

38

FIRING PITS AND POTTERY PRODUCTION AT LUGO DI GREZZANA (VR): USING EXPERIMENTAL ARCHAEOLOGY FOR THE INTERPRETATION OF ARCHAEOLOGICAL PROCESSES

Hoyos de cocción y cerámica en Lugo di Grezzana (VR): empleo de arqueología experimental para la interpretación de los procesos arqueológicos

Annalisa Costa*, Fabio Cavulli*, Annaluisa Pedrotti*

*Laboratorio "B. Bagolini" – Archeologia preistorica, medievale e Geografia storica.
Dipartimento di Lettere e Filosofia, Università degli studi di Trento,
via Tommaso Gar 14, I-38122, Trento.

annalisa.costa@unitn.it
fabio.cavulli@lett.unitn.it
annaluisa.pedrotti@unitn.it

Abstract

The poster presented a PhD project in progress of the University of Trento which aims to analyse several firing pits found at Lugo di Grezzana, an early Neolithic site located in Valpantena, Italy, at the foot of the Lessini Mountains, one of the major flint source for the area. Firing pits excavated in the site have been studied in a previous work that evaluated and confirmed their possible use for pottery firing. Several hypotheses related to their use and function still need to be developed and will be listed in this work. Particular attention will be paid to *figulina* ware, a class of very fine ceramic usually considered the result of firing at high temperatures. Experimental archaeology will be used as support for testing new hypotheses on pottery production and firing processes, in order to verify their technical and functional features and for a better understanding of processes involved in manufacturing and firing pottery.

Keywords: northern Italy Neolithic, firing pits, pottery technology, experimental archaeology.

Resumen

Esta presentación se basa en un proyecto de doctorado de la Universidad de Trento que tiene como objetivo analizar la tecnología cerámica en Lugo di Grezzana, un antiguo yacimiento Neolítico situado en Valpantena, al pie de las montañas Lessini, una de las principales fuentes de sílex de la zona. Varios pozos de fuego excavados fueron estudiados en un trabajo previo que evaluó y confirmó su posible uso para la cocción de cerámica. Varias hipótesis relacionadas con su uso y función y se presentan en este trabajo. Se prestará especial atención a los utensilios de cocina, una clase de cerámica muy fina que normalmente se considera el resultado de la cocción a altas temperaturas. Sin embargo, un análisis reciente de las muestras encontradas en el sitio ha revelado que las temperaturas máximas de cocción que no superan los 900 ° C. Estos nuevos datos relativos a los utensilios de cocina pueden proporcionar conocimientos sobre el papel que pudo haber tenido en el norte de Italia y las decisiones de fabricación que estaban implicadas en su elaboración.

La experimentación se utilizará como soporte para probar hipótesis sobre la producción de cerámica y los procesos de cocción, con el fin de verificar sus características técnicas y funcionales y para una mejor comprensión de los procesos involucrados en la fabricación y cocción de cerámica.

Palabras clave: Neolítico del norte de Italia, hoyos de cocción, tecnología cerámica, arqueología experimental.

INTRODUCTION

Lugo di Grezzana (VR) is located in Northern Italy, at the foot of the Lessini Mountains, one of the major flint sources of the area (Figure 1). The deposit investigated since the early nineties by the *Soprintendenza per i Beni Archeologici del Veneto* in collaboration with the *University of Trento* revealed an extended Early Neolithic settlement related to the Fiorano culture (5500 – 4900 cal BC). Archaeological research at the site has shown

Figure 1. Lugo di Grezzana, Northern Italy. ©Google Maps - Microsoft Encarta.



traces of dwelling structures consisting of post holes and hearths, as well as the foundation trench of a palisade (Cavulli 2008, Cavulli and Pedrotti 2003). The role of the site as important supply center for flint and flint products has been revealed by the presence of several flint knapping areas. Several firing pits have been found and a recent study (Costa A. 2009-2010; Costa *et al.* in press) evaluated and confirmed their possible use as pottery firing. Various aspects concerning their function still need to be investigated together with new hypotheses related to the pottery production attested in the site and they will be the focus of a PhD research currently in progress (Costa, University of Trento). This paper aims to present the main features we will investigate with the help of experimental archaeology during the three years of the project.

(F.C., A.P.)

FIRING PITS AND POTTERY PRODUCTION

The firing pits are situated in areas X (ES 473/03=920) and XVI (ES 635/03; 554/03; 541/03) and have been excavated during the 2003-2005 campaigns. They are circular or squared, while their dimensions vary from a minimum diameter of m 0.85 m to a maximum one

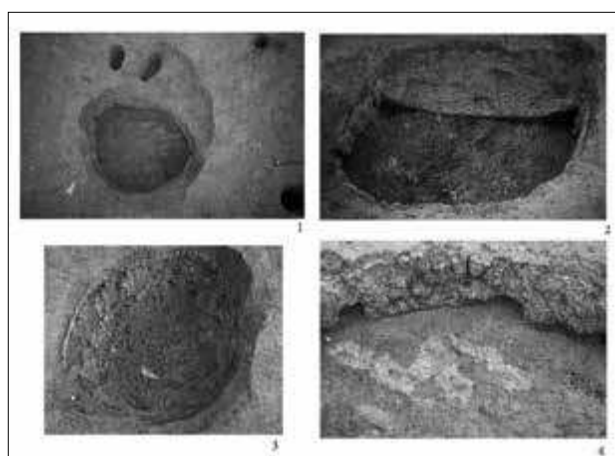


Figure 2. Firing pits at Lugo di Grezzana. 1. ES 473 /03; 2. ES 473 /03, section and infilling of burnt beams (US 482-483 /03); 3. ES 473 /03, rubefaction of the walls (US 482 /03); 4. ES 473 /03, potential evidence of vents.

of 2.10 m (Costa *et al.* 2015). Each of them presents specific features (dimensions, shape, materials found in the infilling) but all of them may have had vertical walls and flat or concave bases, with infillings rich in charcoal and ash remains, strong rubefaction of the walls, oxidized sediments, artefacts and ecofacts modified by fire such as burnt clay, burnt planks, flint tools and small sherds. All of these characteristic can be related with the fire use (Figure 2). Several kinds of materials, as bones, pottery and flint were found in most of the pits, but their presence cannot be reliably connected with a primary use of the structures. Although it is difficult to give a functional interpretation, the considered features have been interpreted as the result of combustion in a reducing atmosphere that,

decreasing the circulation of oxygen, preserved charred wooden beams that otherwise should have turned their cycle into cinders (Costa *et al.* in press a). Different hypotheses connected with the use and function of wooden beams need to be evaluated together with those processes that influenced thermic alterations of soil. However, we cannot exclude that the same structure could have been used to cook food, to produce charcoal for heating and/or to fire pottery. Thanks to experimental tests, the hypothesis of their use as pits to fire pottery has resulted as the more plausible (Costa *et al.* in press a;b).

Pottery production in Lugo di Grezzana (Figure 3) is characterized by different classes of coarse and fine wares with dark-colored or patchy red/black staining surfaces of various shapes and sizes (Pedrotti and Salzani 2010). Particular interesting is a class of very fine pottery widely diffused in central Italy, characterized by a pale buff-yellow or grey untampered, polished paste, usually considered the result of a firing at high temperatures. This class is called pseudofigulina, coarse figulina or figulina-type ware, very similar to “figulina” classes from which differs for its fabric, and for being slightly coarser. (Spataro 2009). Some XRD (X Ray Diffraction) and DTA-TGA analyses (Differential thermal analyses and Thermogravimetric analyses) carried out on the Lugo di Grezzana pottery show that pseudofigulina wares have been shaped using local clays and fired at temperatures that can be placed between 700° C to 900° C (Bouvet *et al.* 2010; Fermo *et al.* 2013). Such kind of maximum temperatures are usually related to firing in a kiln that allows to easily reach 950°/1000° C., however there are no evidences for such structures in Lugo di Grezzana.

A series of experimental firings we carried out in a previous work (Costa 2009-2010; Costa *et al.* in press a; b), in a covered firing pit similar to those excavated in the settlement, revealed that maximum temperatures did not exceed 750° C. However, the comparison with data from other experimental firings and from ethnographic evidences (in an open firing or in a covered pit) revealed that structures of the same type have a wide range of recorded temperatures, varying from 700° C. to 900° C. (Arnal 1991; Gosselain 1992). New insights could come from another series of experimental tests we will lead during next months (November 2016, September 2017) and from some analyses on Lugo di Grezzana firing pits oxidized sediments, currently in progress, that could help us to identify the temperature range at which sediments were burned. (The analysis will be held with the collaboration of Dipartimento di Ingegneria Industriale, Povo, TN).

The firing temperature range from experimental tests seems to be the more common for every day, ordinary pottery. During our first series of firing tests, similar archaeological traces of those recorded in the archaeological record and similar patchy red/black pottery surfaces have been obtained (Figure 4) that is why the structures analyzed at Lugo di Grezzana have been considered potentially suitable to firing pottery (Costa 2009-2010; Costa *et al.* in press a; b). Despite maximum temperature related to firing pits structures are lower than those reported by archaeometric analyses on pseudofigulina wares, we wonder if a series of variables as for example a firing in a pit without a cover or the use of fire vents that could increase temperature in the pit and others listed in next paragraph)

Figure 3. Pottery production at LUGO di Grezzana (after Pedrotti A., Salzani P. 2010, p. 89, fig.2).



Figure 4. Patchy red/black pottery from experimental tests (ph. after Costa 2009-2010).

could have influenced this result, so that firing pits were suitable to fire also figulina wares. New experimental tests, that will be part of the experimentation lead for the Phd actually in progress, would be helpful to answers several questions and test some hypotheses in order to verify which processes were involved in pottery pyrotechnology.

CAN EXPERIMENTAL ARCHAEOLOGY ANSWER TO SOME QUESTIONS?

Experimental archaeology is a valid method to test hypotheses and to evaluate different variables involved in pottery production. Replication rather than a certainty about the type of technology used becomes also a method to consider differences and problems that would be difficult to predict. This concept is well expressed by the definition "*Exploratory experimentation*" (Mathieu 2002, 7): informal studies would allow to explore possible alternatives related to the production processes.

Several key research questions need to be addressed concerning the firing pits. In particular, we aim at analyzing the processes that allow preservation of charred wooden planks and understand if firing was performed in a reducing environment and if the burnt beams had a specific function. We would like to understand also how specific variables as temperatures, sediments, kind of atmosphere, vents presence, reuses, etc... influence thermic alterations of soil (Costa *et al.* a).

Another variable that need to be tested is the one connected with the use and effect of introducing oxygen by flues, a practice that could be attested by the two oval holes recorded in pit ES 473 /03 that could be interpreted as a way to draw air down to the base of the fire (Figure 2.1 and 2.4). Could this expedient have played a role in obtaining a succession of oxidizing and reducing phases in a covered pit and to obtain temperatures higher than usual in order to fire figulina ware? A range of firing experiments for *figulina* wares reproducing manufacturing and firing techniques and comparison with archaeometric analyses, could provide interesting insights on Early Neolithic pottery firing technology and manufacturing choices involved in northern Italy.

(A.C)

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