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Glass and Alchemy in Oberstockstall

A Material Culture Approach

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Abstract

The chemical analysis of an assemblage of glass fragments from the laboratory of Oberstockstall (Lower Austria) revealed the supply pattern of glass apparatus. Expensive glass of high technical quality was reserved for distillation vessels, while non-specialised containers were made of a cheaper local glass. Besides completing our knowledge of the laboratory apparatus, the results also speak in favour of the importance of archaeology and material culture as a source of information in the history of science.

Keywords: Glass, distillation, Oberstockstall, alchemy, material culture

Zusammenfassung

Die chemische Analyse einer Reihe von Glasfragmenten aus dem Labor von Oberstockstall (Niederösterreich) hat neue Erkenntnisse bezüglich der Angebots- und Nachfragemuster von Glasgefäßen geliefert: Teures Glas von hoher handwerklicher Qualität wurde in der Zeit, in der das Labor genutzt wurde, ausschließlich für Destillationsgefäße verwendet, während für nicht-spezialisierte Behälter billigeres lokal hergestelltes Glas verwendet wurde. Abgesehen vom Wissenszugewinn in Bezug auf konkrete alchemistische Laborgeräte und deren Nutzungsgeschichte zeigen die Ergebnisse abermals die zentrale Bedeutung der archäologischen und *material culture* Ansätze als Informationsquellen für die Wissenschaftsgeschichte.

Schlagwörter: Glas, Destillation, Oberstockstall, Alchemie, Materialität

Until rather recently glass, as a material of interest to alchemists throughout the centuries, has been given surprisingly little room in the history of science.[1] And yet, this substance has fascinated and even baffled natural philosophers and alchemical practitioners. What even is glass? According to Vannoccio Biringuccio (1480–1539) glass is "one of the effects and peculiar fruits of the art of fire", simultaneously a stone, a metal, and a mineral.[2] It can take virtually any shape and any colour, which makes it a quintessentially alchemical product, a transmutation of humble materials (sand and alkali salts mainly) into something beautiful and precious. But the presence of glass in the history of alchemy does not stop with its "philosophical" value. Indeed, glass was also the very material of which some key instruments were made, like the many types of distillation vessels that populated alchemical spaces both physical and imagined.

As it happens, there are times when we get lucky enough that remains of laboratory apparatus survive in the archaeological record and become available for us to study. This "archaeology of alchemy"[3] is a young discipline, but it has already shown the valuable information potential that material culture holds in contributing to historiographic narratives on the history of science.[4] Materials tell us about the practical dimension of alchemy and complement the mostly text-based knowledge we can rely upon. This is certainly the case with the 16th-century laboratory of Oberstockstall in today's Lower Austria (fig. 32).[5] The recovery of a vast assemblage of ceramic and glass vessels, as well as various other tools, makes Oberstockstall one of the most comprehensive collections of early modern alchemical apparatus (fig. 33).

Thanks to a series of scientific analyses performed on the ceramic crucibles and the residues within them, we know that the laboratory was specialised in the assay of gold and silver minerals from nearby mines by means of high-temperature processes.[6] We also know that the alchemists only used high-quality crucibles manufactured in Germany and famous for their resistance.[7]

But what about the glass equipment? Where did the alchemists source their distillation vessels, so important to make acids for refining purposes? Did they favour specific producers? If so, why? To answer these questions, we collected some fragments belonging to both distillation vessels proper and non-specialised forms such as dishes and bottles.[8] The colour of the glass ranges from completely colourless

1. Beretta 2004, 2009; Dupré 2018; Bycroft and Dupré 2019
2. Smith and Gnudi 2015, 126
3. Martinón-Torres 2012
4. Martinón-Torres and Rehren 2005a; Martinón-Torres et al. 2008; Veronesi et al. 2019; 2021
5. For further information on Oberstockstall see von Osten 1998.
6. Martinón-Torres and Rehren 2005b; Mongiatti et al. 2009
7. Martinón-Torres and Rehren 2009
8. Veronesi and Martinón-Torres 2018

Figure 32.: **The laboratory occupied the sacristy of a church (photo by the author)**

Figure 33.: **Some pieces of apparatus from the laboratory (photo by the author, Alchemistenmuseum, Marktgemeinde Kirchberg am Wagram)**

and clear to blue-green and brown (fig. 34). The fragments were embedded in resin blocks, their cross section exposed and polished to a mirror-like look and analysed with a scanning electron microscope (SEM). In post-Medieval Europe there existed two major glass technologies whose main differences are reflected in their chemical

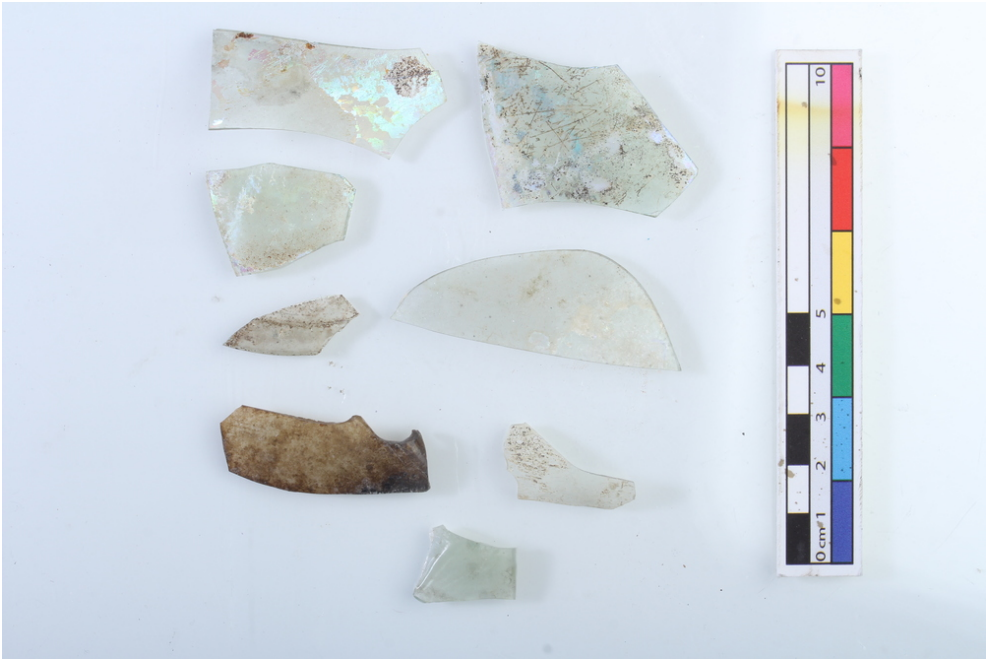

Figure 34.: **Some of the fragments analysed (photo by the author)**

composition.[9] In central and north-western areas glass was traditionally made using the ashes of forest plants, which imparted a potassium-rich composition and a distinct dark green to brown colour resulting from impurities.[10] On the other hand, Venetian and Venetian-style glass was made with ashes of coastal plants, rich in sodium but poor in potassium. Thanks to the careful purification of the ingredients, this glass was also known for its exceptional, crystal-like clarity.[11]

Our analyses on the Oberstockstall assemblage show a clear division – in terms of glass supply – between specialised and non-specialised forms. For the distillation equipment, the alchemists chose vessels of high quality, made either in Venice or in places where Venetian glass was imitated.[12] These had to be imported and were therefore costly. However, it was crucial that the vessels did not shatter as they were gently heated during distillation procedures. Maybe even more importantly, the higher transparency of this glass enabled a better control over what happened within the vessel, when a slight change in colour or texture of the substances being distilled

9. See contributions in Janssens 2013
10. Wedepohl and Simon 2010
11. Verità 2014
12. Janssens et al. 2013

could be important indicators. Instead, when it came to containers which did not require specific characteristics, cheaper items made locally were preferred.

At a very immediate level, this study completes our knowledge on the rationale behind the supply of laboratory equipment at Oberstockstall. Just like with the ceramic crucibles, the technical quality of the apparatus was key to the success of the chemical operations carried out. Despite only scratching the surface of the topic, the results outlined here remind us of the importance of glass in the history of alchemy. Finally, and most importantly, the material culture of alchemical laboratories provides us with important pieces of information regarding what happened within the laboratories and the desires and hopes that fuelled alchemical work in early modern Europe.

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Umberto Veronesi is an archaeologist and heritage scientist based in Lisbon. He is specialised in the study of pre-modern technologies and uses scientific techniques as a way to inform historical research. Umberto received his BA in Archaeology from Sapienza Università di Roma in 2013 before moving to UCL where he completed the MSc in Archaeological Science. He developed a strong interest in ancient glass and glassmaking which brought him to explore the topic and work with glass-related materials spanning both chronologically and geographically. His Ph.D., also at UCL, explored the practice of early modern alchemy through the lenses of the material culture of laboratories. Umberto is currently a research fellow at VICARTE, within the project ChromAz: The chromatic journey of the Portuguese azulejo, where he investigates the colour technology of Portuguese tiles through a mixture of scientific analyses and laboratory replications.

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