

PROMATECH

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**Production, Materials and Techniques of Copper Alloy Alms Basins in Northern Europe
(15th - 17th centuries)**

SUMMARY

Context

The PROMATECH project, conducted at the Royal Museums of Art and History and in partnership with the European Centre for Archaeometry at the University of Liège, focused on the interdisciplinary study of the so-called “offering” basins, versatile, utilitarian and mass-produced utensils, made between the end of the 15th and the end of the 17th century. It aimed at studying these objects from a technical and material perspective, in order to highlight the practices and know-how of the artisans working with copper and its alloys in Northern Europe, and to focus on the diffusion of these objects in the society, as well as the specificities of the commercial market that encouraged this diffusion.

Objectives

In order to recontextualize these objects, the PROMATECH project carried out exploratory and interdisciplinary research, based on visual, textual, material and experimental data, with the aim of highlighting the material elements (the techniques and the composition of alloys), as well as the historical elements (social, cultural and economic) that documented the production, use and perception of these objects in the medieval and modern period.

The surveys that were conducted in the framework of the project aimed to acquire three types of data: material data, technical data and historical data. The most important part of the project consisted of the selection, the study and the interpretation of a representative corpus of basins, from a quantitative and qualitative perspective. The MRAH collection, the largest in Belgium (63 basins), served as a reference to develop the descriptive protocol and to obtain the first analyses on the composition of the alloys. The corpus was, in a second phase, heard from other collections to test the reliability and the adequacy of the descriptive methodology and to enrich the analytical data repository. Sixteen collaborations were concluded with European museums, whose collections gathered 833 basins. For such mass-produced objects, quantitative methods and statistical processing of large data sets were the only way to establish meaningful relationships between the singular technical and material criteria of the objects.

The archaeometrical analyses had two objectives: to identify the nature of the alloy in these basins, i.e. to determine the range of values assigned to them by the craftsmen, and to identify trace elements, likely to function as markers, characteristic of the raw materials. These analyses, using portable X-ray fluorescence (p-XRF) and based on the CHARM reference

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protocol (Cultural Heritage Alloy Reference Material set), guaranteed precise, comparable data that could be reused by research laboratories.

The second part of the project is dedicated to the study of written (inventories, accounts, regulations and treatises), iconographic and archaeological sources to investigate three types of information: the technical characteristics of production (know-how, tools, materials, gestures, practices), its organization - the way these basins invested different social contexts and were exported internationally - and the conditions of supervision of the craft.

Finally, the last part of the project aimed to resolve, through archaeological experimentation, hypotheses that could not be verified with certainty in historical sources. The difficulty of carrying out these experiments (mobilization of the necessary know-how and the reproduction of working conditions) led to a re-evaluation of the expected results, targeting more precisely other methods of basin analysis (X-rays and multispectral imaging techniques). Several experiments were carried out to understand the reproducibility of stamping techniques (models and impressions).

Methodology

The project favored an interdisciplinary, technical-material and historical approach to these basins.

A precise protocol for describing the objects in the corpus was established, by selecting a series of morphological, technical, metric and ornamental criteria. Each of these criteria provided a precise idea of the technical conditions, the skills required, and the know-how used for the manufacture of these basins. Three additional methods helped to deepen the hypotheses of the manufacture of these objects: a 2D+ multispectral imaging technique, casting tests to understand the stamping techniques and X-rays to understand the shaping techniques.

To complete the technical and material information, more than a thousand analyses of the composition of the alloys were carried out using a portable X-ray fluorescence device. These non-invasive and non-destructive surface analyses helped to clarify the nature of the alloys (range), and the choices made during the manufacture of the alloys (practices linked to economic, technical or legislative constraints).

Several surveys were carried out in the archives not only to trace the history of the collecting of these objects, but also to highlight their use and perception by the society in the late Middle Ages and early modern period. This recontextualization was accompanied by surveys selecting a wide range of images (336) and the highlighting of some archaeological discoveries (4).

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Results and recommendations

The project gathered an unprecedented corpus of 833 objects (769 basins and 64 dishes), from sixteen European museum collections, among the most important in the world. The majority of these objects had never been studied before. The description protocol made it possible to initially identify two different types of basin productions – one German and the other from the activity of the Southern Netherlands' workshops – using different techniques (stamping using dies for the first one and the repoussage technique for the second one). These two productions also differ significantly in terms of the composition of the alloys of the objects. The in-depth study of the corpus contributed to collect more than a thousand analyses carried out by portable X-ray fluorescence. This is to date the largest archaeometrical database available for these objects. The results show the use of very pure brass in both cases, but higher zinc contents are observed for the Southern Netherlands' production.

This protocol also helped to highlight twelve typo-morphological groups with standardized characteristics (for shaping and ornamentation), showing a search for profitability from the workshops. It identified more than a thousand different types of ornaments, corresponding to the use of a very large set of engraved dies, guaranteeing a very wide ornamental variability in a very standardized craft organization, oriented towards international mass export. At this stage, the cross-study of technical, material, historical and experimental data has not allowed to determine with certainty the existence of one or more workshops. However, it has helped to highlight most of the techniques used by the craftsmen, some of the tools and to reconstruct the main stages of the *chaîne opératoire*.

Research conducted in written, iconographic and archaeological sources has contributed to constitute three sub-corpora: 150 documents (inventories, accounts, legal and legislative texts), 336 images and around 10 archaeological excavations.

The interpretation of historical data suggests that these objects played a preponderant role in the late medieval and early modern society, due to their ubiquity and their presence in a very wide range of uses, both in a domestic (body hygiene and lighting) and religious contexts (ritual and paraliturgical practices, baptism). The versatility of these objects largely explains their success with consumers.

The project was able to rely on the cross-referencing of these different sources to bring out new research hypotheses, renewed and an in-depth knowledge of these basins. The interdisciplinary nature of the project also provided enriching perspectives, in terms of museum, academic and scientific collaborations for the study of similar copper alloy objects and the creation of an effective network, dedicated to the analysis of copper metallurgy at the end of the Middle Ages and in the Early Modern period.