



HAL
open science

Crossing Manufacturing and Use-Alteration Traces on Vessels. Contribution to a Functional Typology in Alsace (France) at the Dawn of the Iron Age

Marie Philippe

► **To cite this version:**

Marie Philippe. Crossing Manufacturing and Use-Alteration Traces on Vessels. Contribution to a Functional Typology in Alsace (France) at the Dawn of the Iron Age. Pottery Function and Use: a Diachronic Perspective 2021, Feb 2021, Belgrade, Serbia. pp.87-102. hal-03685510

HAL Id: hal-03685510

<https://hal.science/hal-03685510>

Submitted on 21 Nov 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

University of Belgrade – Faculty of Philosophy | 2022



1838

Institute of Archaeology, Belgrade





**Porter's Function and Use:
A Diachronic Perspective**

*Edited by
Jasna Vuković and Vesna Bikić*

Pottery Function and Use: A Diachronic Perspective
Edited by Jasna Vuković and Vesna Bikić
Belgrade 2022.

Publishers

University of Belgrade – Faculty of Philosophy
Čika Ljubina 18–20, Belgrade 11000, Serbia
www.f.bg.ac.rs

Institute of Archaeology
Knez Mihailova 35, Beograd 11000, Serbia
www.ai.ac.rs

For publishers

Prof. Dr. Danijel Sinani, Dean of the Faculty of Philosophy
Dr. Miomir Korać, Director of the Institute of Archaeology

Reviewers

Staša Babić, full professor,
Faculty of Philosophy, Department of Archaeology, University of Belgrade

Ivan Bugarski, senior research associate,
Institute of Archaeology, Belgrade

Nikos Efstratiou, full professor,
School of History and Archaeology, Aristotle University at Thessaloniki

Thomas Eriksson, PhD, senior curator,
State Historical Museums, Stockholm

Andreja Kudelić, research associate,
Institute of Archaeology, Zagreb

Sabine Ladstätter, Priv.-Doz. Mag. Dr.,
Austrian Archaeological Institute, Vienna

Sebastien Manem, PhD,
Technologies et Ethnologies des Mondes Préhistoriques
CNRS / Université Paris 1 Panthéon-Sorbonne / Université Paris Nanterre

Zrinka Mileusnić, assistant professor,
Faculty of Humanities, University of Primorska, Koper

Ina Miloglav, associate professor,
Faculty of Humanities and Social Sciences, Department of Archaeology, University of Zagreb

Tibor Ákos Rácz, PhD,
Ferenczy Museum Center, Department of Archaeology, Szentendre

Tajana Sekelj Ivančan, scientific advisor,
Institute of Archaeology, Zagreb

Michela Spataro, PhD, scientist,
The British Museum, Department of Scientific Research, London

Selena Vitezović, senior research associate,
Institute of Archaeology, Belgrade

Proofreader

Dave Calcutt

Pre-press

Dosije studio, Belgrade

Printing

Dosije studio, Belgrade

Print run

200 copies

ISBN

978-86-6427-219-3 (FF)

978-86-6439-068-2 (AI)

CONTENTS

- 7 | Preface

INTRODUCTORY CHAPTERS

- 13 | Use activities, wear mechanisms and residues:
the use alterations variability on pottery in light of the latest
research advancements
Vanessa Forte
- 37 | Pottery Function in the Archaeology of the Continental Balkans:
An Overview
Jasna Vuković and Vesna Bikić

ACTUAL USE OF POTS AND CULINARY PRACTICES

- 69 | Pottery Made to be Used: Starčevo Ceramics from the site
of Svinjarička Čuka, Serbia
Clare Burke
- 87 | Crossing Manufacturing and Use-Alteration Traces on Vessels.
Contribution to a Functional Typology in Alsace (France)
at the Dawn of the Iron Age
Marie Philippe
- 103 | In Search of Pottery Function by Context, Techno-Stylistics, and
Use-Wear Patterns: A Case Study of Brikulji Hillfort Pottery
Vanda Visocka
- 133 | Baking Bread in Italy in the Early Middle Ages:
Some Notes on Portable Ovens
Sauro Gelichi
- 143 | Foodways and Pottery Usage in Ottoman Buda
Ágnes Kolláth
- 163 | Pottery Used for Wood Tar Production and Iron Smelting
Found in the Early Medieval Settlement in Grodnia (Poland)
*Mariusz Błoński, Waldemar Andrzej Moszczyński,
and Jolanta Sadowska-Topór*

- 177 | Ceramic Forms Used for Portable Illumination
in the Bulgarian Lands During the 10th – 11th Centuries
Mariya Manolova-Voykova

POTTERY USE AND TECHNOLOGY, PRODUCTION, AND
MORPHO-METRIC DATA

- 189 | Does One Size Fit All? Inverted-rim Bowls from
the Late Neolithic Sites of Belovode and Pločnik
Marija Sivilar
- 209 | Capacity as Quantitative Data of the Household Activity.
Neolithic Case Studies from the Great Hungarian Plain
András Füzesi
- 263 | Calculating Pottery Usage: The Link between the Capacity
of Vessels and Their Function (Based on the Pottery from
Zlatna Livada, Bulgaria)
Rumyana Koleva

CONTEXTUAL, SPATIAL, AND CHRONOLOGICAL
CONSIDERATIONS AND FUNCTION

- 279 | The Structure of Archaeological and Functional Ceramic
Assemblages of Cucuteni-Tripolye Sites:
Precucuteni, Cucuteni A – Tripolye A, BI Periods
Iliia Palaguta
- 301 | The Ceramic Assemblages of Cucuteni A-B, B – Tripolye BII, CI:
Archaeological and Functional Aspects
Elena Starkova
- 323 | *Olla et Domus*: Interpreting the History of Late Roman Houses
Based on The Study of Pottery and Vice Versa
Platon Petridis
- 337 | Clay Cauldrons in the Southern Parts of the Carpathian Basin
– Facets of Consumption and Use
Miklós Takács

CLOSING CHAPTER

- 351 | Understanding Pottery Function: Consider the Cooking Pot
James M. Skibo
- 363 | Notes on Contributors

PREFACE

International meetings of pottery experts, even though pottery is the most numerous material found during excavations, are surprisingly rare. Except for large conferences, for instance meetings of the European Association of Archaeologists, with the possibility of organizing themed sessions, the existing conferences dedicated exclusively to pottery are focused on a specific field of research, such as archaeometry, or are limited to a specific period. This is why we came up with the idea of establishing an international conference specializing in archaeological pottery, with the main goal of bringing together researchers dealing with different periods and geographical areas, and originating from different research traditions. We strongly felt that, for instance, medieval experts share similar research doubts and difficulties as prehistoric archaeologists and that all of us eventually use similar methodologies, ask similar research questions and, consequently, can potentially learn a lot from each other. Therefore, the *BECAP – Belgrade Conference of Archaeological Pottery* was established as a biennial, themed conference, with minutely formulated topics aimed at pottery specialists, regardless of their cultural/chronological preferences.

The first meeting, entitled *Pots in context: Vessels' use, function, and consumption, research strategies, and methodology*, was planned for May 2020. We wish to express our gratitude to our colleagues, the members of the Scientific Committee of the Conference, who were very enthusiastic about the conference and took an active role in evaluating all the submitted abstracts. The global outbreak of COVID-19, however, heavily impacted all aspects of life and, as a consequence, challenged scientific practice as well. Like many other conferences, the BECAP meeting was postponed and was held online several months later, in February 2021: 45 participants from 16 countries were presenting, while many researchers from Europe took part in a range of fruitful discussions. Adjusting to the new pandemic situation and the necessity for remote communication, as many fellow archaeologists experienced themselves, however, revealed some positive sides. The BECAP meeting was live-streamed on YouTube, and it turned out that several hundred people watched it live and later via the BECAP channel. We are grateful to all participants and colleagues who served as moderators for the conference, for making it dynamic, interesting and engaging, both for us and the audience.

The present edited volume encompasses some of the papers presented at the meeting held in 2021. It is the first book examining pottery use and function diachronically in this part of the world: different theoretical perspectives and methodological approaches, and several case studies, we believe, enable a more thorough understanding of pottery and raise new questions and research challenges. The book is organized into several sections. The introductory chapters consider the state of research and methods for use-wear analysis, with valuable methodological guidelines, and the importance of the contribution of experimental archaeology (Forte), whilst also presenting an overview of current knowledge related to pottery function in the Balkans (Vuković and Bikić). The first section of the book is dedicated to analyses of actual use of pots, culinary practices, and secondary use. A combination of analyses of vessel morphology/typology and use-alterations, use-modes of Early Neolithic Starčevo, Serbia (Burke), Early Iron Age, France (Philippe) and Late Bronze – Early Iron Age, Latvia (Visocka) pottery were explored. The usage of basin-covers during the Late Antique period and the Early Middle Ages in Italy reveals a long tradition of baking bread in a specific way (Gelichi), while food habits in Ottoman Buda, Hungary, are explored by examining written sources, archaeozoological and macrobotanical evidence and pottery analyses (Kollath). Ceramic containers used in the process of iron smelting and tar production in medieval Poland (Błoński et al.), and secondary use of pots for illumination in medieval Bulgaria (Manolova) reveal some of the non-food related activities involving pottery. The relations between technology and production, and pottery use are explored in the second section: morphometric data revealing standardization, and formal attributes combined with the analysis of use-wear traces were used to assess the function of one class of bowls in Late Neolithic Serbia (Svilar). The importance of vessel volumes is also stressed: based on the results of capacity data analysis, the interrelationship between size and function was explored for the medieval assemblage from Bulgaria (Koleva) and, additionally, users' group sizes for the Neolithic assemblages from Grat Hungarian Plain were established (Füzesi). The third section is dedicated to various research related to contextual, spatial, and chronological analyses and function. The notion of functional assemblages and their contents was explored in the cases of Cucuteni-Tripolye sites from the Prut-Dniester interfluvium (Palaguta, Starkova); a methodological contribution focused on analyses of stratigraphy and pottery from Late Antique Greece sites reveals how possible errors in interpretation may emerge if the investigation is conducted only by using a typological approach (Petridis); the analysis of formal properties, chronology, and establishing regional groups of medieval cauldrons of the

Great Plain of the Carpathian Basin are presented (Takács). Finally, prof. Skibo reconsiders the significance of the “ugly” cooking-pot as an innovation, and reexamines the reasons of devaluing such important technology in archaeology.

We would like to thank all the contributors for their interesting articles, for their patience during the review process, and for fulfilling our, the editors’, very demanding requests. We would also like to thank the reviewers, who promptly and meticulously read the papers and offered their suggestions. Our gratitude is extended to our institutions, the Faculty of Philosophy, University of Belgrade, and the Institute of Archaeology, for supporting us, and enabling funding for this book. Finally, we would like to express our special thanks and appreciation to Professor James Skibo for his support and promotion of the BECAP conference.

Jasna Vuković and Vesna Bikić

CROSSING MANUFACTURING AND USE-ALTERATION TRACES ON VESSELS. CONTRIBUTION TO A FUNCTIONAL TYPOLOGY IN ALSACE (FRANCE) AT THE DAWN OF THE IRON AGE

Marie Philippe

Most of the time, pottery studies focus on dating and relationships between settlements. In this way, they overlook two crucial questions related to understanding the objects and their context: how were the ceramics made? What were they used for? Although these aspects are partially linked, this paper concentrates on the second question.

In Ittenheim, more than 1,700 broken vessels were discovered in just two pits (Vergnaud 2021). This is a huge quantity of sherds for a very small frame of time and space. This offers the chance to observe a strong recurrence in the artifacts without any spatial or chronological distortion. It gives the opportunity to question an aspect that is inextricably bound up with the activities based at the site: pottery function and use. How did people cook and eat in the past? What were their behaviors for heating, serving or storing food? Did potters adapt their *chaînes opératoires* to these needs? These aspects have rarely been questioned in French protohistory. The research about ceramics is dynamic in Alsace, but the functional approach remains rare. It is mostly an English-speaking topic. However, some isolated works have already mentioned a relationship between pottery morphology, technology and decoration (Philippe 2018; 2021). They suggest that potters adapted their behaviors to functional needs. However, the actual use of the ceramics has never been studied in these works. Yet, the theoretical intended function and the actual use of a vessel can be different. The aim of this paper is to compare them for the first time in Alsace, using the huge and homogeneous corpus of vessels from Ittenheim.

A short methodological review introduces first the difference between intended function and actual use. The uncommon discovery of It-

tenheim is then described. Actually, considering the collection of vessels allows the chance for this study, the settlement is very poorly preserved. A third paragraph details the method used to build a specific functional typology. Five well-defined types are then described. The distinguishing features include morphology, technology and decoration. The membership to a general functional category is then discussed for each of these types and, finally, the use-alteration traces are detailed, in order to approach the actual use of the vessels. A discussion follows, comparing the approaches to verify if the intended function corresponds to the actual use of the vessels, and to deduce some cooking and eating behaviors of a past society.

Inferring function and use: a short methodological review

A key notion is the difference between the *function* and *use* of a vessel. The first term refers to the intended purpose of the potter while making the vessel; the second term refers to the actual use of the pottery by the owner (Rice 1990; 1996). In this sense, the concept of function suggests that potters could adapt some performance criteria to meet some needs, which could be utilitarian as well as symbolic (see Santacreu 2014, 147). The actual use of a vessel often corresponds to the intended function, but this is not always the case. Moreover, one vessel can be used for different tasks, and be reused during its lifetime (see Orton et Hughes 2013, 258–59; Vuković 2015). For example, a plate could be used either to serve some food or to cover another container; a pot with a crack, which cannot contain liquids anymore, could hold some dry food.

The identification of function can especially be undertaken through a typological approach and an analysis of the physical properties of pottery. According to Rice, the form is of primary importance because it is related to four major use-related properties: capacity, stability, accessibility of contents and transportability (Rice 1987, 225–26). Basing her work on ethnographic studies (Howard 1981; Henrickson and McDonald 1983; Smith 1985), she suggests five main functional categories: storage, cooking, food preparation without heat, serving and transport (Rice 1987, 236–242). She also emphasizes the importance of pottery characteristics depending on technical choices made during the manufacturing process. Following this idea, an experimental approach was developed in the 1980s that tested physicochemical properties of the materials (see Skibo 2013 chapter 2). It demonstrated especially that paste composition affects thermal shock resistance, cooling effectiveness, portability, impact and abrasion resistance

(Bronitsky and Hamer 1986; Feathers 1989; Skibo and Schiffer 1987; Skibo et al. 1989; Tite et al. 2001; Müller et al. 2010). Surface treatments also influence permeability, heating and evaporative cooling effectiveness, thermal shock and abrasion resistance (Schiffer 1988; 1990; Schiffer et al. 1994; Skibo et al. 1997). However, one should not forget that a variety of factors (social or environmental for example) also determine the manufacturing process and the use of vessels (see Santacreu 2014, 146–51 and 185–93).

The identification of the actual use can be inferred by analyzing soot-ing and attrition macro-traces. Experimental works (for example Forte et al. 2018) and ethnographic analysis (as Arthur 2002) produce reference documents to help understand the link between traces and use. Skibo, especially, used his observations among the Kalinga to correlate carbonization patterns and soot patches to the temperature of fire, distance from fire and mode of cooking (Skibo 2013 chapter 3). He also demonstrates how abrasive and non-abrasive processes can remove or deform ceramic surfaces during cooking, cleaning and storing (Skibo 2013 chapter 4). In the end, organic residue analysis is another approach to determining the actual use of vessels (Heron and Evershed 1993). Some compounds, such as lipids, wax, resin, sugars, etc., stuck to or absorbed into the clay, can be recognized even if degraded. This kind of analysis has not been applied for this paper.

A case study: Ittenheim

In 2018, two pits from the Early Iron Age were excavated in Ittenheim *Eselacker*, in eastern France, during the preliminary works of the highway “Contournement Ouest de Strasbourg” (Vergnaud 2021). They were about twenty meters apart.

The biggest one (structure 106) appeared as an irregular dark surface, measuring about 10 by 5 meters. It was actually a concentration of 16 hollows intersecting each other. This poly-lobed pit had been created to extract some earth (loess), probably to construct houses. Shortly after, the depression was filled with two thick and silty layers including a small quantity of rubbish. Then, three hollows were dug inside this silty filling in which to dispose of a large quantity of ceramics, charcoal and fragments of burnt earth.

The second poly-lobed pit (structure 132) was about 6 by 4 meters in dimension. First, a deep hollow was dug to extract some loess, which was then filled with silt and rubbish. Then, another hollow was dug nearby. It intersected the first one but was also probably made to extract some earth, before being filled with a silty layer.

These two complex pits contained 250 kg of sherds. The typical rounded shapes, impressed decorations, slips made of iron oxides and graphite related the ceramics to the Hallstatt C (Adam et al. 2011). In this period, Alsace was a part of the *Westhallstattkreis* (see Müller-Scheessel 2000). The ceramics are very similar to those found in the surrounding regions: Lorraine, Baden-Württemberg, Switzerland, Franche-Comté and Burgundy (Adam et al. 2011, 135–36).

The excavation in Ittenheim also revealed occupations dating back to the Neolithic and Early and Middle Bronze Age. The poly-lobed pits 106 and 132 are the only remains of the Early Iron Age period. The related dwellings should be nearby, but they have likely been destroyed by the highway. The large quantity of sherds suggests a vast settlement, as the numerous remains cannot be those of a pottery workshop. Use-alteration traces indicate that the vessels have been used, and the purpose of this paper is to understand in what way.

Material and method of analysis

The two pits contained at least 1,747 broken vessels. This estimated quantity is based on separate rims (method described in: Arcelin et al. 1998). A specific typology was created in order to explore the intended function of the vessels. Concurrently, use-alteration traces were recorded to assess the use of these types.

The classification was based on several descriptors. Shape and dimensions have an impact on capacity, stability, accessibility and transportability (Rice 1987, 224–26). Geometric profiles were compared using segmentation points and the ratio of height to orifice diameter (following Balfet et al. 1989; Adam et al. 2011). The average thickness of the walls was also taken into account. The size of the inclusions of the paste has an impact on ceramic strength (Bronitsky et Hamer 1986; Feathers 1989). As the size of inclusions can be very different in the same sherd, we observed their sorting (as in Quinn 2013 fig. 4.15): for example, well sorted inclusions are all very small, whereas poorly sorted inclusions combine small and large elements. We referred to several experimental and ethnographic reference works to interpret the technique of surface treatment (especially Rye 1981, 89–90; Balfet et al. 1989, 77–81; Martineau 2010). This has an impact on permeability, heating effectiveness and abrasion resistance (Schiffer 1988; 1990; Schiffer et al. 1994; Skibo et al. 1997). Finally, decoration was also taken into account.

Several steps were necessary for the construction of the typology:

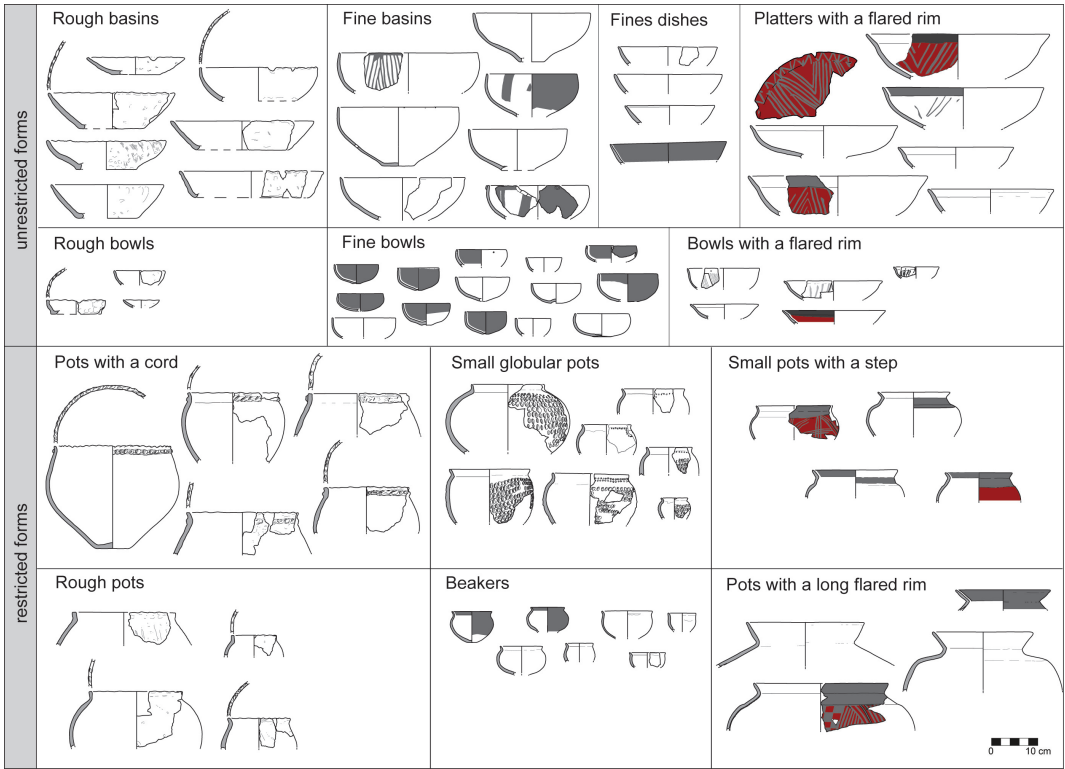


Figure 1. The 13 types of vessels from Ittenheim

- Training: 300 vessels were drawn and described in a database. This information was the basis on which to create the classification.
- Test: 171 vessels were classed *before* being drawn and described in the database. After some adjustments, 10 types were thus well-defined.
- Validation: 1,276 vessels were classed among the 10 types. The outliers were put aside and classed afterwards. Hybrids were classed into their closest type. Three new types were then created to include the others. These categories were less homogeneous and plentiful, but necessary in order to question the diversity of the vessels.

In the end, 1,285 vessels were classed into 13 types (fig. 1) and 462 rims were “undefined” due to fragmentation. Five well-defined types are presented below. The functional categories are discussed further, referring especially to the works of Rice and Skibo (Rice 1987, chapter 7; Skibo 2013, chapter 2). Finally, use-alteration traces were observed with the naked eye and with a binocular loupe, and interpreted following Skibo (Skibo 2013 chapters 3 and 4).

Five well-defined types

Only 13 types were necessary to class 1,285 vessels. This reveals a relatively low diversity of ceramics. Even if they were not standardized during this period, some of them could be very similar in their physical properties, suggesting that people produced and used well-defined functional types. Five types represent 56 % of the classed vessels: fine basins, fine bowls, pots with a cord, small globular pots and pots with a long flared rim.

Fine basins (n=354) are unrestricted forms. Their size is medium. The orifice diameter is 25 cm on average (with a standard deviation of 4.4). The rim is more or less vertical. The thickness of the walls is 6.5 mm on average. Fine basins are made of fine clay, with well and moderately sorted inclusions (according to Quinn 2013 fig. 4.15). The inner and outer surfaces are regular and have a luster: they were thus burnished or polished (see Martineau 2010). There is no decoration most of the time.

Fine bowls (n=122) are unrestricted forms. They are very small, with an average orifice diameter of 11.4 cm (with a standard deviation of 1.6 cm). The rim is more or less vertical. The walls are very thin, about 4.5 mm on average. They are thus very light. Fine bowls are made of fine clay, with well and moderately sorted inclusions. A graphite coating is frequent on the inner and outer surface.

Pots with a cord (n=145) are restricted forms. They have an ovoid shape with a short and more or less flared rim. The volume is quite large, with an average orifice diameter of 24.4 cm (standard deviation of 5.4). The walls are very thick, about 8.4 mm on average. The inclusions of the clay (especially grog) are poorly to very poorly sorted (according to Quinn 2013 fig. 4.15). The inner and outer surfaces are matte, mostly regular, sometimes with ridges or grit-drag marks. This indicates that they were smoothed or even just scraped (see for example Rye 1981, 86–90; Roux 2016, 214 and 236–37). The lip is punctuated with fingertip marks, and the rim is underlined by a coil, also impressed with a fingertip and applied on the outer surface.

Small globular pots (n=55) are restricted forms. They have a globular body with a short vertical or flared rim and rounded lip. The volume is quite small; the diameter of the orifice is 13.2 cm on average (standard deviation of 3.9). The thickness of the walls is medium, about 6.6 mm on average. The inclusions of the clay are well or moderately sorted. The inner and outer surface of the rim is regular, with a non-uniform luster; this indicates that it was burnished (Rye 1981, 90; Martineau 2010). The rim is also sometimes underlined by a punctuation stamped with a hollow cane on the outer surface. The body is mostly covered by fingertip marks on the outer surface.

Pots with a long flared rim (n=41) are tall restricted forms with large dimensions. The shape of the body could vary, but it is mostly unknown, due to fragmentation. The diameter of the orifice is 23.7 cm on average (standard deviation of 3.2). The walls are thick, about 7.16 mm on average. The clay is fine with well to moderately sorted inclusions. Graphite coatings are frequent on the inner surface of the rim and on the outer surface of the body. The body is also sometimes finely decorated with geometric patterns made with colored slips.

Functional categories

Looking at the characteristics of each type, one can relate them to a theoretical functional category. According to the sourcebook written by Prudence M. Rice, cooking vessels are likely to have rounded shapes, relatively thin walls, coarse clay and a roughened surface (Rice 1987, 237–38). Pots with a cord and small globular pots have, indeed, globular shapes. The surfaces of the body are quite irregular, neither burnished nor polished. Moreover, small globular pots have a roughened wall covered by fingertip marks. A permeable interior surface and/or an exterior textured surface increases thermal shock resistance (Schiffer *et al.* 1994; Skibo 2013, 49). Permeability also reduces heating effectiveness (Schiffer 1990; Skibo 2013, 50), but a small orifice increases it (Skibo 2013, 36). The orifice of a small globular pot is indeed very small. In addition, pots with a cord are made of coarse clay, which increases thermal shock resistance (Skibo 2013, 40). The decorative cord is reminiscent of the rattan pot carriers used by the Kalinga to handle hot pots (Skibo 2013 fig. 2.3). All these characteristics could indicate cooking vessels in theory, as they are ideal for thermal resistance.

The characteristics of the pots with a long flared rim are very different from the previous categories. The large dimensions and the thickness of the walls result in a low transportability. In addition, the fine colored decoration of these vessels suggests that they were handled or placed so that they could be seen (Tsirtsoni 2001, 4). This decoration would probably have been altered if placed regularly on an open fire. Another intended function should be supposed, such as storage for example.

Unlike the pots with a flared rim, fine bowls and basins have very good portability. They are unrestricted forms, which could be useful to prepare (without heat) or to serve food (Rice 1987, 240). The surface treatments reduce permeability and enhance abrasion resistance (Skibo, Butts, et Schiffer 1997). They could thus be used to prepare or serve liquid preparations for example, for a group (basin) or an individual (bowl).

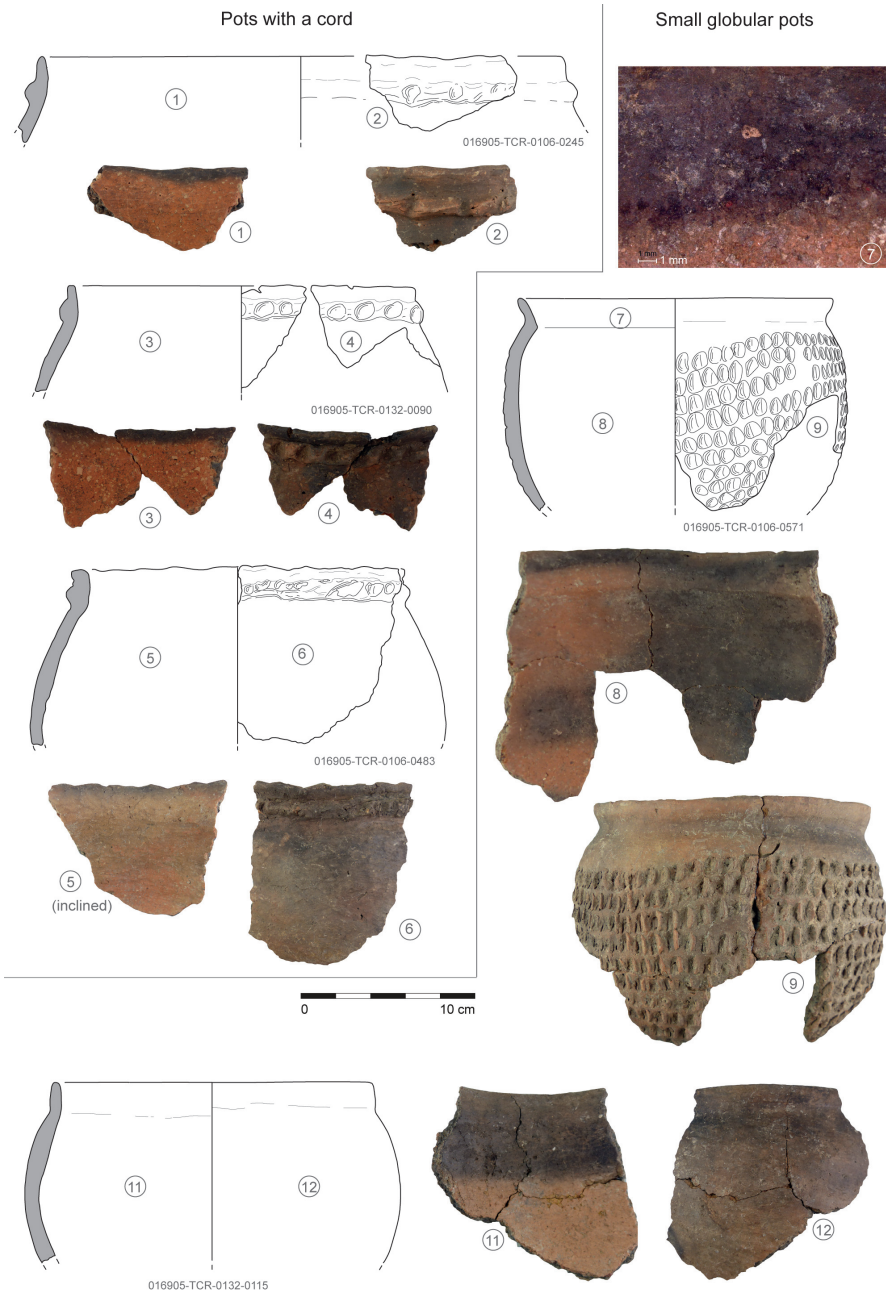


Figure 2. Examples of pots with a cord and small globular pots from Ittenheim. The firing coloration is heterogeneous on the outer surface, and there is a horizontal coloration limit on the inner surface

However, if the properties of a vessel were ideal for a functional category, it does not mean that it was actually used in this way.

Use-alteration traces¹

For each type, specific kinds of traces appear regularly. This suggests that several vessels among one type were actually used in the same way.

Pots with a cord and small globular pots have a specific firing coloration and carbonization pattern (fig. 2). The color is heterogeneous on the outer surface, and at least 14 vessels show a horizontal coloration limit on the inner side. The limit is a black glossy strip, which occurs on the upper body and/or on the rim. The upper surface is dark, the lower surface is red or orange. This coloration could not have resulted from the firing of the pot, as the reddish surface would be closer to the orifice (where the oxygen is) and the black one to the bottom. One can suppose that these pots were used to cook some food in a liquid. The lower red coloration would thus be the original color of the pot, preserved by the liquid. Above this line, fats and food particles carbonized on the hot clay, as observed on contemporary Kalinga cooking pots (Skibo 2013, 85–86) and experimental vessels (Forte *et al.* 2018, 130).

Pots with a long flared rim do not have this carbonization pattern. However, on 20 containers, the inner surface of the body is pitted, has spalled or has sometimes entirely eroded (fig. 3). This attrition patch can be a result of fermentation, as observed in contemporary Ethiopia for example (Arthur 2002, 347–50). Gases formed in the fermenting liquid penetrate into the walls of the ceramics and break their surface (Skibo 2013, 152–53). In eastern France, early Iron Age tall restricted forms sometimes show this kind of pitting on the inner surface of the body, and it is related to the hypothesis of wine production and consumption (Saurel 2017, 390–92). An interesting comparison exists in Vix-Mont Lassois, a Hallstatt D2-La Tène A hillfort located about 300 km to the south-west of Ittenheim. A tall restricted vessel, also decorated with fine geometric painted patterns, has pitting and corrosion on the upper internal wall. Organic residue analysis confirms that this vessel was probably used to prepare fermented beverages (Rageot *et al.* 2019).

Fine bowls and basins have neither carbonization nor pitting. However, the lip is often abraded, at least 28 times (fig. 4). A thin layer of clay is worn away on the top and the exterior side of the lip, and sometimes also on the interior. This kind of wear is usually related to the use of a lid

1 The amounts presented below should be considered as the minimal number of occurrences for each kind of use-alteration traces.

Pots with a long flared rim

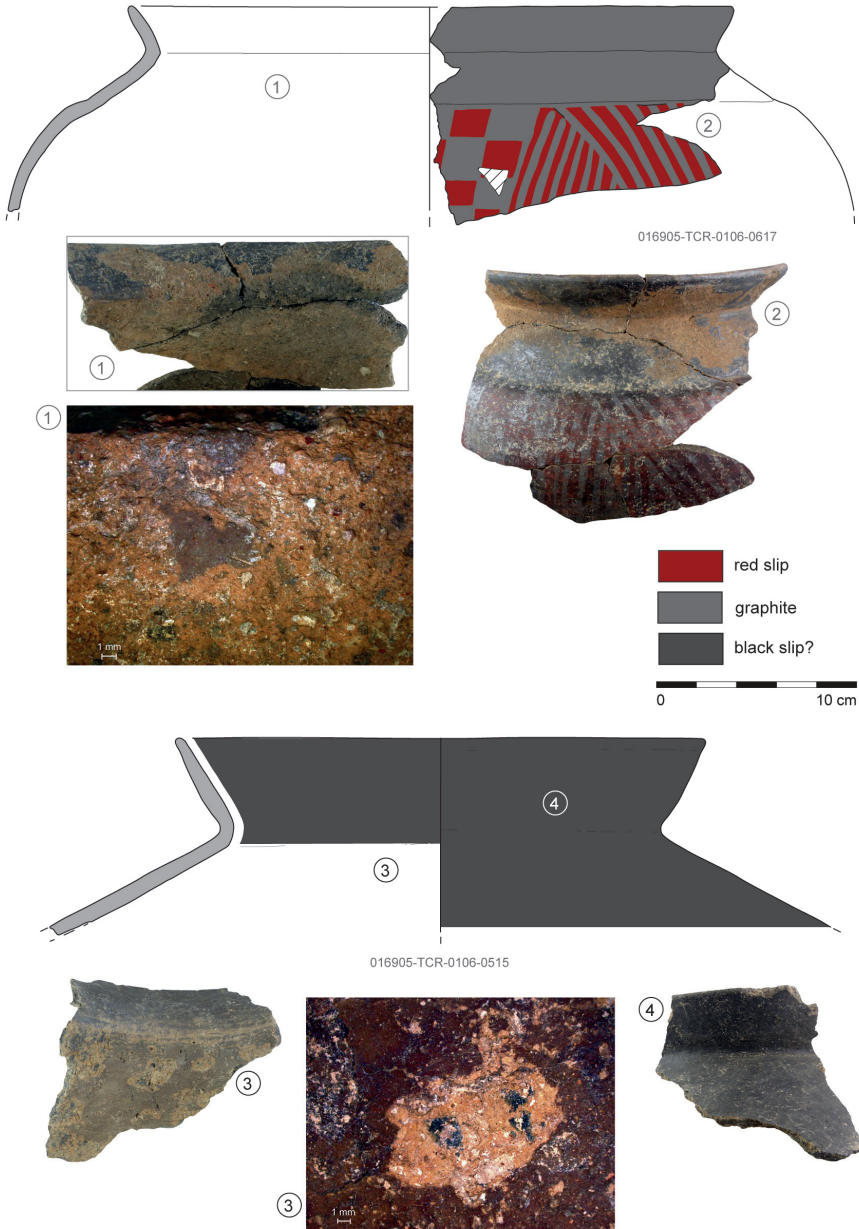


Figure 3. Examples of pots with a long flared rim. The inner surface of the body has spalled



Figure 4. Examples of fine bowls and fine basins. The lips are abraded, and the outer surface has vertical and horizontal striation

made with a hard material (Vuković 2010, 17–18; Gijn van 2020, 79; Gijn van et Verbaas 2020, 140–41). In this case, the vessel could be the lid itself. However, the fringes of the base are also abraded on two bowls and one basin (where preserved); this indicates that they were also used to contain something. Seven vessels also have vertical and sometimes horizontal striation on the outer surface, especially where the diameter is the largest (fig. 4). Perpendicular scratches on this specific location are related to stacking vessels on top of each other (Saurel 2017, 338–39; Gijn van 2020, 91–92). Finally, one basin (016905-TCR-0132-0042) is also abraded on the lower interior surface. The scratches are short, gathered, and slanting. Near the bottom, a superficial layer of clay has been removed. This could result from stirring the content with an utensil, or washing the vessel (Saurel 2017, 338; Gijn van 2020, 81–84). Fine basins and bowls were thus probably often handled, to prepare, store, drink and/or eat small quantities of food, but the scratches can also result from washing and storing the vessels (see Skibo 2013 chapter 4).

Results and discussion

The functional typology of Ittenheim considers several facets of ceramics: composition of the clay, surface treatments, shape, decoration and dimensions. The huge number of vessels enables an observation of regularities, resulting in the recognition of several types. Following Rice (1987) and Skibo (2013), the types are related to a theoretical functional category. Pots with a cord and small globular pots are likely to be cooking pots, whereas pots with a long flared rim could rather have been used for storage. Fine unrestricted forms were probably intended to prepare and serve food, for a group (basin) or an individual (bowl).

Use-alteration traces were not used either to define the types or to sort the sherds. However, each kind of trace occurs preferentially on ceramics belonging to one or two types inside a functional category. Pots with a cord and small globular pots share a typical coloration and carbonization pattern. This confirms their use as cooking vessels. Pitting inside pots with a long flared rim suggests that they were used to prepare fermented beverages. We previously supposed that these big and fine pots were intended for storage. This should also be considered, but storage leaves few traces visible to the naked eye. Finally, abrasion of fine vessels indicates that they were often handled, probably to prepare, store, drink and/or eat, and also maybe to be washed and/or stored. Bowls and basins thus correspond with the serving category.

The recurrent correlation between use-alteration traces and types reveals the functional significance of the typology built for Ittenheim. It can be considered an external validation of the typology (see for example Legendre et Legendre 1998, 379–80). It shows especially that the intended function corresponds most of the time to the actual use in this context. However, this observation needs to be put into perspective. First of all, recurrent use-alteration traces have been well recognized on five types only. Sometimes, they are common between two types of vessels: for example, the same kind of abrasion is observed on fine bowls and basins. This indicates that the correlation is not complete: two types of vessels can share a similar use.

A rarity of use-alteration traces can also be informative, as in the case of platters with a flared rim (see fig. 1; n=71). The portability is very low, the wide orifice offers easy access to grasp the contents and to admire the colored decoration of the internal surface. The use-alteration traces are very scarce and, thus, these platters do not seem to have been frequently handled, heated, or washed. They could have been used to display some dry food for example, like fruits or breads.

In some cases, the intended function and actual use do not correlate. This is especially the case when vessels have been perforated after firing to become filters. Six restricted and unrestricted forms were recycled in this way (fig. 5 below). The internal surface, holes, and external surface of the base is covered with a white deposit, which reveals that they could have been lime filters (Saurel 2017, 402–15) or cheese strainers². Another filter was perforated before firing and has the same white deposit inside and below (fig. 5 above). In this case, one can suppose that the intended function correspond with the actual use.

These few clues are indicative of behaviors related to daily food processing. Food was heated in liquid form in pots with a cord and small globular pots. This reveals the consumption of boiled food. Fermented beverages were also drunk, as revealed by the pots with a long flared rim. Small bowls suggest that there could have been an individual serving of food and/or beverages. Platters with a flared rim could have been used to display some dry food, like fruits or breads. This suggests that some food could also have been shared by several people, using one vessel. Residue analysis could confirm and clarify these first hypotheses.

2 According to recent chemical analysis: M. Landolt, A. Charrié, F. Fleischer. 2021, unpublished. « *Les entonnoirs en céramique du Hallstatt final /La Tène ancienne et la production de fromage* ». Poster presentation at the 45th International Colloquium of the AFEAF

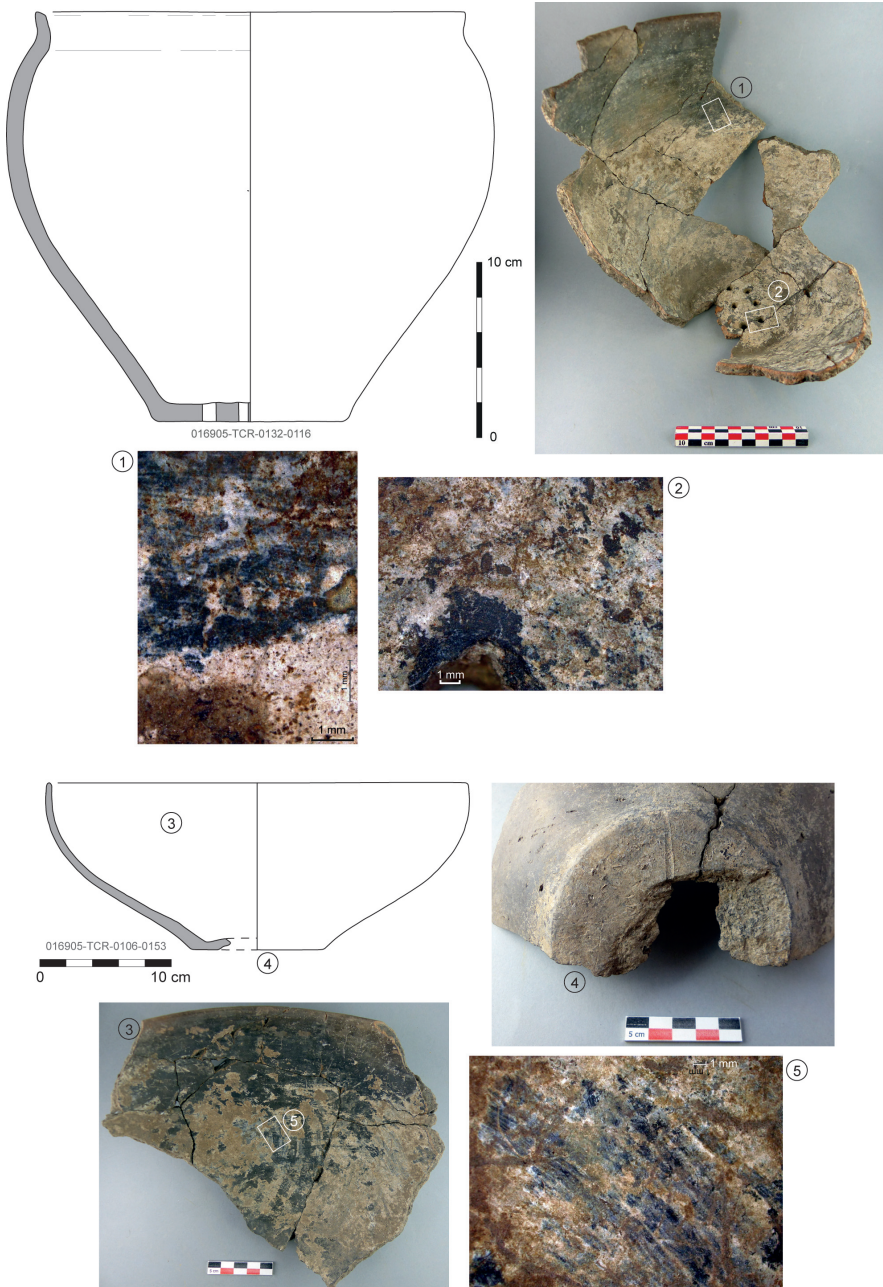


Figure 5. Examples of different forms covered with white deposits. They could be lime filters or cheese strainers

All of the main functional categories do not appear in the vessels of Ittenheim, and some questions remain unanswered. For example, storage vessels, water jars or vessels for transport have not been recognized in the settlement. Either they were not useful or evidence is missing, or finally they could have been made from another, degradable, material (wicker, wood, skin...). For example, a fragment of burnt earth showing the mark of a piece of basketwork reveals the existence of baskets coated with (un-fired) clay on a neighboring and contemporary site (Goepfert 2021, 356–58). Ethnographical studies show that these kinds of containers are likely to have been used to store and transport food, as clay regulates the inside temperature and oxygen and prevents small items such as grains or berries from falling through the holes in the basket (Chazelles et Leal 2018).

In conclusion, the vessels from Ittenheim are ideal for this approach to function as they are numerous and discarded in just two pits, in close proximity to each other. The spatial and chronological context is thus very tight. However, similar ceramics with the same shape and decoration have been discovered in the surroundings. One can suppose that they also share the same technical features and use-alteration traces, something that should be verified in the future. With this in mind, the typology of Ittenheim could help to explain pottery production and function, and thus dietary behaviors, in an extended context.

References

- Adam, Anne-Marie, Sylvie Deffressigne, et Marie-Pierre Koenig. 2011. La céramique d'habitat du Bronze final IIIb à La Tène A en Alsace et en Lorraine essai de typo-chronologie. *Revue archéologique de l'Est Supplément* 29. Dijon: Société archéologique de l'Est. <http://www.sudoc.fr/154045489>.
- Arcelin, Patrice, Jacqueline Balensi, Yvan Barat, Philippe Bet, Jean Chausserie-Laprée, Armand Desbat, Bruno Dufay. 1998. "Protocole de quantification des céramiques". In *La quantification des céramiques. Conditions et protocole. Actes de la table ronde du Centre archéologique européen du Mont Beuvray, Glux-en-Glenne, 7–9 avril 1998*, édité par Patrice Arcelin et Marie Truffeau-Libre, I–XVII. Bibracte 2. Glux-en-Glenne: Centre archéologique européen du Mont-Beuvray.
- Arthur, John W. 2002. Pottery Use-Alteration as an Indicator of socioeconomic Status: an Ethnoarchaeological Study of the Gamo of Ethiopia. *Journal of Archaeological Method and Theory* 9 (4): 331–55.
- Forte, Vanessa, Stella Nunzianta Cesaro, et Laura Medeghini. 2018. Cooking traces on Copper Age pottery from central Italy: An integrated approach comprising use wear analysis, spectroscopic analysis and experimental archaeology. *Journal of Archaeological Science: Reports* 18: 121–38.
- Gijn van, Annelou. 2020. "Studying the life history of vessels. Creating a reference collection for microwear studies of pottery". In *Pots and Practices. An experimental and microwear approach to Early Iron Age vessel biographies*, Sidestone Press, 65–107. BEFIM 3. Leiden.

- Gijn van, Annelou, et Annemieke Verbaas. 2020. "Microwear studies of pottery from the Iron Age site of the Heuneburg (Germany)". In *Pots and practices. An experimental and microwear approach to Early Iron Age vessel biographies*, Sidestone Press, 121–50. BEFIM 3. Leiden.
- Legendre, Pierre, et Louis Legendre. 1998. *Numerical ecology*. Developments in Environmental Modelling 20. Amsterdam: Elsevier Science B.V.
- Martineau, Rémi. 2010. Brunissage, polissage et degrés de séchage. Un référentiel expérimental. *Les Nouvelles de l'Archéologie* 119: 13–19.
- Quinn, Patrick S. 2013. *Ceramic petrography: the interpretation of archaeological pottery & related artefacts in thin section*. Oxford: Archaeopress.
- Rageot, Maxime, Angela Mötsch, Birgit Schorer, David Bardel, Alexandra Winkler, Frederica Sacchetti, Bruno Chaume, Philippe Della Casa, Stephen Buckley, Sara Cafisso, Janine Fries-Knoblach, Dirk Krausse, Thomas Hoppe, Philipp Stockhammer, and Cynthia Spiteri. 2019. New insights into Early Celtic consumption practices: Organic residue analyses of local and imported pottery from Vix-Mont Lassois. *PLoS One* 14 (6).
- Rice, Prudence M. 1987. *Pottery analysis a sourcebook*. Chicago London: The University of Chicago Press. <http://www.sudoc.fr/005305926>.
- Saurel, Marion. 2017. *Le site protohistorique d'Acy-Romance, Ardennes. VI, Le temps et l'usage : étude de céramique en pays rème, vers 400–30 av. J.-C., et hypothèses autour du foyer, des boissons fermentées, de la chaux*. Mémoires de la Société Archéologique Champenoise 22. Reims: Société Archéologique Champenoise.
- Schiffer, Michael B. 1990. The Influence of Surface Treatment on Heating Effectiveness of Ceramic Vessels. *Journal of Archaeological Science* 17: 373–81.
- Schiffer, Michael B., James M. Skibo, Tamara C. Boelke, Mark A. Neupert, et Meredith Aronson. 1994. New Perspectives on Experimental Archaeology: Surface Treatments and Thermal Response of the Clay Cooking Pot. *American Antiquity* 59 (2): 197–217.
- Skibo, James M. 2013. *Understanding Pottery Function*. Manuals in Archaeological Method, Theory and Technique. New York: Springer.
- Skibo, James M., Tamara C. Butts, et Michael Brian Schiffer. 1997. Ceramic Surface Treatment and Abrasion Resistance: An Experimental Study. *Journal of Archaeological Science* 24: 311–17.
- Tsirtsoni, Zoï. 2001. Les poteries du début du Néolithique Récent en Macédoine, II. Les fonctions des récipients. *Bulletin de correspondance hellénique* 125 (1): 1–39.
- Vergnaud, Luc. 2021. *Ittenheim Eselacker. A355-Contournement Ouest de Strasbourg- Site 3.5. Rapport final d'opération d'archéologie préventive*. Habsheim: ANTEA-Archéologie.
- Vukovic, Jasna B. 2010. Neolithic fine pottery: properties, performance and function. *Journal of the Serbian archaeological society* 26: 7–23.