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THE TECHNOLOGICAL CHAIN AS A METHODOLOGICAL AND THEORETICAL TOOL FROM ARCHAEOLOGY

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Résumé: On va centrer notre communication en deux aspects: la visée particulière que nous avons donnée à la Chaîne Technique Opérative dans le cadre de l’Archéologie du paysage pour l’appliquer à l’étude de la céramique préhistorique et protohistorique du NW de la Péninsule Ibérique et les problèmes que nous avons trouvés pour l’application de cet outil dans le contexte mentionné.

En ce qui concerne le premier point, nous croyons que la plus grande nouveauté c’est qu’on ne considère pas la CTO comme un outil exclusivement descriptif des faits technologiques mais comme un instrument qui permet la relation de ces faits-ci avec le contexte social dans lequel ils se produisent. C’est pour cette raison que nous avons divisé la CTO en trois aspects profondément imbriqués, les aspects techniques, considérés dans la chaîne technique, les aspects sociaux, inclus dans la chaîne conceptuelle et dernièrement, le produit final, qui constitue le dernier maillon de cette chaîne, résultant de la combinaison des deux aspects antérieurs.

En ce qui concerne le deuxième point, il y a de grandes problèmes pour en connaître les aspects technologiques, puisque on a besoin de l’emploi de techniques auxiliaires pas toujours disponibles, mais il est surtout difficile de connaître la dimension imaginaire en nous y approximant à travers sa représentation matérielle.

Abstract: We will focus on two main topics: first, the special approach to the Technological Chain (TC) that we have used to study NW Iberian protohistoric and prehistoric pottery from a landscape archaeology viewpoint; and second, the specific problems that we found while trying to perform such work.

Regarding the first point, we believe that the most innovative issue is that the TC is not only seen as a mere descriptive tool for technological facts, but we have tried to relate such facts with the social context in which they occur. As a result of it, we have divided the TC into three deeply intertwined aspects: the technical aspects or technological chain, the social aspects or conceptual chain, and the final result of those processes, the final product, which comprises the last link in the chain.

Concerning the second point, we have found important obstacles in trying to get to the technological aspects, because the auxiliary techniques are not always readily available. Also, gaining knowledge of the imaginary dimension is even more difficult, as we approach it solely from its material demonstration.

Key words: Operative sequence, operational technological chain (OTC), ceramics, formal analysis, style, patterns of formal regularity, landscape archaeology.

INTRODUCTION

The theoretical proposal we use as our starting point is that of Landscape Archaeology1, according to which archaeological entities are not isolated objects, but are instead determined by all of the social events which go together to form this record. Archaeological entities are spatial entities, forms produced by social action, connected to a socio-cultural context and comprehensible within it. Material culture is understood as an objectification of the social being, as proposed by Shanks and Tilley (1987: 130, quoted by 1993b: 41)2, a product of a specific society which responds to specific cultural norms, meaning material culture "may be interpreted in terms of coherence with the whole cultural system" (Rivera 1990: 24), as all of the process followed to elaborate it, from obtaining prime materials until achieving the final product, is conditioned either intentionally or accidentally by the social circumstances surrounding it. It becomes a reflection and active part of the social context within which it was produced3.

The study method we propose is what we have called Formal Analysis4 (Figure 1), comprising a deconstruction of the characteristics of the objects through a descriptive process,

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1 This paper was presented in the XIVth Congress of the U.I.S.P.P. (Liège, Belgique, 2-8 Sept. 2001). Symposium 2.1: Pottery Manufacturing Processes: Reconstruction And Interpretation (Organisers: Alexandre Livingstone Smith, Remy Martineau and Dominique Bosquet).
2 The basic principles of this theoretical vision have been dealt with by Felipe Criado Boado in numerous articles (see: 1993a, 1993b, 1999).
3 We offer here is only a brief summary of a line of investigation into prehistoric and protohistoric ceramic material culture, which has been under development since 1993 until now in the Material Culture Group of the Laboratory of Archaeology and Cultural Forms, belonging to the University of Santiago de Compostela in Spain, directed by Felipe Criado. Other papers which may be consulted about this line of investigation are Cobas 1995 and 1997, Cobas and Prieto 1997, 1998a and 1998b, Prieto 1993, 1995, 1996, 1998 and 1999.
4 In the study of myths using Structural Anthropology, it is said that one of the aims of description is to "identify and make inventories of types, analyse their respective parts, and to establish correlations between them. Without this preliminary work (...) the comparative method (..) runs the risk of failure: either the data which one attempts to compare are so geographically or historically close that it is impossible to be certain that one is dealing with different phenomena, or they are too heterogeneous, and the confrontation becomes illegitimate as it approximates things which are not comparable" (Lévi-Strauss 1987: 29). We agree with this definition, and believe that it is perfectly applicable to ceramic studies.
and then reconstructing them via an interpretative process. This study takes place in three successive stages which deal with increasingly higher degrees of subjectivity and interpretation. Firstly, a description is made of the objects, forming the foundations upon which all later developments will be based, with the aim of recognising the objects’ physical characteristics. The objects are then classified, re-ordering formal relationships (Criado 1993b: 53) and recognising the formal features which make it possible to define tendencies and variations, types and subtypes within the material group studied, and finally the process of interpretation, within which data are elaborated from the previous stages, attempting to relate them with a pattern of common rationality. This is done by contrasting the data obtained from material culture with other data relevant to this culture, and, when possible, by relating this data to an anthropological theory (figure 2). In summary, the aim of the study is to reconstruct the patterns of regularity which

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5 The development of work with material in three stages is a common proposal by most authors: Rivera (1990), Hodder (1988), Bate (1978) Delgado (1989).
exist between objects, with the objective of characterising styles⁶.

1. THE OPERATIONAL CHAIN

We believe that the operational chain is the instrument which most obviously brings together all of the principles upon which our proposal for the study of material is based. It unites aspects of descriptive, analytical and interpretative nature, graphically presenting the formal patterns of regularity and differences in material cultural throughout the complete technological process, as far as the archaeological remains permit, in order to characterise the context of past primitive societies, by comparison in multiple levels of complexity. It is descriptive, as long as it is carried out using the data obtained in the first part of the study. It is analytical, as it considers the different phases of material elaboration within a given material group. It is interpretative, as it is hypothetical attempt to not only understand the way in which an object was made, but also the conditioning factors and circumstances which are hidden beneath this process of fabrication⁷.

1.1. Historiographic revision of the use of the technical chain

When referring to technical chains we should inevitably refer to the origin of this concept in the context of the study of stone production, despite the fact that in order to apply it to the study of ceramic materials there has been no direct transposition of the term in the way that this was used at first, as a descriptive utility, in Historical-Cultural Archaeology (Lévi-Strauss 1965) and later on also as an analytical utility, in particular from a functionalist perspective (Binford 1989), but rather in relation to the developments which this concept has undergone in recent years, basically in Technological Anthropology (Lemonnier 1986, 1991a, 1991b, Gosselain 1992), in which its interpretative potential is explored.

1.2. The concept of the technological chain in Landscape Archaeology

The main difference which we believe is introduced by Landscape Archaeology into the application of the concept of the technical chain in ceramic studies lies in the fact that it does not only attempt to reconstruct a physical chain of movements made until obtaining a finished product (Julieu 1992: 176-79) but instead that it gives particular importance to the conceptual aspects involved in this sequence of movements, and the way in which the finished product is related to the social context. For this reason, instead of using the term operational sequence, we prefer to use the concept of technological-operational chain, as we believe that the term 'technology', considered as "knowledge which makes it

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⁶ We understand the concept of Style in its widest sense, "as one of the mechanisms of the discourse of power, as it is reflected in the formal products of the society: style would be the external formalisation of power, this understood in a Foucaultian sense" (Prieto 1999: 75) (Figure 4).

⁷ These three principles are structurally opposed to the concepts of type and typology, notions which have marked studies of material culture since the earliest days of archaeological literature, using typology as a key methodological instrument, and definitions of type the final objective of the study (Figure 3).
possible to make things” (Criado 1996: 26), better fits the reality under study, in which it is important to not only consider the physical capacity to create a product, but instead the possession of a symbolic knowledge according to the social context within which the product was created.

We understand the concept of technological-operational chain as an analytical utility which makes possible an orderly description of the events and circumstances which determine the process of manufacturing ceramic elements. These events may be basically arranged into three groups: the technical aspects in their strictest sense, considered within what could properly be called the technical sequence, the aspects which refer to the social events when the social group as an individual and the historical context are combined, which we call the conceptual sequence, and finally the result of these two processes, defined as the final product. However, this is division only from a practical point of view, as they are all interrelated. We will now go on to explain each of these aspects in greater detail (Figure 5).

**Technical Sequence/Chain.** Within them we differentiate between the phases of elaboration, meaning the succession of cycles which occur in the production of a ceramic item, and the processes of elaboration, meaning the actions involved and types of work or specific tasks in each of these stages, as lesser entities which make possible the development of each of the cycles.

**Conceptual Sequence/Chain.** This considers the conditioning factors of economic, territorial, social and imaginary nature which come together and indicate all of the productive process of the technical sequence. The way of making a piece, from start to finish, forms part of a social intention, integrated within a specific discursive practice, related to the manufacturing methods of a specific social group. Beyond the differences or nuances present in many of the productive phases, it makes it possible to recognize it within a wider social framework which will indicate the identity of style. It is the desire for knowledge and ability of each group which determines the different discursive practices which develop within them⁸ and which will accordingly mark the type of social use for which the product is destined. We do not therefore consider that it may be possible to establish universally valid technological-operational chains using technical aspects as our sole point of reference. As indicated by Perlès (1991: 9), the technological-operational chain “is not an inferential system which goes from the specific to the abstract of the conceptual scheme and the scheme of knowledge, but is also inscribed within a time and a space”. There is no direct relationship between society and material culture considered as general and unchangeable concepts: instead there is an intermediate element, or third factor (Criado 1984-85), formed by the

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⁸ According to Foucault’s idea of will of knowledge-power (“volonté de savoir-pouvoir” 1984). We believe that this idea may be applied, although of course not directly, to prehistoric societies (Criado Boada, 1989: 78 and Méndez Fernández, 1994: 79); accordingly, the concept of power should not be understood in a strict sense, as Foucault applies it to modern western societies. The hypotheses it presents about the notion of power may be seen in Poderes y Estrategias (Powers and Strategies) (Foucault 1980: 176-1 and 1981: 82).
individual historical group, which conditions it and makes it characteristic.

The result of all this process will be the final product. Here we return to the definition which we gave at the start of this text, as we understand the product to be a form, the formal or joint manifestation of formal characteristics acquired as the result of “man’s gestural intervention on material” (Delgado 1988) determined by social occurrences, which due to this social determination are inscribed within a pattern of formal regularity stipulated in coherence with other codes, and in its final instance as a reflection of the pattern of rationality within which it is inscribed. Here material cultural takes on not only a functional (real) value, but also one which is symbolic (imaginary), as an element through which the cultural norms of the society which produced it are reflected. It thus acts as a transmitter of its system of values and beliefs, “although this does not imply that in daily life they may have always acted according to these values” (Rivera 1990: 24 and 25). This final product will go on to form part of the social sequence or process, which will form the cultural context of the piece. Later on, using the final product once it has come to the end of its useful stage, a series of post-depositional processes take place. Finally the archaeologist enters into the picture, attempting to achieve an understanding of all of this from a radically different context.

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9 What Boast calls the useful biography of ceramics (Boast 1995: 70).

10 Called biography of deposition by Boast (Boast 1995: 70).

11 The biggest problem in the process of reconstructing the significance of a piece is that the archaeologist’s own subjectivity is further marred by the often ignored fact that this reconstruction has to be made only by using the biography of deposition. Importance should be given to studies now underway exploring how materials are integrated within the archaeological record, and the relationship between their actual condition and their possible original characteristics (Evans and Millar 1992, Hill 1995b, Maltby 1985) which, although guided by a different theoretical framework, follow lines of investigation which have started previously (Schiffer 1976), and which call attention to the dangers arising from carrying out a direct reading of ceramic material.

12 We find similar ideas in other authors such as Gruber 1986 and Sackett 1983, which attempt to avoid the direct identification between ceramics and cultures which prevail in studies of evolutionary or diffusionist type.

13 As is seen in the definition of style as the “formal knowledge of the particular ways in which the different artifacts have similarities between them” (Davis 1986).

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Figure 5. Scheme of the Operative Technological Chain

2. POSSIBILITIES AND LIMITATIONS IN THE USE OF THE OTC

The use of the technological-operational chain offers important novelties for the study of ceramic material culture, and in particular for the definition of styles, as compared to the normal concept of style, based only on the most material aspects, evident and susceptible to change (Lemonnier 1986), the morphology and decoration represented in the finished object, there is instead a study of all the variety of choices made throughout the technological-operational chain which are produced within an equally viable series of options, in particular the active role of the object in past societies, and
the variable cultural election for each society\textsuperscript{14} (socially pertinent technological choices, according to Lemmonier 1986: 153)\textsuperscript{15}. By incorporating the concept of the technological-operational chain, we are incorporating the technological aspect as a new parameter of style: by following the technological processes we may access criteria which are less susceptible to change and which give a more precise idea about past societies (Gosselain 1992).

Using the concept of the operational sequence has several implications, both methodological and interpretative. The most immediate, responding to a methodological orientation, means widening the areas of study, as there are stages within the operational sequence which cannot be reconstructed through archaeology, in particular those which refer to the social factors which influence it, meaning it is necessary to turn to the resource of ethnology, using weak analogies, or referring to technological processes, for the identification of which a visual observation is not enough, but instead it is necessary to carry out physical and chemical analyses from an interpretative point of view. We should bear in mind that while it is possible to have access to the technical sequence and the processes which are developed in order to make a product via the archaeological record, the consideration of cultural factors takes us on to a more hypothetical plane. The conditioning factors which mark the process of fabrication (such as oral tradition or the mythology of these societies) may not be directly documented, and barely even indirectly, in the archaeological record\textsuperscript{16}.

After identifying cultural choices, we do not directly arrive at the underlying conceptual schemes, as the characteristics of the material culture should be contrasted with the implications about the nature and functioning of a particular society, using this contrast to achieve and understanding of the pattern of rationality which connects both spheres (cfr.: Rivera 1990). The problem lays in the impossibility of knowing the social schemes, as these are societies which have disappeared and which had organisational notions different from our own, leading to the difficulties found in appreciating all the nuances involved in the construction of a piece within the framework of present-day societies (García Alén 1984: 58) becoming even more complicated when we attempt to obtain an understanding of the material produced by a society which has disappeared and was different to our own\textsuperscript{17}; we have no understanding of the meanings which underlay the type of work carried out on the material, and these become even further hidden when we try to directly apply our own patterns of rationality, distorting their original meaning\textsuperscript{18}.

In summary, the type of analysis which we are attempting to propose is different inasmuch as it adds a component of subjectivity into the study of ceramics, although once we accept that this component is inherent in archaeological practice, what we are attempting is to avoid falling into the trap of an uncontrolled and abusive subjectivity, and to instead create a determined methodology and theoretical focus. Similarly, based on the supposition that the different codes produced by the same culture as a response to the same cultural norms may respond to similar patterns of regularity (Lévi-Strauss 1986: 237 and ss.), the aim is to attempt an approximation to past reality through its material culture, in particular ceramic materials. Using these foundations, a defence is offered for the use of the structural line applied to the study of present-day societies. As indicated in Criado (1993b: 53), although not being able to work with present-day societies and not being able to access their language is the basic reason why in archaeology it is not possible to carry out a structural analysis as suggested by Lévi-Strauss, this does not make impossible the existence of theories and procedural methods which may be extremely useful from a methodological point of view.

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Bibliography


\textsuperscript{14} These choices may be seen on two levels: one particular level where it is possible to obtain different combinations for the elaboration of the same code of material culture, or a particular level where it is possible to contrast choices and combinations for the production of objects of material culture of different type.

\textsuperscript{15} This concept has features in common with the proposal of Gosselain (1992), which starts out using the definition of style of Sackett (1990) reconfiguring it by submerging it into the line of study of Technological Anthropology, chiefly developed by Pierre Lemmonier (see 1983, 1986, 1991a, 1991b).

\textsuperscript{16} Mythology legitimises the origins of particular technical operations (Lemmonier 1993: 19); for example in Africa in the Baifa people, the women make ceramics although their invention is attributed to the men (Gosselain 1992); there are also taboos related to some of the technological sequences, perhaps those less controlled by the potter at technological level. In America, pottery is also the target of warnings, prescriptions and multiple prohibitions (Lévi-Strauss 1986).

\textsuperscript{17} Examples of studies of ceramics in present day societies as a complement to past societies are those of Varela (1990) or Delneuf (1991).

\textsuperscript{18} There is increasing awareness about the problems which arise from the manipulation of the archaeological record (p.ej.: Hill y Cumberbatch 1993, Hill 1989, 1993, 1994, Le Roux y Gouyonvarc’h 1991).


