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Architectural decorations, ceramics and terracottas from Veii (Etruria): a preliminary study

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ABSTRACT. — A comparative study of archaic and late archaic materials was undertaken with the aim of creating a ceramic and architectural database on clay production at Veii (Etruria) from the Iron Age to the Roman Conquest (structural clay characteristics, working techniques, materials and techniques for surface refinement and application of decorations) and to define the state of technological knowledge, production sites (workshops) and the circulation of manufactures. Materials were the following: among the pottery, a grey *bucchero* ossuary (Fig. 1) from the Grotta Gramiccia necropolis; among architectural terracottas, one of the large red and brown bases of the statues of the Portonaccio sanctuary (Fig. 2 a, b) and a red, brown and blue antefix with a female head surrounded by a *nimbus* from Casale del Fosso. All these materials add to the data obtained from previous works on architectural decorations and sculptures in terracotta from Veii.

RIASSUNTO. — Ai fini della costituzione di una banca dati sulla produzione fittile veiente, sia vascolare che architettonica, dall'età del Ferro alla conquista romana (caratteristiche strutturali dell'argilla, tecniche di lavorazione, materiali e tecniche per la rifinitura delle superfici e l'applicazione della decorazione), volta sia alla definizione di conoscenze tecnologiche che di botteghe e circolazione di manufatti, è stata preliminarmente affrontata l'indagine comparata di alcuni materiali arcaici e tardo-arcaici: tra il vasellame un ossuario in *bucchero* grigio (fig. 1) dalla necropoli di Grotta Gramiccia, tra le terrecotte

architettoniche una delle grandi basi delle statue dal santuario di Portonaccio (fig. 2 a, b) dipinta in rosso e bruno e un'antefissa a testa femminile con nimbo da Casale del Fosso, dipinta in rosso, bruno e azzurro, a incremento dei dati parziali ricavati da precedenti lavori sulla coroplastica veiente.

KEY WORDS: *Veii, Etruria, terracotta, bucchero, Archaeometry*

HISTORICAL BACKGROUND

The aim of this work is to contribute to the creation of a database of the terracotta production of Veii (Etruria), regarding earthenware and architectural decorations, from the Iron Age to the conquest of Rome, including both aspects regarding structural characteristics of the clay (raw materials and working techniques) and materials and techniques used for finishing surfaces and eventually applying decorations.

The research aims and methods are in line with already repeated standards (generally Cuomo di Caprio 1985, 1987, and references therein) for studies on ceramic production in the main centres of South Etruria, starting from definition of the geological characteristics of the clay beds of the various areas (Mannoni 1988), in order to define both the state of technological knowledge and workshops and

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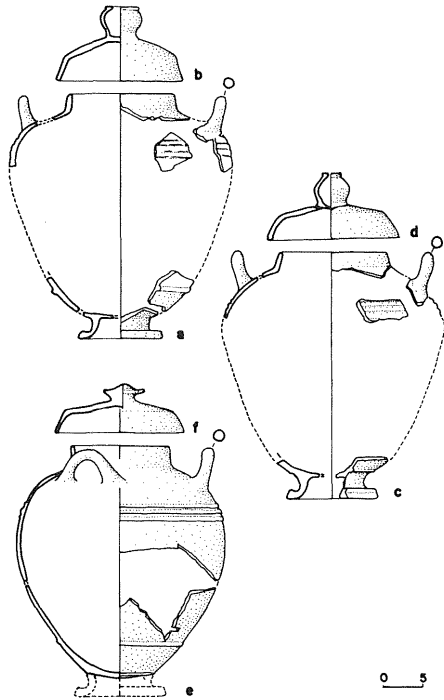


Fig. 1 – Bucchero ossuary in tomb 419 in Veio, Grotta Gramiccia

the circulation of goods. This issue had already been approached for instance for *bucchero* ware, especially from Cerveteri and Tarquinia (Cuomo di Caprio 1987, 1993; Mannoni 1993; Burkhardt 1994, 1996; Naso 1994, 1996) in line with studies already undertaken on the oldest production of ceramics from the *Latium* region (Cuomo di Caprio 1992).

During the first study phase, for reasons of completeness, attention focused on a group of materials of archaic and late archaic age (between the VIth century and the first decades of the Vth century BC). Although sample numbers were low, they did allow proper research to be planned and implemented. Comparisons of both earthenware and architectural decorations of the same cultural environment and

chronological layer were carried out, to provide a set of coherent elements and homogeneous information on the terracotta production of one of the main centres of South Etruria, in turn compared with that of other settlements in and around the low valley of the Tiber, originally called *Latium Vetus*.

More complex study of the overall documentation of the First Iron Age and the Orientalizing Period (IXth and VIIIth centuries BC) was postponed to a later research phase together with the complex questions of comparisons between the oldest definitely local production of brown *impasto*, production in brown and red *impasto* and painted ware made with purified clay (the so-called *depurata dipinta*) more or less directly influenced by the introduction of new techniques from the Greek and Levantine world, already preceding the age of Greek colonization, and imported painted wares in purified clay and the oldest production of thin-walled black *bucchero*.

A comparative study between these various types of production would contribute usefully towards knowledge of the organisation of workshops - a problem already partly tackled with regard to painted ware from Veii of Greek provenance or imitating Greek ware, mainly from Euboea (Boitani, *et al.*, 1985; cfr., for the *Campania* area, D'Agostino and Deriu, 1989; Bailo Modesti and Gastaldi, 1999), following technological studies on the ceramic production of *Latium* in the same chronological layer (Cuomo di Caprio 1992).

In this preliminary phase, therefore, some samples were selected from the field of architectural terracottas of late archaic age, including an *antefix* with a female head surrounded by a *nimbus* from Casale del Fosso, decorated in red, brown and blue, already analysed in a preceding study (Saviano *et al.*, 1999), a small group of samples from one of the large bases decorated in red and brown with dolphins, volutes and eyes, interpreted as supports for the acroterial statues which decorated the roof of the late archaic temple of Portonaccio (Stefani 1946, 1953; Santangelo 1952; Colonna 1985, 1987, 1998, 2001;

Baglione 1987, 1989-90; Michetti 2001) (Figs. 2 a-b).

The final aim of our work was to compare data on the antefix and the bases, both among themselves and with partial data available from preceding preliminary research on architectural decorations and terracotta sculptures from Veii (Curri and Sorbelli, 1973; Gaugler and Anderson, 1989) and, more generally, archaic and late archaic architectural terracottas from Etruria and *Latium*, based on eutopic and, more recently, mineralogical and petrographic analyses, not always accompanied by research on the techniques, pigments and slips, used for the preparation and application of polychrome decoration (Andr n, 1940; Fenelli, 1981; Fiorentino, 1981; Tabasso, *et al.*, 1981; Schweizer and Rinuy, 1982; Knoop, 1987; Cuomo Di Caprio and Romito 1993; Hulthen, 1993; Zampi, 1993; Lulof, 1996; Pallecchi, 1996 a, 1996 b; Cuomo Di Caprio, 1997; Strazzulla 1998;). In the field of archaic ceramics, a small group of samples of grey *bucchero* ware was selected, from one of the three ash-urns of Tomb 419 in the Grotta Gramiccia necropolis (Fig. 1), dating from the first half of the VIth century BC (Drago Troccoli 1997).

These data may then be compared with those from research on *bucchero* production in other centres of South Etruria, in the first place Cerveteri, mainly to define the specific techniques potters used to produce *bucchero*, including choice of clay, type of kiln, ways of working the clay and firing (Flamini *et al.* 1975, Cuomo Di Caprio, 1993; Mannoni, 1993; Burkhardt, 1994; 1996; Naso, 1994, 1996) and, also, with data on *bucchero* ware from *Latium* (Cuomo Di Caprio, 1992).

Information on the archaic Veii samples in grey *bucchero*, in a following stage of the work, may be compared with that from planned analysis of the oldest production of thin-walled black *bucchero* from the same centre. Changes in clay composition and of producing and firing techniques, compared with the Orientalizing Age production of thin-walled black *bucchero* ware, will improve our understanding of the

ways and reasons for the passage from the more refined Orientalizing Age production - characterised by a uniform black colour and shining surfaces - towards the later production of the archaic and late archaic period, characterised by a thicker walls, less homogeneity between surface and inner core, and dull grey colours. Comparisons may also be made with the production of other cities in South Etruria, mainly Cerveteri, as well as with the *Latium bucchero*, for which local production has been presumed, besides importations from South Etruria (cfr. Bartoloni and Cataldi Dini, 1980; Ampolo, 1980; Cuomo Di Caprio, 1992, and references therein).

Sampling of clay beds in and near Veii was planned, for comparisons with data concerning clay production, for both earthenware and architectural decorations, in order to identify the clay beds used in antiquity and their possible use to produce *impasto*, purified clay, *bucchero* ware and architectural decorations.

METHODS AND TECHNIQUES

Techniques for producing manufactures were analysed, together with the compositions of single parts of mixtures and all substances in them occurring either naturally or added (Grimshaw, 1971; Nosbusch, 1988; Fiori *et al.*, 1989; Mommsen *et al.*, 1997).

Several sample areas without significant quantities of added strengthener were analysed by SEM-EDS, e.g., *bucchero* and terracotta base, in order to highlight possible differences in mixtures, since such differences had already been found in some parts of the antefix from Casale del Fosso. Production techniques and methods of pigment application or natural colouring during firing were also studied by SEM-EDS (White, 1985; Hawthorne and Martin, 1995; Felli *et al.* 1997).

Diffractionograms were made of small pigment samples from the base and from the whole mixture of the *bucchero*.

Representative samples were taken from terracottas and ceramics from the Veii area,



Fig. 2 (a) – Veio temple, Portonaccio: in situ reconstruction

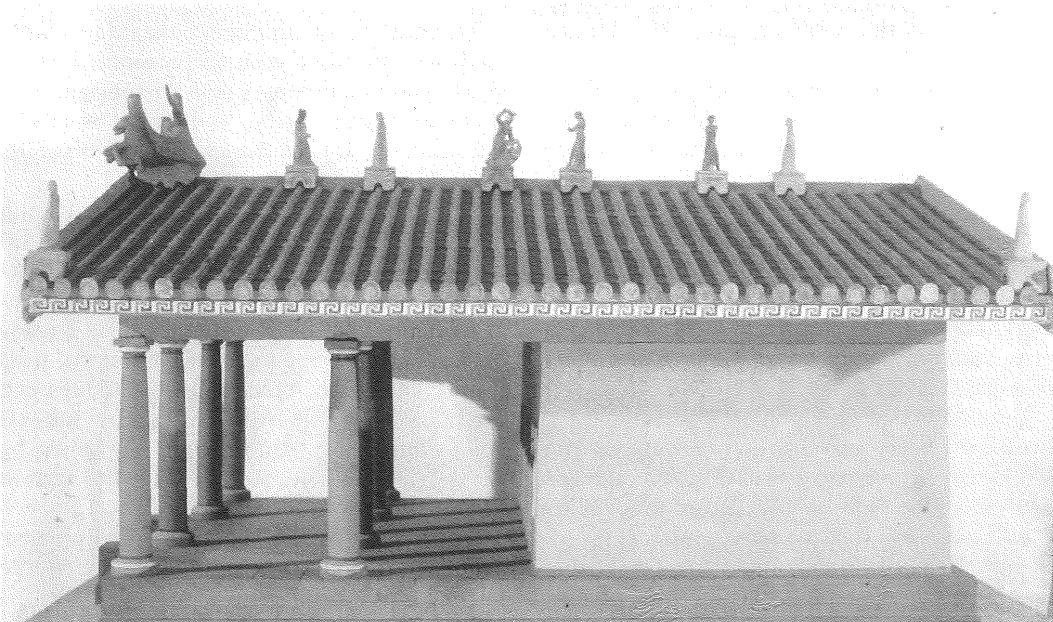


Fig. 2 (b) – Model of an ideal Tuscanic temple, with decorations inspired to the Veio temple, Portonaccio.

particularly the base of a large statue from the Portonaccio temple and a piece of *bucchero* from Tomb 419 of Grotta Gramiccia (Veii). Chemical compositions were examined by X-ray powder diffraction (Meurig, 1987; Zampi, 1993) and SEM-EDS.

Thin sections of the two artefacts were embedded in epoxy resin, polished for SEM microanalyses, and metallised by evaporation of a thin carbon film.

STUDIED MATERIALS

The samples examined in the present study come respectively from one of the large terracotta bases decorated with dolphins and volutes in red and brown (see Michetti 2001, and references therein), believed to be supports for the acroterial statues which decorated the roof of the late archaic Portonaccio temple in Veii (Fig. 2 a-b) and from one of the three ash-urns in grey *bucchero* from Tomb 419 of the Grotta Gramiccia necropolis of Veii (Fig. 1), dating from the first half of the VIth century BC (Drago Troccoli, 1997).

The base is currently under study by L. M. Michetti within the framework of the most recent work on the Portonaccio sanctuary-complex in Veii, coordinated by Prof. Giovanni Colonna (University of Rome «La Sapienza»). This piece has a truncated-pyramidal shape (h. 70, lower base 90×83 , upper base 81.5×57 cm), long bell-shaped walls leading to short vertical walls with large arched openings for the insertion of the *columen* roof-tiles of the temple. The long walls have small arches with mouldings on the edges, in order to fit semicircular tiles on the slope of the roof, and two holes at a height of about 1 m, to lift and set the piece in position, probably with the help of wooden poles. Dolphins and volutes are painted in red and black, with details in white on the first layer of paint; the beige background of the terracotta, was covered by a slip and smoothed for later application of paint.

The grey *bucchero* ash-urn (h. 30, diameter of rim 13 cm) has a small vertical rim, an oval

body decorated by groups of horizontal ribs, a low bell-shaped foot, and two horizontal handles set obliquely on the shoulder. This urn, which contained the cremated remains of a probably female adult, has a lid with a rim and oblique walls, and a grip in the form of a little «jar». It was deposited in a *fossa*-tomb with three steps at the entrance, three loculi on the rear wall and on one of the sidewalls, without any grave goods, like most of the tombs in Veii between the VIth and Vth centuries BC (Drago Troccoli, 1997, and references therein).

RESULTS AND DISCUSSION

Terracotta

SEM-EDS analysis on samples from the terracotta base from the Portonaccio temple (Fig. 3) revealed the chemical composition of

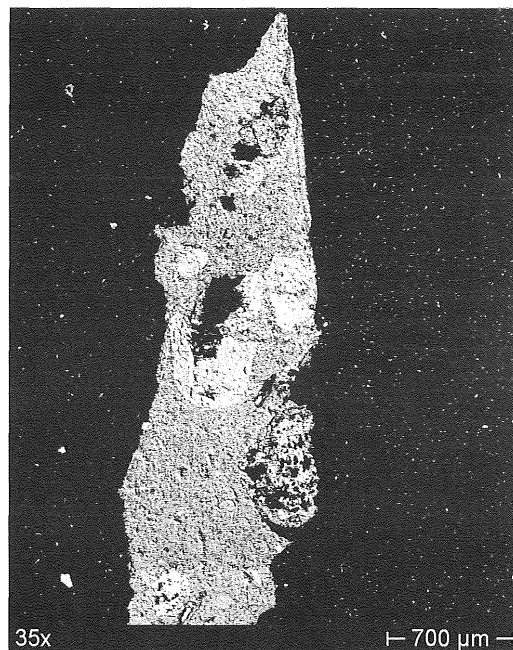


Fig. 3 – Base fragment coming from the Portonaccio temple; SEM picture (backscattered electrons) of a section. Inclusions of large dimensions are visible (clearer in photo); they are composed of rounded quartz, feldspar and piroxenes.

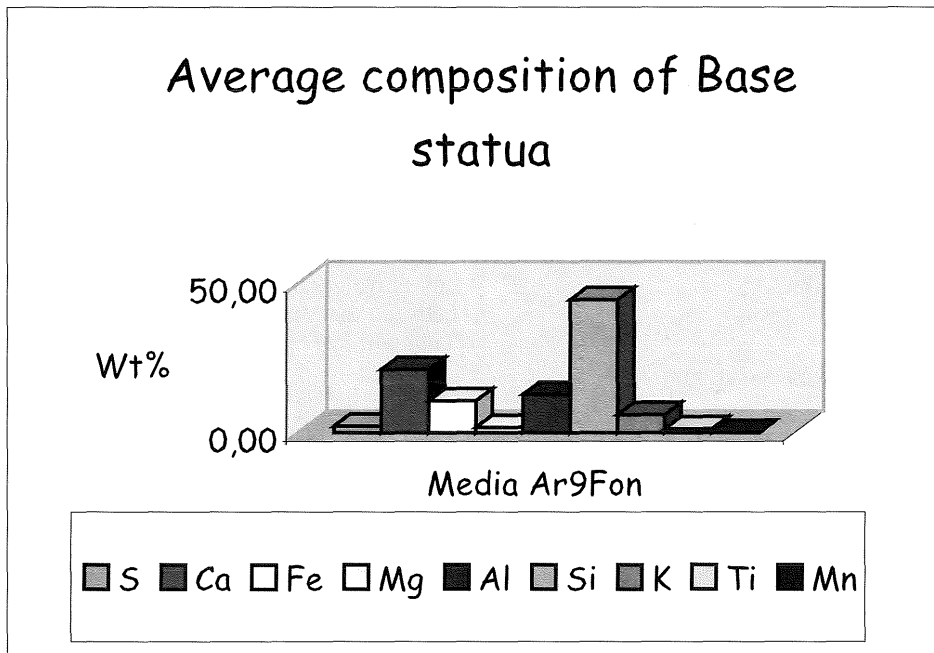


Fig. 4 – Average composition of the base of the statue coming from the temple of Portonaccio. (analysis by EDS - SEM)

the mixture, nature of inclusions, structure, and technique used to apply the black pigment which covers part of it (Curri and Sorbelli, 1973; Tabasso-Laurenci and Meucci, 1981; Gaugler and Anderson, 1989; Cuomo di Caprio and Romito, 1993; Hulten, 1993; Burragato *et al.*, 1994; Lazzarini *et al.*, 1994; Cuomo di Caprio, 1997).

The average composition of the mixture (Fig. 4) is quite similar to that used for the *antefix* from Veii (Saviano *et al.*, 1999). Individual elements are recognisable; since no consistent sinterisation or vitrification occurred during firing, the structure is not well assorted and contains rounded, rough-edged, and occasionally quite large crystals. No specific orientation is visible in the inclusions.

Inclusions are mainly rounded quartz, kaolinised feldspar, iron oxides, and a large quantity of framboids, originally composed of pyrite and marcasite, completely oxidised by firing (Fig. 5). Small fragments of residual gold were found in the matrix (Fig. 6).

A physical discontinuity surface separates the outer wall, black-pigmented, from the inner one (Fig. 7). As in the *antefix*, there is no superficial slip: the pigment was put directly into the mixture (Fenelli, 1981). The pigment is not crystalline, as shown by the diffractograms, and SEM revealed the presence of iron and manganese (Fig. 8), used to obtain the desired colours. The same composition of black pigment has been found in other manufactures from the same site and dated to the same period as the *antefix* (Schweizer and Rinuy, 1982; Saviano *et al.*, 1999).

Ceramics

Analysis on the *bucchero* sample showed that the chemical composition of its mixture was unlike that of the terracotta objects (Fig. 9): it has more iron and far less calcium. This last datum agrees with previous studies and analyses, according to which the clay used for

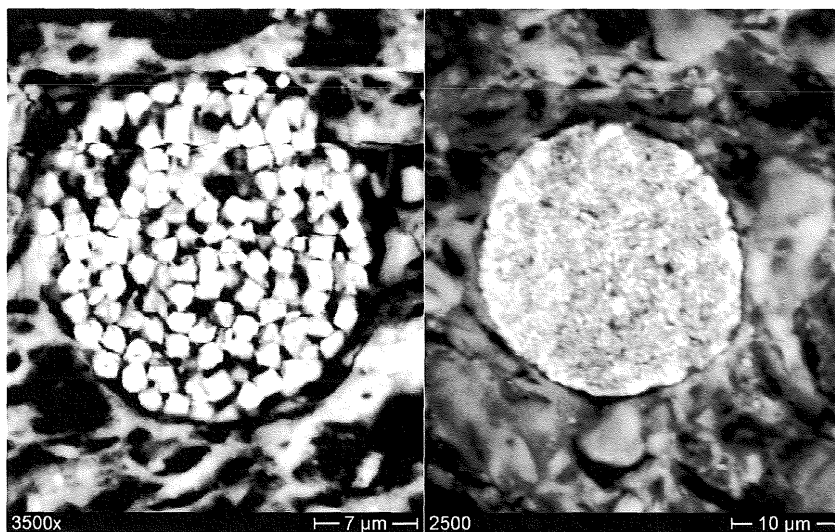


Fig 5 – Photos of inclusions in the mixture of the ceramic body of the Portonaccio base (backscattered electrons); a framboid is visible: it's composed almost exclusively of iron with traces of sulphur, manganese and silicium. Marcasite and pyrite framboids are typical, they are oxidised in the firing process.

modelling *bucchero* ware contained very little calcium (Cuomo di Caprio, 1993 and references therein). EDS and XRD analyses showed no differences in chemical composition but did highlight the difference between the paler inner wall and the darker outer one. Sinterisation phenomena are visible in the mixture, as are iso-oriented mica flakes, more frequent in the superficial areas with fusion nuclei inside (Mannoni, 1993) and traces of combusted organic materials (Fig. 10) (Amadori *et al.*, 1994). Further studies should focus on $\text{FeO}/\text{Fe}_2\text{O}_3$ ratios and the quantity of organic material with more appropriate methods, partly in order to evaluate firing temperatures more accurately.

Diffraction analysis of the *bucchero* mixture revealed quartz, feldspar with potash, plagioclase and muscovite. As the diffractograms show, there are no differences in the composition of the paler inner and darker outer parts (Fig. 11). Inclusions show better sorting and also greater homogeneity in mineralogical composition, in comparison with

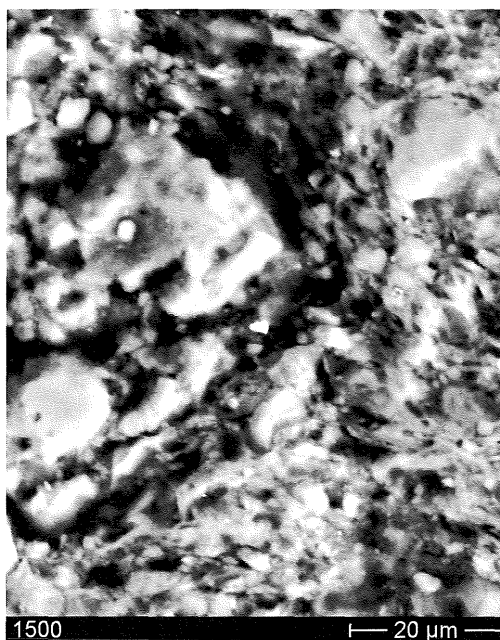


Fig. 6 – Residual gold fragment from the terracottas mixture of the Portonaccio base.

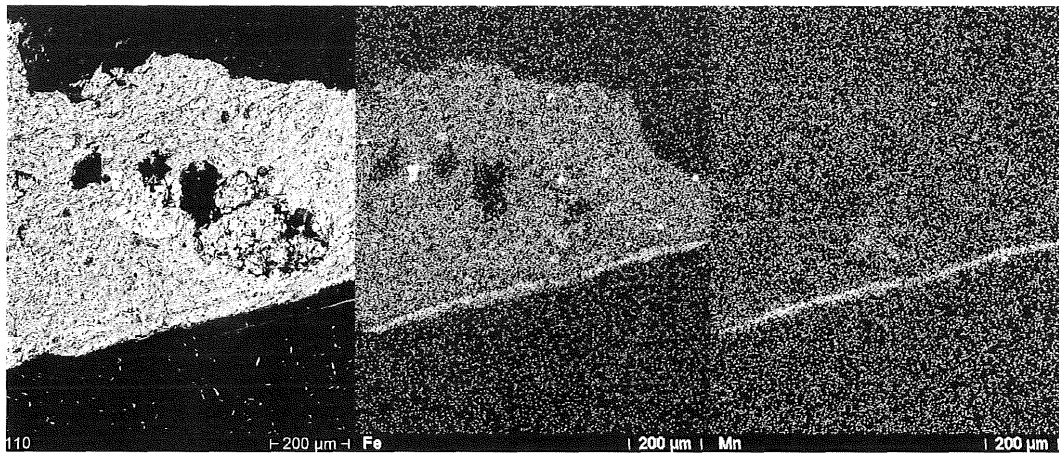


Fig. 7 – Fragment of the Portonaccio base; on left detail of the of the section with the pigmented zone (backscattered electrons). The external layer is separated from the ceramic body by a thin line of discontinuity; on this part of the manufacture the particles are smaller and there are no inclusions. On right the maps made by SEM on the black pigmented area (Fragment of the Portonaccio base); in this area there is concentration of iron and Mn.

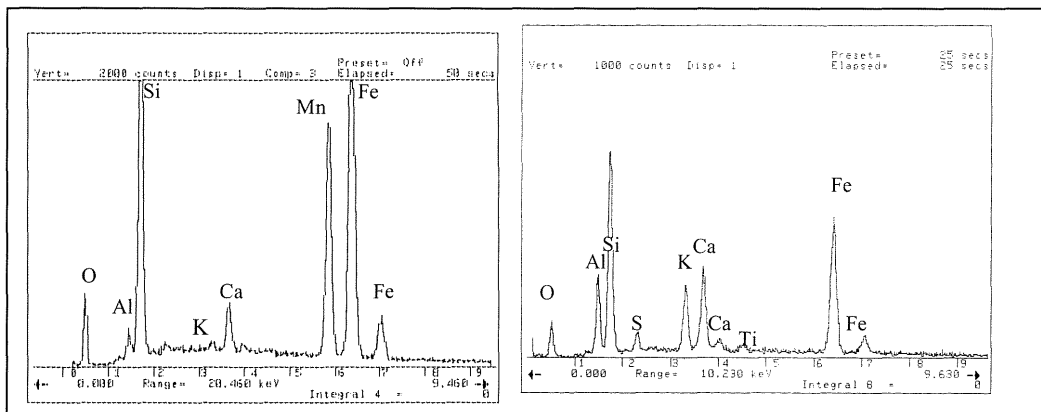


Fig 8 – EDS spectrums of the analysis of the areas pigmented respectively in black (a) and red (b) on the surface of the base of Portonaccio; the black pigment shows a greater concentration in iron and the presence of Mn, the red one has only iron.

the inclusions and added strengthener of the architectural terracottas. These inclusions are made of quartz, feldspar, altered plagioclase, and iron oxide grains of various sizes (Fig. 12). There are abundant muscovite lamellae, confirming previous studies on *bucchero* ware from Cerveteri with similar inclusion

compositions. The presence of small mica flakes and rounded quartz grains are explained not as the consequence of river transport but rather as due to prolonged marine neogenic action on the sedimentary paleogenic rock formations along the Cerveteri coast: the inclusions probably came from fossil beaches. However, oxidised

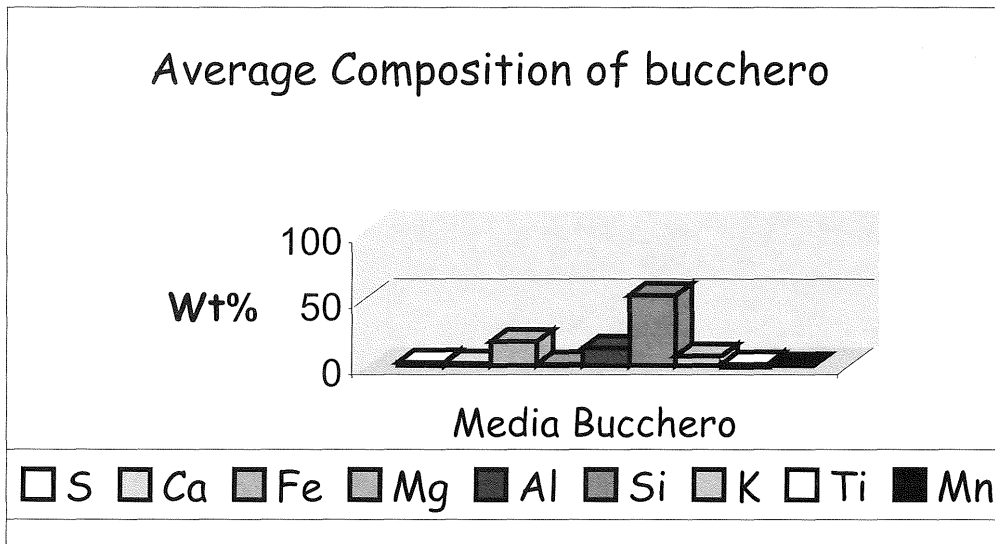


Fig. 9 – Average chemical composition of the bucchero coming from the tomb of Grotta Gramiccia. (EDS - SEM analysis).

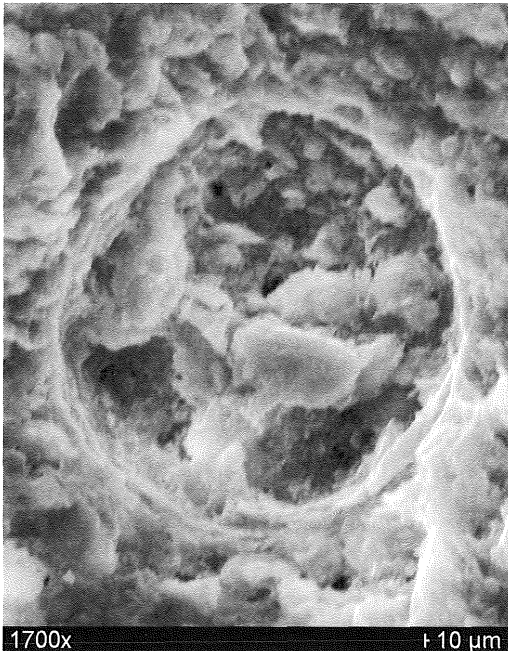


Fig. 10 – Fusion nucleus of combustioned organic material.

iron which, when it occurs in the Tarquinia *bucchero* pieces is abundant, is explained as originating from inclusions from the Tuscan Apennines (Mannoni 1993; Naso, 1994;).

This study will be continued by extending sampling to other objects belonging to the same period and archaeological site and by further chemical and thermodifferential analysis by ICP (Inductive Coupled Plasma) of mixture compositions, in order to confirm already existing evidence. Different types of clay were used in the various preparations: richer in calcium and with moderate iron contents for terracottas, and types with more iron for *bucchero* objects. There seem to be no significant differences in the additives put into the mixtures: for both inclusion groups, the mineralogical type is compatible with originally local raw materials.

The difference in the greater granulometric homogeneity in inclusions in *bucchero* were compared with terracotta is probably due to the compatibility which they had to have with the thickness of the final manufact.

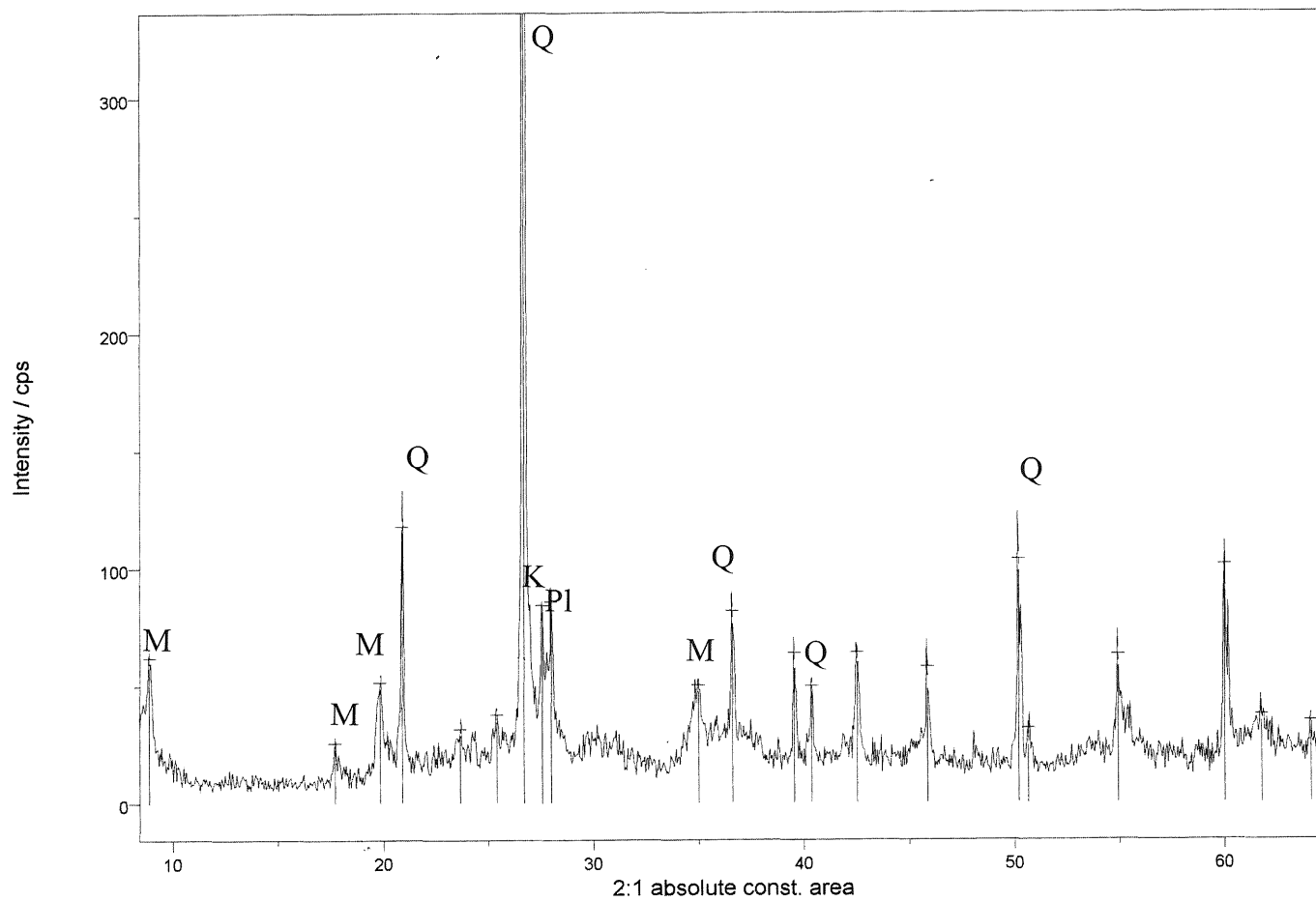


Fig. 11 – Diffractogram of the mixture of the bucchero's internal and external parts: there is no difference in the mineralogical composition. Q=quartz; K=kfeldspar; Pl=plagioclase; M=mica.



Fig. 12 - Photo of the grey bucchero's mixture backscattered electrons); there is a greater abundance of iron compared to the compositions of the mixtures of the architectural decoration and sculpture in terracotta production. This is evident from the distribution of this element in the map.

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