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Submissions
Submissions to The Crucible are welcome at any time, but deadlines for each issue are 1st March, 1st July and 1st November every year. Contributions can be sent in any format, but we prefer digital if possible.

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Inside The Crucible

The HISTORICAL METALLURGY Society

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Theory in Archaeometry: Society for American Archaeology

Honolulu, Hawaii, 3rd-7th April 2013

The 78th Annual Meeting for the SAA was convened in April, and as usual provided an opportunity for scholars to present on a wide range of topics in global archaeological research. Over 1000 papers were presented. Of particular interest to the archaeological sciences (and more specifically the archaeometallurgical) community was the session "Invention as a Process: Pyrotechnologies in Pre-Literate Societies", convened by Miljana Radivojević from UCL's Institute of Archaeology, and Benjamin Roberts of Durham University. One of the major themes of the session was to deconstruct a traditional focus on "the earliest", "inventions," and "origins", to a more theoretically rigorous conceptualization emphasizing the interplay between technological invention and innovation, and the cultural underpinnings of technological selection.

Every archaeometallurgist knows that there is a wealth of archaeometallurgical data spread ubiquitously across the globe, with relatively few trained scholars able to process this data analytically (Knapp 2000). There has been an increasing awareness that archaeometallurgists and archaeometrists need not focus on cataloging finds or technical reports alone (although these are also very important). Instead, it has become clear that those with the most intimate knowledge of the archaeometric data are also uniquely suited to generate explanations of human behavior (Binford 1962), and need not rely wholly on other scholars to provide anthropological interpretations. Archaeometallurgists seemingly have tended to shy away from embracing the big picture, universalist questions that well-contextualized metallurgical data is apt to address. It was therefore immensely refreshing to attend this SAA session and find that I was not alone in my desire to seat historical metallurgy within various theoretical frameworks.

Benjamin Robert's talk, "Inventing Metallurgy I: A Global Perspective," discussed how the scholarly primacy given to earliest inventions has tended to overshadow research into the "why" and "how" of metallurgical innovations on a global scale (namely Europe, Asia, and Central and South America). Likewise, Miljana Radivojević continued along this trajectory by focusing on what appear to be independently developed metallurgical traditions in the Balkans of the 7th-5th millennia BC, in her talk entitled "Inventing Metallurgy II: A Look Through the Microscope Lens." Copper ores with particular aesthetic properties were selected for, and this technological adoption was studied

using optical, compositional, and isotopic techniques on copper minerals, ores, slags, metals/alloys, and technical ceramics. Thilo Rehren provided an insightful look into the pyrotechnological requirements of "Inventing Technical Ceramics," processes on which metallurgical, pigment, glass, glaze, and pottery production are frequently dependent. He correctly argued that incremental changes are responsible for much of what we may call invention. These changes may be discernible only when approached from a long-term, evolutionary perspective, rather than a quest for a monolithic origin. Peter Hommel delivered a paper co-authored with Roger Doonan on early pottery invention called "Between Ideas and Objects: The Doings of Invention in Pottery and Metallurgy." David Killick presented "Invention and Innovation in African Iron Smelting Technology," in which he illustrated that the two terms should not be considered synonymously. A high degree of differentiation between African bloomery traditions demands that the spotlight be focused more on the dynamic reasons for variation than on previous disparaging arguments viewing African technological progress as static. In his talk entitled "Cast Iron Smelting in Early China: Archaeological Survey and Laboratory Simulation," Qian Wei proposed an 8th century BC date for the earliest invention of cast iron in China. Research into the subsequent adoption of this technology was executed in part by 3D laser scanning, which aided in reconstructing the spatial evolution of the furnaces. Attempts to explain the adoption of specific silver smelting technologies over others in the Andes were presented by Carol Schultze in her talk "Invention of Silver Technology in the New World."

Ben Roberts presenting his talk on 'Inventing Metallurgy'.

I would make one terminological amendment to the session that caused some confusion among the participants and audience. Instead of attempting to define and distinguish between the terms "invention" and "innovation", which can tend to project analogous connotations, it may be more fruitful to employ the distinct terms "invention" and "adoption." Invention is the creation of a new technology, whereas adoption occurs when this new technology can provide 1) like or superior quality over previous technologies, with 2) lower cost (or no increase in cost for superior quality), while 3) satisfying cultural tastes or taboos, and is subsequently selected. All technologies that are eventually selected must undergo both invention and adoption for their material remains to be pervasive enough to become discernible and statistically significant in the archaeological record.

It is unreasonable to state that the question of theoretical approaches to archaeometry or archaeometallurgy is one that has not been posed before. A growing amount of archaeometallurgical work has indeed been focused on anthropologically pertinent issues, such as iron production lineages within technological and economic constraints (Charlton et al. 2010; Humphris et al. 2009), as well as environmental considerations such as fuel availability and efficiency during the Levantine Bronze Age (Ben-Yosef 2012; Kaufman 2012), to name just a few of the more recent contributions. The assessment of the field I provide may seem over-generalized, but the unfortunate fact remains that many archaeologists view archaeometrists merely as providers of raw data, while archaeometrists feel comfortable generating technical reports that they hope will one day be used by archaeologists (for a much more sophisticated look at these paradigmatic issues, cf. Thornton 2012). Of course, teamwork and collaboration between specialists and generalists is a fundamental aspect of archaeological research and should not be discarded. But it may also be fruitful for the next generation of archaeometallurgists to be trained formally in anthropological theory. This would at the very least facilitate a better understanding of the interaction between data and theory, and at best create scholars who can both acquire experimental results, and explain them.

Brett Kaufman

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