Agricola's De re metallica) mark the step from a predominantly prehistoric (archaeological) to a more historic (literature-based) framework of research. It is clear to us, however, that this separation is neither helpful nor indeed relevant for much of the rest of the world.

Geographical and technological coverage

The word archaeometallurgy was coined in the context of Near Eastern research, when Beno Rothenberg established the Institute for Archaeo-Metallurgical Studies (IAMS) in the early 1970s as a vehicle to promote his work in and around Timna. Ever since, the Near and Middle East has seen the bulk of archaeometallurgical research, broadly spanning the Aegean, Cyprus and Turkey to the Levant (particularly Israel and Jordan), Oman and Iran. Much of this has concentrated on copper and, to a lesser extent, lead-silver metallurgy. Elsewhere, only the Alps have seen a similar sustained interest, again mostly focussing on copper production.

In contrast, historical metallurgy received much of its formative input from Ronnie Tylecote, one of the founders of the Historical Metallurgy Society. Initially, this was mostly concerned with the industrial heritage of iron smelting in Britain and elsewhere, but soon covered also much research done on early iron smelting and manufacturing in central and northern Europe. It would be interesting to test whether this apparent correlation between metal (copper vs iron) and geographical research coverage (Middle East and Alps vs northern Europe) is a pure artefact of research history, or reflects a real difference in the relative importance of the two metals in those regions. The different chronological focus between the two seems to underpin at least some of the material differences, but is not sufficient to explain all of it.

Outside Europe, there is a strong interest in iron smelting in Africa and in bronze casting in China; it is again puzzling to see the seemingly strict correlation between geography and metal, considering that both Africa and China were multi-metallic for much of their history.

This leaves significant gaps in the geographical coverage of Meso- and South America, Russia including Siberia, Central Asia, and South and South East Asia. Of course, there is good work being done in all these regions – recent work extending both the range of metals and processes studied – but the quantity of data is meagre given their size and cultural complexity.

However, if the programme of the recent 50th anniversary conference of HMS is anything to go by, then there is a good chance that the future in this respect has already begun. One would therefore expect as much as hope that this trend gathers momentum, and that future work will see more on the metallurgy of metals other than iron and copper, more on metallurgy (pre-colonial and colonial / early modern) in the Americas, Africa, South and South East Asia, and Central Asia including Siberia. Such work will also offer fascinating opportunities to study mechanisms and effects of the creolisation of technology, as European and later North American technology influenced and was influenced by earlier local or indigenous practices.

Social and economic contexts

Historical metallurgy has a significant scholarly root in history, and consequently incorporates social and economic theory and data into its practice. This reaches from macro-economic and global studies, such as the influence of South American silver production on the economy in Europe and the European-Asian trade dynamics, to detailed studies of individual companies and biographies of industrialists. Although direct comparisons with prehistoric periods are difficult, it is nevertheless possible to consider historical data in the analysis of prehistoric sites, landscapes and networks.

The concept of efficiency can only be meaningfully discussed when wider economic factors are being considered: namely relative costs of labour, ore, fuel and transport within the overall economy. The spatial arrangement of ancient industries is not only determined by purely technical factors such as geological availability of ore, or access to water for power. Aspects of land ownership, competing interests in related resources (fuel, labour), and availability (or otherwise) of capital and transport infrastructure have certainly played as much a role in pre-history as in the later periods. In addition,

systems of kinship, social structures and power relations are important considerations.

Future research in archaeometallurgy should take inspiration from historical metallurgy in this respect. Again, we see already some of this happening, for instance in the 5th to 4th century BC industrial landscape of southern Attica around Laurion, and the established practice of provenance determination for Cypriot and other Bronze Age copper offers a good starting point for some of this. Geographical information systems (GIS), and the theory and practice which is already well advanced in landscape archaeology and industrial landscape studies have much to offer in this respect, and are likely to generate meaningful information even where historical sources are lacking.

Practical challenges

There are several challenges for the future. Firstly, there is the issue of preservation of the evidence. Metallurgical landscapes and individual sites are often threatened by subsequent development – indeed this was one of the driving forces behind the establishment of the Historical Metallurgy Society, and remains important today. But even preserving representative finds collections is a major challenge; few museums have the interest or capacity to deal with industrial waste which is neither pretty nor easily categorised. Here we face a major educational challenge, addressing the general public as well as decision makers in local and regional levels, up to national heritage legislation.

Indeed 'outreach' in its broadest sense should and must include the delivery of training for indigenous archaeologists and local communities in recognising, dealing with, and analysing the evidence. Too often in the past, European-led projects have gathered data without reference to local conditions, which has been detrimental on two counts. Firstly it fails to develop local appreciation for the resource and mechanisms for local heritage management; secondly it divorces the data from ethnographic information which may be vital to understanding and interpretation.

Given the limited ability to preserve and store original primary evidence, our efforts must focus on satisfactory documentation. This raises issues of data quality, compatibility and completeness, as well as the archiving of original samples. Recording standards need to be further developed so that data becomes consistent, or at least comparable. This includes proper documentation of sampling procedures and analytical protocols as well as open data access.

A large amount of data is routinely generated but not easily available; his includes grey literature from developer-driven archaeology as well as unpublished Masters' and doctoral theses. Conversely, much of the academic literature remains behind the paywalls of large publishing houses, and is thus inaccessible to commercial archaeologists and independent researchers. Open access data repositories are clearly highly desirable, to enable information sharing between sectors.

Conclusions

The future of archaeometallurgy and historical metallurgy is bright, and has already begun. Research will increasingly reveal the diversity of processes in the past, covering previously neglected regions and materials, and hopefully applying a more balanced mix of methodological approaches to both prehistoric and historical assemblages. Concepts of economic and social study traditionally applied to historical research can be transferred to archaeology, and the analytical work typical of archaeometallurgy can make significant contributions to more recent remains, complementing historical sources. This is likely to lead more generally to a blurring of the distinction between historical metallurgy and archaeometallurgy, which would be a good thing for both sister disciplines. In practical and intellectual terms, greater collaboration between different research traditions, from different parts of the world and dealing with different periods, would greatly benefit the discipline.

In all these challenges the Historical Metallurgy Society must play an active part in promoting and directing some of these developments; but it is up to those many individuals to engage creatively with concepts outside their comfort zone, and to seek new paths to change all of our futures.

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