**What is a form? On the classification of archaeological pottery.**

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**Abstract :**

The main question we want to ask here concerns the application of philosophical considerations on identity about artefacts of a particular kind (pottery). The purpose is the recognition of types and their classification, which are two of the main objectives of archaeological investigation. These ceramic objects, because of their “simplicity”, also lend themselves to abstract considerations that may suggest a fruitful use of the mathematical rules of geometry. It is therefore not surprising that mathematicians have been interested in this question of the characterization of forms. Rather than imposing a very precise definition of the notion of “type” from the outset, we shall consider it initially as equivalent to that of “category” or “class”, and then risk an “onto-epistemo-semantic” proposal.

**Key Words : artefact, classification, epistemology, form, geometry, mereology, ontology, object identity, pottery, semantics, shape, theoretical archaeology, typology**

**Introduction**

One of the aims of archaeological investigation is to classify the artefacts found in subsoil assemblages. Numerous procedures, sometimes intuitive and now increasingly automated, can be used to recognise types. This project has at least two ambitions: firstly, to describe the objects as rigorously as possible in order to identify the features that make them similar or different; and secondly, to try to get as close as possible to what we assume to be the categorisations of the society being studied (and the role these objects play in the functionality of these social groups).

The aim here is not to review all of these procedures, following their academic development according to various schools of thought (Rice 1987; Adams, Adams 1991; Orton, Hughes 2014), but to propose some general considerations that find numerous echoes in ancient (antiquity) or very recent philosophical debates relating to ordinary material objects (Margolis, Laurence 2007; Korman 2020). In archaeology, I believe that the metaphysical questions that arise when analysing artefacts have not always been highlighted as they should be. I will attempt to shed light on some of these questions here by focusing on a particular category, that of pottery.

Because of their formal regularity (to which we shall return), these ceramic objects also lend themselves to abstract considerations that might suggest a fruitful use of the mathematical rules of geometry, a science of the abstract if ever there was one (i.e. circles and triangles, for example, have no causal power in the world). So it's hardly surprising that genuine mathematicians, such as George David Birkhoff (Birkhoff 1933), took an interest in this question of characterising shapes and, above all, their complexity. These mathematicians' thoughts were in turn taken up by talented archaeologists (Shepard 1954).

We shall see how this mathematical approach, which facilitates the best replicas of these objects (and, from a certain point of view, the most “rigorous” descriptions), diverges from the comprehensive perspectives of the social sciences, from which archaeology cannot escape. In a way, this divergence reiterates the opposition between the abstract and the concrete, although we must consider certain interrelationships. But, as we shall see, it does not really merge with the two main philosophical approaches to objects: one that considers them as elements of reality (ontology), and the other as entities targeted by acts of representation (semantics).

Faced with an archaeological situation, and in the specific case of type recognition, this tension will generally be expressed in terms of uncertainty (an issue generally addressed by epistemology). This is not really the situation encountered in ethnoarchaeological fields, or by sociologists and anthropologists interested in materiality. These researchers, immersed in "complete" societies, have the opportunity to question the agents concerned with these objects about the terminologies used, sometimes by subjecting them to cognitive tests, as Willette Kempton did in Mexico, for example, in order to put her prototypical approach to the test (Kempton 1981). In this semantic register, as in the more sociological register of Material Studies (Miller 1985), the social structures are known in advance by the researcher, who also benefits from the assertions and ostensions of the agents in contact with materiality, as well as from information about their mental images (which corresponds to the "mental templates" once evoked by James Deetz (1967), whereas his structuralist approaches, involving "factemes" and "phonemes", certainly deserve to be forgotten). For this reason – and others that can be found in other summaries (Boissinot 2015; Boissinot 2017) – it is important not to consider archaeological investigation as part of a hypothetical and generalising "Discipline of Things" (Olsen et al. 2012), in relation to which archaeology could only appear to be deficient (Boissinot 2011).

Finally, rather than impose a very precise definition of the notion of "type" from the outset, we will initially consider it to be equivalent to that of "category" or "class", before venturing a more elaborate onto-epistemic-semantic proposal. The first step is to answer some simple questions: What is this thing? In what way is it not the same as something else? These questions are also of interest to storekeepers who have to tidy their shelves.

**Artefact identity and classification**

The question of identity is complex and can be broken down into three meanings when we limit ourselves to the apprehension of the identical (Wiggins 1980; Descombes 2013). Thus, we can recognise that there are objects in industrial productions that are almost indistinguishable. Certainly, they do not each occupy the same spatio-temporal position, which makes it possible to count them (numerical identity). But, among those which are mobile or potentially mobile (aptly named "*le mobilier*" in French), their study leads to some difficulties in processes of recognition: for example, is this beautiful plate that has disappeared from a museum the same as the one found at a thief's place? In this field, professionals from museums and suchlike institutions have become accustomed to affixing a mark for identification and certification purposes, a procedure that resembles the affixing of a signature in other registers. Once they have left the factory, objects can also have small defects that differentiate them, but it is above all as a result of their use that particular marks appear and make distinctions possible (qualitative identity). We all have specimens of tableware which, even though they come from the same industrial factories, we exclude on special occasions because they have chips that are considered "unsightly", and are therefore incidentally singled out. On a mesoscopic scale (Gibson 1979), this question of indistinguishability is less relevant in the majority of archaeological contexts studied (an archaeology of the industrial periods is, however, quite legitimate). We find productions that are never really identical, but individuals who seem to be distributed around types of which we can "intuitively" spot certain variants (sortal identity). Obviously, this division into types applies even more easily to industrial productions, and all of them, whether they are inventive or stereotypical, are susceptible to a classification, automated or otherwise.

Before we focus on the specificity of pottery, it is worth recalling a few general traits relating to ordinary objects or artefacts (Preston 2022). The question of the identical, namely "is it the same object?", can also be broken down into three categories (Lenclud 2007; Boissinot 2013). Firstly, we can consider the manner in which the object occupies space, including both its shape, dimensions, and material constituents. Unlike natural substances and organisms, it is uninformative to analyse an artefact that has been reduced to powder or put into solution to better determine it. This is not how one recognises a pencil or an amphora, their spatial configuration being as important as their microscopic nature. Secondly, an object is characterised by a functionality, i.e. by direct or indirect ways of acting through it and on it, which supposes the existence of an agent who recognises it, whether or not they have made it themselves (it can be other agents or natural things that have not been transformed). Thirdly, an object is usually associated with a function assigned to it within a society together with a name. While its material can be qualified after the fact, and marks of functionality can be observed mainly on its surface, its function (arguably one of the most important aspects of its identity) requires in vivo observation and extrinsic considerations. The first two observations require an etic approach, whereas the last one, related to function, is primarily based on emic considerations. The matter becomes even more complex when the function assigned by the manufacturers differs from that assigned by users, for example when the objects cross socio-cultural frontiers, or when opportunity or circumstances seem to impose themselves. For example, I use as a bedside table something that in supermarkets is sold as a stool, on which I never sit even though I know it is designed for that purpose. These considerations lead to confusion about the difference between function and functionality, as one often finds in academic literature. François Sigaut, who saw so many agricultural objects and other objects in contemporary contexts (where one can imagine a certain freedom of use, as in the example of my stool), summarised this with a subtle formula: "*un couteau ne sert pas à couper, il sert en coupant*” - a knife is not used for cutting, it is useful in cutting" (Sigaut 1991).

Finally, it should be noted that these three categories (form, functionality and function) can also be considered from the perspective of affordance, introduced by James J. Gibson in relation to the actions that are actually possible when using an object (Gibson 1977), and then developed in relation to design by Donald Norman, who focused more on perceived affordance (Norman 1988); the concept was subsequently appropriated by archaeologists (e.g. Knappett 2004 or, more recently, Pérez-Balarezo, Gonzalez-Varas 2023). This approach would be facilitated by the assured recognition of evolutionary lineages or "technical tendencies", to use the phrase of André Leroi-Gourhan (1943), later taken up by the philosopher of science Gilbert Simondon (2005) mainly in relation to the more complex artefacts that are machines (which is not without epistemic consequences). This question of technical lineages and systems would merit a more in-depth examination than the one we are presenting here. We might then ask ourselves whether there is not an element of retrospective illusion, as well as an underestimation of the "hybridisations" and "bricolages" present in the construction of these lineages. These few reservations reinforce the idea that the question of classification is not entirely obsolete outside of a genetic approach, contrary to what Simondon thought (to avoid any confusion, we should also note that the abstract-concrete opposition cited above does not refer to the same notion in Simondon's work).

The epistemic constraints of archaeology also oblige us to adopt a certain modesty. Indeed, we must distinguish between the deductions made from the configuration of the artefacts themselves and the aggregates in which these objects are discovered (Boissinot 2015), and the information that may be obtained from other documents (written or oral testimonies). It must then be admitted that the identity of the artefacts remains largely undetermined, despite increasing recourse to laboratory observations and analyses, as well as to more and more ethnographic references. While it is clear that one cannot just do anything with an object and that the existence of a field of possibilities (or impossibilities: a vase in the shape of a jug cannot be used to bake a pie!) is a valid hypothesis, the fact remains that the real function of artefacts is inaccessible in most cases.

**The essential characteristics of (archaeological) pottery**

What do we want to talk about here? The objectives of this study are twofold: 1) to designate a concrete category of artefact that has some consistency and 2) to examine how it leads us to more abstract questions that other objects do not generate. Although our reflections apply to these objects in general (and, for example, to industrial productions that we can find in catalogues and acquire), we limit ourselves here to archaeological situations, that is to say, cases where we are deprived of any information other than that coming from the (material) things themselves. For the reasons we have given in this paper, the question of the function of these objects will not be addressed, nor that of their possible prior naming (but we are well aware that the problem of the lexicon cannot be avoided). It is in a way an attempt to "naturalise" the artefacts, although we know that the things in question do not belong to "nature". With this expression we characterise an approach to the bare object, i.e. in the absence of any prior knowledge, apart from its possible spatial proximity to other artefacts. The reader will therefore understand how important it is here to distance ourselves from the situation of the ethnoarchaeologist (even if I do not deny the heuristic effects of such an approach).

The category selected is that of "pottery". The term seems to come from the French and certainly designates productions first shaped from plastic materials (clay, stoneware, etc.) and then usually fired. It is preferable to the term "ceramics", which refers to a broader category of objects and includes building materials such as tiles, bricks or floor tiles, or to "statuary". The proximity to the term "pot" (though the latter mostly refers to deep containers) is interesting in that we want to mention the functional relationship between content and container, usually indicated verbally by the preposition "in", which is one of the most fundamental spatial relationships in many languages. We could, to paraphrase a remark we quoted, say that a "pot is useful in containing", whether liquids or solids, with or without the action of fire (obviously, other objects have these functionalities too). According to Claude Vandeloise, who was a Belgian linguist influenced by cognition and working on spatial representation, the container-content relationship is understood less in terms of inclusion/exclusion (as developed in mathematics) than in terms of the "forces" that the container exerts on the content (Vandeloise 1986). Taking up his distinction between target and site, in this case content and container respectively, the linguist notes that the former "moves" towards the latter and that the latter "controls" the position of the former, not the other way around. Finally, depending on the concavity of the site (the container), it is sometimes the carried-carrier relationship that takes priority when it comes to verbally describing these situations by using, this time, the preposition "on".

The accessibility of the pottery's contents is undoubtedly at the origin of the academic distinction between open and closed vessels, as understood, for example, by the French school of ethnography – an outlook that chimes well with the search for fundamental oppositions as practised in certain circles (Balfet *et al.* 2000). This intuitive (and primordial) difference has given rise to various arithmetical proposals based on the study of the proportions of the pottery and, in parallel, attempts to classify the forms. The simplest proposals define open vases as "vessels that have their largest diameter at the opening. Closed vases, on the other hand, have an opening diameter that is much smaller than the maximum diameter. They often have a more or less wide neck" (Chertier 1976, p. 102). Other, more elaborate relationships have subsequently been considered in the case of more complex forms (Dumas 2016), but it must be admitted that some vessels escape this dichotomy, such as the cylinder vases (a type of tankards) that are known from both pre-Columbian South America and protohistoric Europe (Boissinot 2022). For her part, Anna O. Shepard, the author of the first major work on ceramics for archaeologists (Shepard 1954), identified three major categories by distinguishing between unrestricted, restricted or necked openings (fig. 1), which corresponds well to this idea of resistance to extraction, but which does not concern the entire vase.

In many societies, the container-content relationship is the subject of metaphorical developments in relation to the body, whether human or animal. This aspect concerns both the habitat and the pottery. For the latter, it is not so much the stories as the lexicon (lip, neck, throat, body, shoulder, foot, etc.) and certain forms of decoration (intaglio or in relief, when not comparing handles to arms) that attest to certain analogies (fig. 2). It will be noted that the scientific literature has not completely abandoned these ways of naming which, like any description in natural language, encounters problems of definition and vagueness. Other attempts, which aim at more rigour and to which we will return, have sought new formulations or, indeed, a global coding of the selected observations.

Unlike other artefacts, pottery is not an assembly of different parts (think of a bicycle or a boat), but a plastic montage where possible additions of material, such as for gripping elements, are finally "melded" into a clay mass. This description in terms of "fusion" could also be used in relation to various prefabricated parts which are finally assembled to obtain the whole (one generally recognises them thanks to the preferential breaks which show when the object is broken). But should these technical aspects, when they can really be demonstrated, be taken into account in an analytical approach to the form? And should this be done in the same way that we take into account the bone assembly, hardly visible when examining the body surface of a vertebrate, in order to distinguish (and thus name) the different parts of the body? Concerning this "fusional" aspect, we must also point out certain consequences in terms of identity over time. Indeed, in the absence of a true assembly, this type of object cannot see some of its parts replaced without directly losing its identity; it is moreover difficult to replace parts, i.e. to compose an assembly which allows us to preserve the integrity of the object. Repairs are certainly sometimes made, for example around cracks using lead staples or with gold as in the Japanese kintsugi, or others that are less noticeable using glues that have not lasted over time. But, generally speaking, deteriorated pottery changes its functionality or is sent directly to the rubbish bin. This is not the case with flints that can be resharpened, metals that can be reheated or reforged, or boats that can be repaired by having all their parts gradually replaced. This nod to the famous ancient enigma of Theseus's boat, which paradoxically raises the question of the identity of artefacts over time (one object that can eventually become two: Ferret 1996), does not therefore concern our pottery, which is an object with "restricted" plasticity, establishing a direct link between manufacture and use. For this reason also, we will be less inclined to consider a four-dimensional presentation of these ceramic objects, that is to say, take into account both the three-dimensional space and time, as suggested by certain philosophical currents (Heller 1984; Sider 2001).

Another property that concerns the vast majority of these vessels is their cylindrical symmetry, which is almost systematic for modelled vases, and which will become even more important with the introduction of the potter's wheel technique. There are, of course, vases with square mouths, oval dishes or zoomorphic pottery which join our "other" categories and do not count for much in our attempts at systematic classification. This property of symmetry concerns the profile of the vase, the knowledge of which is reduced to a profile and, finally, to a curve (with the possibility of angular parts), apart from the possible decoration or means of gripping. Describing a type (or a category) is therefore the same as characterising a curve, with the nuances that have just been mentioned, which mathematicians are generally good at, as we shall see. Nor should we forget the ease with which they can now be represented, as archaeologists have got into the habit of publishing typological plates (which are sometimes seen as the culmination of their research) where, for each type of vase, an axis separates the inside from the outside, with indications of variations in the thickness of the paste. Another field seems to have led to the same epistemic reductions – with equivalent benefits – namely, modenature in architecture, which refers to the study of the ornamental treatment of a building. While the question of cylindrical symmetry applies to the columns, their bases and in part their capitals, the mouldings that affect the cornices or podiums are, on the other hand, more a matter of translation. Whatever the case, the representation retained is the same, which is that of a curve whose hollows and reliefs can be followed.

Before discussing the question of curve-based treatment, let us point out that there are other ways of constructing types (in the sense of particular configurations) which are not specific to pottery. They consist in the construction of a bundle of properties, the latter being added to an ultimately indefinite list (the ways of conceiving or describing reality are not entirely determined) insofar as it seems to serve our distinctions. And generally, when we proceed to an automated treatment of these data, which are sometimes too numerous to be mastered by a single human mind, we have the satisfaction of seeing that the classifications obtained correspond well to our most intuitive approaches. Because they seem to aggregate in a separate way, we have the feeling of having identified these "plural particulars" that are for us the types (although one can also admit "singular particulars", represented by a single exemplar). But to these particulars we would like to confer the status of universals, in the same way that language operates a displacement of certain proper names towards common names.

**Measurement operations and mereology**

Let us consider the geometric form of the sphere (which can be reduced to the equally pure curve of the circle). According to this mathematical approach, no line on its volume or point on its curve is singular, the centre of the circle being moreover external to it. Let us move on to concrete things: in the case of billiard balls or ping-pong balls, except for a few painted details on the surface, it remains the same. As for our planet Earth, which is not exactly spherical, it has high and low points, parts that are above water and others that are under, so that we can concretely singularise many points, lines and surfaces. In Barry Smith's terminology, these boundaries that we can observe are said to be "bona fide" in that they are authentic, true and without interpretation (Smith 2001). In contrast, when we consider the longitudes and latitudes of the same planet, we do not see any lines on its surface and we know that they refer to a human decision for purposes of location and cartographic possibilities: these boundaries exist only by decree and are called "fiat", even though they may also account for some properties in a relatively fuzzy way (e.g. different climates depending on whether one is near the equator or around the tropics). It is quite likely that both fiat and bona fide delineations will be useful to us in describing our pottery, and we will clarify why this is so (and may follow representations that take this into account in the future, e.g. based on the graphical presentations of Vogt 2010, who works on biological entities).

If, from a sphere, we intend to make a container, we will consequently make a division into three parts (fig. 3): apart from the hole that allows access to its interior, there is the orifice that is the rim area (because it is necessary to be able to access the interior), then the body itself (because it is necessary to be able to contain), and finally the bottom (because it is necessary to have a stable position). Without this being a necessity, the two extreme parts are often given more or less distinctive treatment, so that we are not always able to know where they really begin, because this can happen gradually. We have just seen the simplest case, that of the sphere (or circle), which is close to those of cylinders and cones, and to some extent to hyperboloids, ovoids or ellipsoids (which have particular points of constriction, or of greater width). However, these "pure" forms are not the only ones found in pottery production. Many of them could be considered as arrangements of various "pure" forms, or at least of truncated parts of these forms. This results in a multiplication of parts, and undoubtedly the existence of subparts.

This way of considering parts within a whole belongs to a subdiscipline of ontology called mereology (and mereotopology when dealing with spatial questions: Varzi 1996). This type of approach known since antiquity has been mostly axiomatised and formalised since the work of the Pole Stanisław Leśniewski (1916-1992) and is used nowadays to ask many metaphysical questions about material objects (Goodman 1951; Simons 1987; Casati, Varzi 1999; Cotnoir, Varzi 2021). This theoretical approach is complementary to set theory and differs from it in, among other things, the absence of the null (or empty) element as well as an apparent resolution of the "class paradox" as pointed out by Bertrand Russell. Among the relations of parts to a whole, which are transitive and antisymmetric whatever the formalism used, there is the notion of overlap (and its opposite: disjunction) which is used when two objects (or two parts) have a part (or subpart) in common. This concept can be useful when one is, for example, faced with an uncertainty in the determination of parts, when one does not really know where one part begins and the other ends. Pots can be treated as sums of parts that can be considered either as disjunctive or by admitting the overlapping relation (which, in this case, amounts to recognising fiat limits). We begin with the first option, which has met with some success in ceramology.

We will dwell at greater length on a second, older approach, which was also doomed to failure, insofar as it raises one of the main questions about a "neutral" position in the description of artefacts. We owe the first rigorous analysis of ceramic profiles to a true mathematician. A specialist in the theory of numbers and the analysis of dynamic systems, George David Birkhoff (1884-1944) was also interested in the question of measurement, applying it in particular to human creations that involve "a free expression of aesthetic ideals". It is in his work *Aesthetic Measure* (1933), after considerations on ornaments, that he develops a reflection on vases by privileging the aesthetic attraction which they produce, thus returning to aspects likely to be immediately seized by the eye. It is therefore the "visual contour" (rather than the cross section) that he analyses by identifying characteristic points (with the corresponding tangents at these points) in figures composed of geometric curves that are much simpler than those found in ornaments. He proposes to classify them into four categories (fig. 4): "(1) the points of the contour line where the tangent is vertical; (2) the points of inflection where the curvature changes direction from concave to convex; (3) the end points of the contour; (4) the corner points where the direction of the tangent changes abruptly" (Birkhoff 1933, 69). Based on the number of these points and their distribution along vertical and horizontal axes, he pursues various considerations on the complexity of the vases and their "harmony", as suggested in his introduction which recalls Renaissance research on the proportions of the human body. One will moreover (and retrospectively) notice that this spatial consideration of tangents is not without links with the process of constructing curves in the vector drawing software that we use to represent potteries (and so many other things, such as car bodies in the context of the work of Pierre Bézier who gave his name to their posterity).

This geometric perspective was taken up by Anna O. Shepard (1903-1971) in her very comprehensive manual on archaeological ceramics (Shepard 1956). While certain points concerning technology or material analysis, or even statistical approaches, are partly outdated (this was the time when the first punched cards appeared, as part of the attempts to build a "proto-computer"), her reflections on forms are still interesting today. Once the characteristic points have been recognised (as defined by Birkhoff), properties of symmetry, structure, type of contour, geometric shapes and proportions are considered in this order in order to proceed to a classification that is to be conducted independently of functional considerations. In order to justify this abstraction, the author points out that "vessels are sometimes used for purposes for which they are not well suited by form" (Shepard 1956, 228); and she reminds us several times how unsatisfactory commonly used names are. We can only agree with the ceramologist in this respect when we see the use of different names, from one specialist to another, for profiles that seem similar overall. Dictionaries, which are places for recording usage, but also attempts to regulate the lexicon, are not always very helpful. We have seen this in connection with the definition of "*coupe*” (cup) in French (Boissinot 2022, 92-93). Most of the words in ordinary language are indeed synthetic concepts that combine criteria of various kinds and account for assemblages already exemplified as such, while offering the possibility of metaphorical or metonymic displacements (thus, the term "cup" is often used as a synonym for "open vase"). These terms are also borrowed from a certain vagueness because of the indeterminacy of our semantic categories and the imperfection of our discriminative faculties (Williamson 1994; Keefe 2002; Egré 2018). From "*coupe*" to "*bol*" (bowl) or "*jatte*" (basin), for example, although these are recognised by all, how many intermediate models do we see? We are here under the regime of "family resemblances" pointed out by Ludwig Wittgenstein and we will have to content ourselves with proposing various frequencies of attributes rather than necessary and sufficient conditions. But, from the ordinary to the scientific, there is a great temptation to go for a more stipulative and coherent definition, following the example of what is practised in mathematics and experimental sciences. However, in this case, equipped with our own definition of the category in question (what is a "cup", for example), we will have to negotiate over it with the other members of the present, past or future scientific communities. Experience shows that this generally remains a pious hope and that we must expect a plurality of meanings, probably because the act of definition is not neutral and we import our points of view into it, under aspects that seemed to us to be exclusively descriptive.

In her work of "abstraction", although it is intended to analyse each of the concrete cases, Anna O. Shepard is not fooled by the "violence" she does to social reality: "potters were not constrained by mathematical specifications. Furthermore, the very plasticity of clay tempted them to vary shape and to originate new forms" (Shepard 1956, 232-233). This leads us to three reflections on necessary references to the intentions of the potters:

- first, to admit that the famous "characteristic points" are certainly not the only ones to have been taken into account by the makers (if they really have been), as can be indicated, for example, by decorated bands disconnected from vertical tangency points, or areas with different finishes depending on the intended use of the container (which means that the number of potential parts considered was greater than that established by the mathematical analysis and, for the closest of them, they may not have had the value they have been given);

- then, to take into account a dynamic vision of the types, even if we restrict ourselves to formal characteristics alone: concerning so-called "intermediate" cases, we sometimes remain uncertain about what corresponds to a widening of the neck, to an excrescence of the edge, to the making of facets for a shoulder (this sometimes leads us to identify as variant of a given type something which could come from another type);

- finally, to realise that treating the form in a sui generis manner prevents us from seeing in these vessels transpositions of other containers made of various materials (wood, calabash, wicker, metal, etc.).

These comments, although they concern the form of the pottery, are aimed precisely at what Anna O. Shepard rigorously attempted to remove from her classificatory essay. However, as she points out, there is an order in her choice of formal criteria (proportions come after types of contour, for example) and therefore, obviously, a hint of subjectivity. Thus, if we follow her hierarchical logic, we would have to think that whether a vase is a high or low form (some have tried one-dimensional numerical criteria on this: Dumas 2016) matters after we consider its profile.

This question of the hierarchy of criteria is fundamental as soon as we want to go beyond the simple question of replicating forms. In more recent analytical approaches, one can observe some biases with regard to the hierarchy of the parts of the profile, leading to the construction of types that one wishes either to bring together or, on the contrary, to distance, undoubtedly because of perfectly valid intuitions (but which are then adorned with the virtues of a systemic approach). We give in fig. 5 the example of a classification that links the forms of the body with information concerning the necks of the vases, and secondarily the bases of these vessels. Now, the "families" distinguished (and subsequently compared) are indeed based on the "elementary forms" of pans (A to L), about which (and particularly in relation to C) one can question their elementary nature. In this particular case, one may wonder if the upper part is not a neck in some sense (above a basin), and one will appreciate that the authors, in affirming their choice, have deduced the logical impossibility of having a low or high neck. However, is it necessary to distance them so much from the specimens appearing in the lower right quarter of the table? If one adopts a "dynamic" perspective, is it not possible to pass from certain forms to others by simply widening or stretching certain specimens, until a carina is transformed into a shoulder?

**Point of view from nowhere, universals and culturalism**

The reality is always more populated than the lexicon. We can see this with colours, which are difficult to name in ordinary language and yet are perfectly defined (and ordered) thanks to their specific wavelengths. However, it is not with this latter type of variable that one speaks to oneself or paints one's walls, by giving oneself good reasons moreover. On the other hand, in the very particular register of technoscience, and in order to progress even more in this same field, one admits without hesitation that this wavelength-based approach is perfectly useful and rigorous. A few nuances aside, almost the same thing applies to the definition of types of pottery, for which one would however (greatly) struggle to find a variable to order them along a single axis. Even if we resort to multidimensional analyses starting from a coding of the finest observations and by sharpening all the elements of the lexicon as well as possible, we risk developing a complex formula, but which will not be a usual name (such as a cup, bowl or jar, etc.). This procedure would undoubtedly be useful for computer processing (and incidentally for digital duplication of the specimens), valid in Singapore as well as in Berlin, and even for a non-human intelligence to whom the code could be delivered. This sort of "point of view from nowhere" is unlikely to be of much use to anyone making an effort to understand human production, which is nevertheless the epistemological project of the human and social sciences, to which archaeology belongs. We will therefore have to come to terms with attempts to make adjustments between the etic and emic points of view, should these at all be possible.

In asking "what is a form?" we have evoked questions of identity that come back to the question "how can we be sure that two objects that are not strictly identical belong to the same form?" As we have seen, Birkhoff's analytical procedure – one of the most rigorous proposals in this register and a beautiful mereological construction – ultimately comes up against the vagueness of the lexicon that one will eventually have to use in order to get out of a codified description and produce historical inferences. The usual words used to name the parts are not perfect analytical concepts (although the synthetic concepts designating the wholes that are our objects are even less so). Moreover, the parts themselves do not have totally assured limits, so that one sees some of them as fiat and others as bona fide, when one is not forced to consider overlaps between them (no doubt this is due to the plasticity of the ceramic). Finally, as we have suggested, functional and dynamic aspects seem to shape our ways of talking about forms and, by abstraction, of conceiving types, even if it seemed to us that we were only talking about parts in geometric space. In a way, this is a "contamination" of ontology by semantics, which is undoubtedly a specific feature of artefacts, which are sometimes downgraded to "integral wholes" by contemporary metaphysicians such as Peter van Inwagen (1990).

When one has to analyse a collection of pottery coming from a singular archaeological context, the distribution of these objects is first done in an intuitive way based on syncretic criteria of resemblance. The recurrence of observed traits helps in establishing types, even if some of the specimens do not seem to be entirely similar. One can then dispense with a very fine description and propose a list, without giving much importance to their denomination in ordinary language (or even a relatively specialised lexicon): this context will thus present types 1 to n, or A to Z, and will therefore be considered as typical of a time and a place (culturalist perspective). It becomes imperative to resort to more analytical descriptions as soon as a comparison is projected, either in distant contexts or in relation to others that are not contemporary. For it is a safe bet that the lists to be compared will not be the same, and that types from one context are not so easily translated to another. We might say, for example, that type X here has a more rounded or angular form than type X' over there, which nevertheless relates to the same "idea", which is also very difficult to grasp with any rigour; or else, that it has no correspondent (i.e. another type that belongs to the same "idea") elsewhere. In other words, it will be necessary for us to have some universals at our disposal in order to make this comparison, and finally to give up a too abrupt distinction between abstraction and concreteness. The great philosopher of phenomenology, Edmund Husserl, who was interested in morphological idealities, not in terms of compactness or angularity but in terms of roundness, referred precisely to the aim of the potters, who were the most concrete of all (Husserl 1984). But in this philosophical register, as in ours, which is an applied field, it is not certain that the questioning can easily be interrupted.

**Conclusion**

The aim of this study was to explore the importance of a number of metaphysical issues (the identity of artefacts, notions of whole and part, particulars and universals, the concept of limit, etc.) and to show their prevalence in our analytical procedures concerning archaeological pottery (the reader will have understood that part of our discourse can be transposed to other kinds of objects). Confronted with the concrete study of collections, about which we had to make assertions, not only did we not find an infallible method, at any stage of the analysis, but we also felt trapped by language, even if we took care to define the terms used (the act of defining, let us remember, is a position on limits). The question first arose in the distinction between open and closed vases, which is generally the first to be made in most ceramic typologies; but it continued to trouble us when dealing with most of the other categories. Should we then resolve to develop a "practical typology", such as that of the brothers William Y. (archaeologist) and Ernest W. (philosopher) Adams, which is clearly linked to research objectives rather than to the "fixed reality" of things (Adams, Adams 1991)? In many respects, these authors give an account of the actual work of ceramologists who, whatever they may say, accept vague delimitations, polytheistic definitions and non-uniform criteria chosen according to intuition. For them, a well-crafted typology can be seen in the results of identical sortings carried out by different researchers (but following the same rules), or by the same researcher at different stages of their career; it is also open to new discoveries and susceptible to reformulation. For them, this coherence, a certain flexibility and operational efficiency constitute a success, while the precision of the analysis is deemed secondary. Although, as an archaeologist, I am sensitive to these pragmatic aspects, the (occasional) epistemologist in me will find it harder to be convinced by this devaluation of precision, a fratricidal composition of sorts...

This attempt to clarify typology, which must therefore be pursued, certainly contrasts with the success of the technologies used to represent objects in three dimensions of space (and at all scales), to characterise their alterations or to determine their physico-chemical components. This should not cause us to remain silent. On the contrary, it should raise new questions, reformulate existing ones and eliminate others; and we will see that some of these questions have already been asked in other fields, particularly philosophy.

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**Illustrations:**

**Fig. 1**: general system of shape classification after Shepard 1956 (p. 231).

**Fig. 2**: the naming of the parts of a restricted Iron Age vase from southern France according to Py and Dedet 1975 (with translation).

**Fig. 3**: the passage from an abstract to a concrete object, with the example of the sphere. On the left, the different parts that can be identified, with the broken lines (after Vogt 2010) indicating the gradual (and therefore uncertain) limits or those postulated by the analysts. VT: vertical tangent.

**Fig. 4**: the essential points of a ceramic profile according to Birkhoff 1933.

**Fig. 5**: an attempt to classify the ceramic types of the protohistoric necropolis in Gourjade (France) according to Giraud *et al.* 2003. Lines: types of bodies; columns: types of necks and, secondarily, types of bases.

*(NB: 4 and 5 can be redrawn vectorially)*