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Unreviewed Mixed Matters Article:

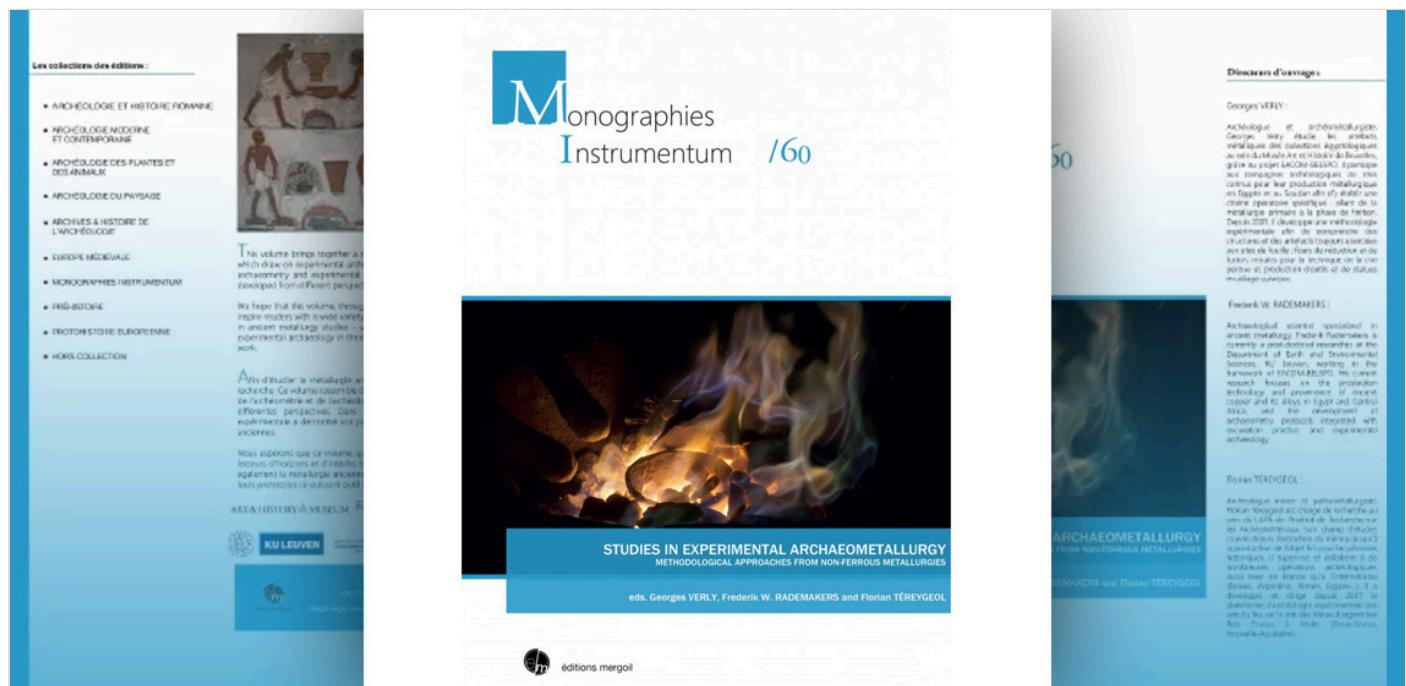
Book Review: MI-60. Studies in Experimental Archaeometallurgy: Methodological Approaches from Non-Ferrous Metallurgies by Georges Verly et al (eds)

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Issue 60 of Monographies Instrumentum, titled *Studies in Experimental Archaeometallurgy, methodological Approaches from Non-ferrous Metallurgies*, exhibits 10 papers presented at the first International Conference on Non-Ferrous Metal Metallurgy and Experimental

Archaeology – *Metallurgie des non-ferreux et archeologie experimentale ICA I*. The conference was held at the Museum of Art and ...

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Instrumentum is quite active in organizing conferences and publishing works on topics related to ancient crafts throughout Europe and the Mediterranean Basin. The general chronological interests are primarily on Greek and Roman antiquity along with the European Iron Age, as well as some in Bronze Age and Middle Age crafts. This issue exhibits how the use of experimental archaeology in archaeometallurgy contributes to the understanding of non-ferrous metallurgy in both Bronze Age and Medieval contexts.

Instrumentum primarily publishes their monographs in French, English, Spanish, German or Italian. However, the language in which each article is written is at the discretion of the writers upon submission, and this can mean a variation of languages in one issue. In Issue 60, the language mix is primarily French with three articles written in English. As I am not a native French speaker, my interpretations are at the mercy of the handy Google translation app which helped me along greatly.

The first article, by Verly and Longelin, proposes a very rigorous functionalist methodology to the application of experimental archaeology to archaeometallurgy. The article outlines some key methodological approaches as a reply to issues of inconsistency observed over 17 years of experimental archaeology in Egypt. This article sets the stage for subsequent examples of experimental archaeology in action, while giving some guidelines for moving forward. I personally find this outline to be very helpful and intend to test this framework in future archeometallurgical work of my own.

The following three articles by Téreygeol, Gauthier *et al*, and Flament and Téreygeol, firstly give a brief overview of paleometallurgy in France. The articles discuss some pitfalls in attempting to create a *Chaîne Opératoire* of technical processes during experiments at the Medieval mining site of Castel-Minier in Ariège, France. These experiments in tandem were very nice to follow for the reader and piqued my interest in the site.

The fifth article is about a highly technical experiment using ancient text to assess the refinement of chloride-sulfate gold from Sardis. I find this article to be very informative on how chemical analysis reveals the technical use of reagents to eliminate contaminants in gold. While it is quite technical, the outcome is very interesting in that it outlines the thermodynamic parameters separating vitrified technical ceramics from lower heat operations necessary for gold refinement.

Articles 6 and 7 are good examples of how pXRF, SEM-EDX and the highly sensitive LA-ICP-MS can be used for archaeological analysis of metal artifacts, while highlighting some limits. In article 6, the outcome of the analysis was used to determine if all the objects found at Trou Des Nutons (A province in current day Belgium) were of the same alloy. The analysis in article 7 was used to determine homogeneity of experimentally refined gold in the mining district of Samut, located in the Eastern desert of Egypt. My experience with an SEM-EDX is that the capacity for object analysis is limited to small artifacts, depending on the machine. I am not, however, familiar with LA-ICP-MS, although I do understand its use in this context and find it a good model for future mineralogical analysis.

In line with interests in ancient mining operations in Egypt, the eighth article takes two separate approaches, from documenting chisel marks in stone quarries to using that data to inform an ongoing experimental project focused on mines at Timna, Isreal. This project utilizes 3D modeling to create a database of chisel marks in ancient quarries, comparing them with experimental ones. This is a standard use of 3D modeling but a unique experiment in quarrying stone, especially from a case study perspective using Egyptian examples as reference.

Focusing on objects suggesting a casting workshop, from an assemblage found in tomb QH 207 at Qubbet el-hawa, article 9 of this series describes lost wax casting artifacts that are somewhat rare to find archaeologically. The artifacts in question exhibit all the steps in the casting process, along with failed examples. This is an incredible find that has not been fully considered since its discovery in 1969. Using μ CT (Micro Computed Tomography) scans, the authors were able to create a 3D reconstruction of the most complete mould from the assemblage. With this information, they were able to test their hypothesis on lost wax. As mentioned, this is an incredible discovery, thought I would like to see more information on the experiment with accompanying illustrations to help visualize the process.

The final article in this monography considers an interdisciplinary approach to technical ceramics, found at the Buto site in the Nile Delta. The thesis of this experimental project is quite interesting, as the hypothesis tests the logical build of the crucible based on the material available, while also testing the use before firing. While the experiment was well documented, the proper materials were not available. As the authors noted, this experiment will undoubtedly produce more conclusive data when the proper materials become available. These crucibles are quite interesting in shape and functionality, and I look forward to seeing more data from these experiments.

I found this collection of works on experimental paleometallurgy to be highly useful, as it exhibits many archaeometric applications in both technical ceramics and non-ferrous metals. While I look forward to reading more works produced by Instrumentum, the only difficulty for me was the language barrier.

Book information:

MI-60. *Studies in Experimental Archaeometallurgy: Methodological Approaches from Non-Ferrous Metallurgies*. Georges Verly, Frederik W. Rademakers and Florian Téreygeol. 2019, 205 p., ill. coul. (ISBN : 978-2-35518-094-1). Collection dirigée par M. Feugère

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