

8 METHODOLOGY OF POTTERY PROCESSING

A number of publications dedicated to typological classification of pottery are focused primarily on defining vessel type. One of the most important such publications is the book by A. Shepard (1985) mentioned above, whose first edition was published in 1956. To this day, it remains the starting point for many archaeologists when they describe their pottery material, and everybody dealing with pottery analysis makes reference to it. When it comes to defining individual vessel shapes, several approaches are possible, and Shepard mentions three of them: *functional, aesthetic and taxonomic*.

FUNCTIONAL ASPECT

The vessel's function has always attracted the interest of researchers, because its purpose can indicate what the customs and activities of a community were like. However, the relationship between shape and use is not always unique. The same shape could be used for various purposes, just as vessels of various shapes were used for the same purpose.

Defining a vessel's function can be approached from two directions, one of which is in the focus of interest of those archaeologists who are involved in analysing the functional component. One approach is based on the vessel's shape as chosen by the potter, with a view to satisfying a particular purpose. For example, a vessel used for cooking had to be resistant to thermal shocks resulting from quick cooling and heating. Furthermore, it had to be big enough and have a wide orifice for putting in and taking out food and it had to have handles or grips to allow its easier lifting from a fire. As discussed in previous chapters, outer-surface treatment with heavy textures such as barbotine, and a polished inner surface, would ensure that the vessel was impermeable and strong (*Fig. 25, p. 74*).

The second approach focuses on the search for traces in the vessel which would uncover its actual use – because, at the simplest level, the primary utilitarian function of the vessel coincided with its contents. Again taking a cooking pot as an example, many traces can be identified and analysed from the external and internal changes on the pot. The vessel's bottom can be oxidized where it was directly exposed to flame, it can present traces of food in the interior or chemical traces of food that were absorbed into the wall (Banning 2000: 179–180). Oxidation discoloration on the outside indicate that the vessel was directly exposed to fire, but such traces can also reveal the position of the vessel in relation to the source of the fire. Furthermore, cooking pots often display traces of soot on their bases, which is a consequence of their exposure to fire, or traces such as remains of food on the inside. However, a lack of oxidation discoloration from a sooted surface is a sign that the vessel was not in direct contact with the fire, but was hanging above it (Hally 1983). This thesis is supported by the pottery hooks mentioned above, used to hang vessels, many of which have been discovered at the Vučedol Culture sites (*Fig. 26, p. 75*).

Pottery is a very satisfying material for analysis because it preserves a number of physical and chemical traces which can indicate its actual use. One of the approaches to the functional analysis includes use-ware and use-alteration analysis. The first works and studies that followed this direction emerged in the 1970s (For an overview, see Vieugué 2014), and they intensified in the 1980s (Hally 1983; Schiffer & Skibo 1989; Skibo 1992).

Traces on pottery can appear in two ways. They can be consequences of mechanical contact between the vessel and the tools used during food preparation (stirring, grinding, scraping), or cleaning or storing of the vessel; such contact causes scratches and various deformities of the vessel. Other traces are caused by chemical reactions in the food contained in the vessel (fermentation, water evaporation, salt crystallization), which enters the vessel's pores and causes flaking (Skibo 1992; 2013; Arthur 2002; 2003). The archaeological literature usually describes them as abrasive and nonabrasive processes. Such processes are largely affected by the properties of the pottery, especially its hardness, porosity, temper (its size, type, quantity, distribution and orientation), the vessel's shape and surface treatment. Thus, polished surfaces are more resistant to abrasion than those that are heavily textured and porous. Organic temper burnt out during firing leaves pores in ceramics and causes high porosity, making such vessels more susceptible to abrasion (Skibo 2013: 120–121). However, we have already seen that organic temper, if large-grained and sparse, will ensure the vessel's resistance to breakage and mechanical impact (Skibo et al. 1989).

Analysis of use-alteration traces on pottery is particularly important because:

- a) it allows a much more precise determination of the vessel's use;
- b) the intended use does not always equal the actual use;
- c) it allows determination of the vessel's secondary use (Skibo & Schiffer 1995).

It is worth mentioning that, when determining a pottery vessel's utilitarian function, all the parameters previously discussed should be considered together, because they could lead to an incorrect conclusion if analysed separately. One of the reasons for this is that a vessel could have been multifunctional, which means that it could have served several purposes, which would not have been unusual. Thus, a vessel used to cook meat or vegetables during the day could be used at night for some ritual or other symbolic activities (Skibo 2013). The traces of those activities can also be identified on pottery. On the other hand, some vessels were used exclusively for a single purpose, and were intended for preparation of only one type of food.

Ethnoarchaeological research on the Kalinga community in the Philippines has shown that rice is cooked in only one type of vessel, while dishes based on meat and vegetables are prepared in vessels of an entirely different type (Skibo 2013). The same is true of milk-cooking vessels, as evidenced by the tradition of the Dalmatian hinterland. There, milk used to be cooked in a special type of bowl with a wide orifice, which was called *lopuža*. It was never put in direct contact with the fire, but hung above the fireplace. After a certain cooking cycle, it would be cleaned by scraping the remains of the encrusted milk from the vessel's inside using a spoon, rather than by washing (Fig. 27, p. 76).

We should also bear in mind that some vessels were used for secondary purposes or recycled. Within the fields of archaeology and anthropology, such studies have evolved into a specialization called *fragmentation*, which has developed intensively over the past few decades (Chapman 2000; Chapman & Gaydarska 2007). Archaeologists often see broken material remains only as the results of accidental processes and unintentional actions (Chapman & Gaydarska 2007). Our perception is limited to the passive role of the object, rather than the active role it played in a society. In this respect, fragmentation as a separate scientific specialization endeavours to widen our knowledge of the object, to perceive it not as an isolated find or sherd, but in its wider context of social relations, ritual activities or symbolic meanings.

Secondary use of vessels is common in today's traditional communities, just as it probably was in prehistoric societies. Once a vessel has been used in its primary function, it can be used

for something else, and thus its uselife can be exploited to the maximum. For example, once a cooking pot loses its water-resistance, it can be used for storing ingredients (Skibo 2013). Given that the uselife of cooking pots is the shortest, ranging from several months up to a year, according to some ethnoarchaeological research (Longacre 1985; Tani & Longacre 1999), most of them had a secondary function before they entered an archaeological context. Pottery recycling has a long traditional record, and, according to ethnoarchaeological investigation, secondary use and recycling can frequently be seen in traditional societies (Hally 1983a; Hayden & Cannon 1983; Deal & Hagstrum 1995; Senior 1995; Deal 1998; Wilson & Rodning 2002; Skibo 2013). On pottery sherds, secondary use can be identified by repair marks, that is, by intentionally-drilled holes in places of breakage. Such holes would be tied together by some kind of organic material which we cannot find in archaeological contexts, due to the nature of the material. Ethnoarchaeological research has shown that these were primarily leather strips or plant twine (Senior 1995: 101). In their secondary function, such vessels could be used for storing and keeping dry foods, such as cereals, seeds and herbs (*Fig. 28, p. 77*).

As discussed previously, one of the 'best-known' recycling methods was crushing broken vessels into grog, to be used as a temper. Other recycling options included turning broken pottery into various tools (scrapers for the processing of pottery and other materials, spoons), loom-weights and weights for nets, which have often been found at prehistoric sites. Recycled pottery sherds have also been found in construction elements, for example in the tiling of pottery kilns (Balen 2005) and ovens (Đuričić 2014; Vuković 2015). Broken vessels were also used as moulds for making new vessels (Rice 1987) and as baking platters (Wilson & Rodning 2002).

Ethnoarchaeological research into ceramic uselife began in the 1960s, when ethnographer G. M. Foster (1960) realised the potential for archaeological interpretation of data contained in ceramics about its uselife. In the early days, the research was based on interviews with potters, but as early as the 1970s, investigations that were methodologically more systematized were carried out, and encompassed the uselife of each vessel in a household, to obtain the mean value of functional classes (David 1972; DeBoer 1974). Nowadays, research on pottery uselife is the subject-matter of many scientific papers and studies, analysed through the vessel's function, frequency of use, mechanical strength etc. (Longacre 1985; Tani & Longacre 1999; Sullivan 2008).

This overview makes it clear that, in order to determine a vessel's function, a range of analyses and comparative studies need to be made:

- a) archaeological context of the find (houses, graves, waste dumps, religious contexts);
- b) the vessel's shape, including its stability, capacity, accessibility, and transportability;
- c) surface treatment (especially important in terms of impermeability and resistance to mechanical damage);
- d) use-alteration and use-wear traces on the vessel (soot, oxidation stains, nonabrasive processes);
- e) organic remains in the vessel's walls (lipids of plant and animal origin);
- f) decoration (the vessel's role in the socio-political life of the community or in a ritual context).

As early as 1956, A. Shepard was the first to point out the importance of analysing metrical values when defining pottery shapes, pointing out that the uses of the vessels can tell us about the activities and customs of the community which used them. Rice (1987: 207) also emphasizes that "morpho-technological characteristics – their attributes of shape and technology – are closely related to their suitability for a particular activity."

Generally, in their everyday roles, vessels were used for food preparation, storage and transport (Rice 1987: 208-210). The technological choices included, among other things, the size and shape of the vessel, to satisfy the requirements posed by its intended use. The orifice diameter was important when choosing the vessel's shape. If the orifice is the same or approximately the same as the maximum diameter of the vessel, it is described as an unrestricted orifice; this category comprises primarily bowls. If the orifice is smaller than the maximum diameter of the vessel, it is a restricted orifice, typical of pots (Rice 1987). Thus, for example, a vessel used for storing liquids will have a restricted orifice to prevent spillage, while a cooking pot will have an unrestricted orifice to allow for easier stirring, putting the ingredients in and taking them out of the vessel.

Hard as it is to specify a vessel's use in prehistory, it is worth noting that all the indicators should be taken into consideration during the final interpretation. It is not enough to analyse just the shape or organic remains in the vessel, because, as discussed above, a vessel could have had several purposes, and it could have had a secondary use. The same is true of studying only traces left on the vessel or any other element. Archaeologists often interpret a pottery function which is based solely on their subjective observations, acquired terms and comparisons with modern, historical and ethnological examples.

It is very important to see the vessel's function as a complex parameter, which is not as legible as it might seem at first sight. What matters is that we approach the interpretation cautiously, taking into consideration all relevant and available analyses that we have carried out: the archaeological context of the find, archaeometric studies, use-alteration traces, organic remains, the vessel's morphology and other evidence of human activity in the same environment.

AESTHETIC ASPECT

The aesthetic component regards the vessel's shape and its proportions, while an analysis of its stylistic features can help us determine its social, economic, religious and artistic components, as well as its relative dating.

TAXONOMIC ASPECT

The taxonomic component regards proportions, or measurements, recorded for descriptive purposes. This leads to the development of classification and terminology relevant to specific shapes, such as bowl, jug, plate etc. (Shepard 1985: 224–225). Taxonomy can be used to classify nearly everything, and in archaeology the term is used to indicate a classification system with a hierarchical structure: that is, a system in which basic types are either clustered into larger groups or split into smaller ones, or both (Adams & Adams 1991: 202). Pottery analysis often begins and ends with taxonomical data designed to organize a large quantity of archaeological material and allow its comparison with other published finds. Type-variety analysis is one of the dominant taxonomic techniques (Neff 1993: 24–25).

With a view to avoiding the creation of distorted data groups during pottery analysis, one possible approach is to identify shapes on the basis of geometric parameters. The credit for ge-

² <http://hjp.novi-liber.hr/index.php?show=search>

neral acceptance of this approach goes to A. Shepard, who champions the geometric criterion in pottery analysis and classification, because our perception focuses directly on the proportion and contours – that is, silhouette – of the vessel. Such an approach has been employed in the majority of literature dedicated to studying pottery types, and it has also been used in classifying the excavated pottery presented in the second part of this book. Proportions are easily calculated, while contours are slightly more difficult, and they have been approached in two ways: by analysing the general characteristics of the contour, and by comparing the shapes to geometric bodies. The basic concept of the analysis of vessel contour, introduced by Birkhoff in 1933 (Shepard 1985: 226), is useful in drawing vessel forms and in their classification and description. Birkhoff considered the point of the vessel's contour on which the eye rests. There are four types of these characteristic points:

1. *end points of the curve at the base and lip* (EP) – these are the extreme points at the vessel's orifice and base (*Fig. 29, p. 80*)
2. *points of vertical tangency* (VT) – there are two kinds of tangent point: the outer point of vertical tangent (OPVT), which determines the maximum diameter of a globular shape, and the inner point of vertical tangent (IPVT), which determines the minimum diameter of vessels of hyperbolic shape (*Fig. 30, p. 80*)
3. *inflection points* – these are points where the curvature changes from concave to convex or vice versa (IP). Shapes containing points of inflection are mostly S-profiled shapes (*Fig. 31, p. 81*).
4. *corner points* – these are points where the direction of the tangent changes abruptly, resulting in a sharp change in contour (CP). In pottery, corner points are typical of vessels with biconical profiles (*Fig. 32, p. 81*).

Using characteristic points, we can easily calculate the vessel's dimensions and determine the contour type and the degree of its representation. Each of the points specifies a main shape class (Horvat 1999: 58). On the basis of characteristic contours, we can specify parts of a vessel, and thus the primary elements of a vessel can be described using the vessel's characteristic contours (*Fig. 33, p. 82*).

The geometric approach is based on similarity between certain vessel types and geometric bodies. Thus, we distinguish between spherical, cylindrical, elliptical and hyperbolic shapes, which can be divided further into simple, complex, composite and inflected vessel shapes (Shepard 1985; Horvat 1999: 74–79). Simple forms can have walls that are straight or curved, and their contours are characterized by a lack of inflection points or corner points. Vessels that have composite contours feature a corner point. Inflected forms are those with just one inflection point, while complex contours feature two or more inflection points or corner points (Horvat 1999: 190). In the pottery classification that is used in the Croatian archaeological literature, 'simple' shapes include conical and curved shapes, 'composite' refers to those with biconical profiles, and 'inflected' are those with S-profiles, while 'complex' shapes belong to vessels with either biconical or S-shaped profiles that are somewhat more developed (*Fig. 34, p. 82*).

The broader classification of the main pottery shapes provided by Shepard (1985), and accepted by other authors, takes into consideration several parameters that have to be selected on the basis of their properties and importance (Shepard 1985: 224–247; Horvat 1999: 57–79).

These are:

Symmetry	When defining the main vessel shapes, symmetry is not considered separately; the starting point is the assumption that the shapes of the vessel under examination are symmetrical.
Contour points	The contour points and contour silhouette, as well as changes in the contour line, should be taken into consideration.
Structure	The distribution of the vessel's parts and their mutual relations are important for the vessel's structure.
Contour type	The corner point and the point of inflection provide the basis for classifying the vessel's contour, which can be simple, composite, complex or inflected.
Similarity with geometric shapes	The vessel's shape can be compared to a geometric form, or a combination of different geometric shapes. The points of tangent and corner points on the contour mark spots in which two parts of the vessel come together, and each of those parts can be compared to a geometric shape or one of its parts.
Proportionality	The stability of every vessel depends on its proportionality, which is in turn related to its function and contour.
Establishing basic shapes, subgroups and shape groups	Establishing basic groups of pottery shapes, based on the properties of those shapes and their proportions.

Considering the extensive range of opportunities and information provided by archaeological pottery, we can recall the statement by Flinders Petrie, who said that “pottery is the greatest resource of the archaeologist” (Petrie 1904: 15-16). The amount of pottery excavated at archaeological sites, its indestructibility and resilience, offers innumerable and very important indications of the cultural, social, economic, religious and technological achievements of a community and the period in which it emerged. We also cannot ignore its chronological importance within relative or absolute dating.

In our attempt to summarize the main parameters of the analysis of archaeological pottery, we should emphasize that the selection of data we wish to analyse and obtain from the material is the first and foremost step in our determination of an analytical method. The reliability of the data obtained will depend on the selection of those features. Parameters to be analysed should be selected within the numerous previously-discussed variables offered by pottery material: shape, size, texture, hardness, strength, colour, decoration and surface treatment, choice of material, forming technique, firing atmosphere and method, and stratigraphic context. In addition, various archaeometric studies can analyse clay and temper compositions and the origins of raw materials. Naturally, the selection of parameters will depend on the nature of the site and pottery repertoire, and also on our own preferences. If our interest goes in the direction of trade and cultural contacts, our selection of parameters to be analysed will include the sources and composition of the clay. Physical properties will be the main parameter for a study that focuses on technological achievements, while a stylistic analysis can provide us with indirect chronological evidence and information about social, ideological or religious components. The parameters we will choose if we are interested in the vessel's function are not only those linked to physical properties, but also those resulting from various analyses of traces present on the pottery vessel.

It is important to note that the selection of the method and parameters for analysis is not always correlated with what we, as archaeologists, would like to learn from pottery material. In-

complete documentation of the site, including a lack of information about the stratigraphic context, or insufficient samples necessary for analysis, will significantly limit what we can do. If the stratigraphic picture of the site is unknown, it will be much more difficult to establish the order in which various types of vessels were deposited. Similarly, the use of a vessel can be much more easily specified if it is determined by a stratigraphic context. However, even if we do not know anything about the vessels' depositional context, they can still serve as a source of information, which will be discussed in further detail in the second part of the book.

At the end of this chapter, it is worth emphasizing that the task of archaeologists is to distinguish between what we know and what we can imagine about a ceramic vessel – which is, of course, also true of all other objects that belong to the past material culture of mankind.